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Improving Healthcare Access for the Underserved in Northern Nigeria: Can the Patent Medicine Vendors (PMVs) Really Help?

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Abstract

To address the health workforce deficit in underserved communities, the Federal Government of Nigeria is contemplating a licensing policy to delegate the provision of some basic health services to patent medicine vendors (PMVs) manned by a skilled health workforce. However, it remains unclear whether residents of underserved communities intend to receive these healthcare services through PMVs. We, therefore, sought to assess the intention to receive basic healthcare from PMVs among 665 heads of households from randomly selected 40 underserved communities in two northern Nigeria states. We used an interviewer-administered questionnaire to collect data between December 2021 and February 2022 for this cross-sectional study. The data were analyzed with STATA version 16. We used the Chi-square test to investigate the factors associated with 'intention' and Binary logistic regression to identify its predictors. The level of statistical significance was determined at P<0.05. We found that 38.8% of the underserved intend to receive basic health services through PMVs and that respondents who reside in rented buildings or temporary shelters and those who have a high level of trust in PPMVs had higher odds of intending to receive healthcare through PMVs. These findings suggest that PMVs can reach slightly above one-third of the underserved with healthcare. We recommend that healthcare administrators should consider designing additional complementary interventions that can be coherently implemented alongside this initiative to significantly improve healthcare access among the underserved.

Keywords: *Access, Communities, Healthcare, Intention, Workforce.*

Introduction

Despite persistent efforts, Nigeria has witnessed slow improvements in its health indices and indicators [1]. Over 28 years (1990 to 2018), Nigeria witnessed a decline in the under-five mortality rate from 193 child deaths per 1000 live births to 132 child deaths per 1000 live births [2] The united nations inter-agency group for Child Mortality Estimation [3] indicates that 858,000 under-5 children in Nigeria died in 2019. The prevailing child mortality in Nigeria, combined with the under-five child deaths in India, accounts for 49% of global child deaths.

Similarly, Nigeria has one of the highest maternal mortality ratios in the world (with 512 maternal deaths per 100,000 live births), higher than both averages for Least developed countries (415 deaths per 100,000 live births and that for the world (212 deaths per 100,000 livebirths), accounting for about 20% of the total maternal deaths across the globe [4, 5]. The situation is much worse in the northern parts of Nigeria,

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where the maternal mortality ratio was estimated to be as high as 890 deaths per 100 000 live births [6]. The report on the National Demographic and Health Survey.[2] further revealed marked regional variation in the health indices of Nigeria, with the Northwest zone exhibiting the worst state: 53.9% of antenatal care (ANC) visits were attended by a skilled provider (lower than the national average, 67%); only 18.2% of births were attended by a skilled provider (far below the 43.3% at the national level), and 19.9% of children 12-23years had received all basic vaccination (lower than 31% national average).

The health indices are typically worse in rural areas than in urban areas. For instance, the proportion of pregnant women who did not attend or visit any hospital for ante-natal care in their last pregnancy was 10.1% in urban and 33.8% in rural [2]. Also, Abimbola and Colleagues [7] reported maternal mortality in rural communities to be as high as 1000 deaths compared to 351 per 100,000 live births in urban areas. The poor health indices in Nigeria and its disparities have been attributed to an acute shortage of skilled medical personnel (health workforce density estimated at 1.95 per 1000 population) [8] as well as inadequate infrastructure (including essential medicines and equipment) [9].

Equitable access to basic health services is at the core of the universal health coverage (UHC) concept. According to the World Health Organization, "UHC means that all individuals and communities receive the health services they need without suffering financial hardship" [10]. This goal is enshrined within Sustainable Development Goal 3(SDG3) as an objective to be achieved by 2030 [8]. Nigeria has demonstrated a long-standing commitment to delivering UHC, evidenced by the establishment of the national UHC policy framework, which is annexed with several other national health policy thrusts. In fairly recent past, Nigeria revised its national health policy (2004), provided for a formal sector social health insurance program (2005); deepened multiple health reforms between 2010 and 2015 (including the national strategic health development plan, primary healthcare under one roof to address the fragmentation in the primary healthcare system, National Policy and Strategic Plan of Action on Prevention and Control of Non-communicable Diseases in 2013), and the promulgation of the national health act in 2014 [1]. The National Health Act has birthed a pro-poor social health insurance program to address the healthcare needs of indigent populations [11]. To address the human resource challenges, which are more acute in rural settings, the task sharing and task shifting policy [12] gives more responsibilities to the Community Health Officers, Community Health Extension Workers, and Junior Community Health Extension workers in offering some basic health services including diagnosis and treatment of malaria, initiating a range of family planning methods, community management of diarrhoea, and acute respiratory infections, basic antenatal counseling, and referral for specialized healthcare services among others.

However, despite these policies, Nigeria still suffers from both acute shortages and maldistribution of the health workforce [9]. The rural population also experiences a deficit of health workforce-number-wise and skill-wise [13]. Most of the human resources for health are concentrated in cities [14]. Though about half of the Nigerian population lives in rural areas, they have limited access to healthcare facilities and providers [15]. Rural dwellers, therefore, suffer the attendant impact of hidden costs ranging from longer travel times to higher transportation costs, and opportunities are forgone to access healthcare [16].

A proprietary and patent medicine vendor (PPMV) is defined as "a person without formal training in pharmacy who sells orthodox pharmaceutical products on a retail basis for profit" [17]. There are about 20,000 registered Patent Medicine Vendors in Nigeria, and they are more widely distributed in rural areas than

conventional health facilities [18]; sometimes serving as the only source of healthcare in some communities [19]; with about 40% of them operated by a skilled health workforce [20]. Between 14% and 57% of the PPMVs are skilled healthcare professionals, including Doctors, Nurses/Midwives, Community Health officers (CHO), Community Health Extension Workers (CHEW), and Junior Community Health Extension Workers (JCHEW) [15, 20-26].

However, the scope of the current patent and proprietary medicine vendor's licensure prohibits the provision of basic health services at the patent medicine store even when the operator is qualified to offer the same services in a formal clinical setting [20]. Despite this, available literature suggests that PPMVs, beyond retailing medicines, provide a variety of healthcare services, including providing contraceptive services [17], the first point of care for childhood diarrheas (54%) and Fever (57.7%)[2] management of cough, catarrh, and diarrhea [22]; responsible for 35-55% of childhood and adult malaria diagnosis and treatment [28] and even post-abortion care and management of post-partum haemorrhage [29].

As part of the efforts to leverage existing human resources for expanding access to basic health services, the Nigerian Federal Ministry of Health and the Pharmacist Council of Nigeria (the regulatory body for PMS and community pharmacists) are in the process of finalizing a "PPMV Tiering Policy" that seeks to license Patent Medicine Stores operated by skilled healthcare providers to deliver, in their outlets, the basic health services that the existing task sharing and task shifting policy empowers them to provide [30].

There is a popular conjecture that the integration of PMS into the formal healthcare system could increase access to high-quality primary healthcare services.[18] However, the processes and considerations involved in seeking and obtaining healthcare are complex and never straight-forward [31, 31]. Despite Chace and Colleagues [33] observing the preference of some women of reproductive ages in Lagos and Kaduna states for FP services received from accredited PPMV within a pilot of the tiered accreditation system, with the majority (89%) of them still utilizing FP methods 9 months after, the optimism that the implementation of this Tiering Policy can significantly expand access to basic health services for those who are currently not being adequately covered by the health system (the underserved) remains largely speculatory. This study, therefore, sought to assess the intention to receive (and its determinants) the expanded basic healthcare services through PPMVs among residents of underserved communities in the north-western region of Nigeria.

Evidence-based policies have greater prospects of success and addressing the problems they seek to address. Implementation failure, on the other hand, has negative consequences, including a waste of financial and human resources in pursuing ill-conceived policy directions. This study, by providing evidence from formative assessment of adoption (through intentions) of the PPMV tiering policy, offers an opportunity to know whether and how to deliver the policy to maximize the benefits of the initiative and by extension, contribute to the growing body of evidence on interventions for improving access to basic health services among the underserved populations in low- and middle-income countries.

Materials and Methods

This cross-sectional study was conducted between December 2021 and February 2022 among heads of household in North-western region of Nigeria. The North-west region is one of the six geopolitical zones of Nigeria comprising 7 states (including Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zamfara states). The region is native to Hausa and Fulani tribes. North-Western states account for about 15% of Nigeria's population [2]. The region is said to be poorly developed economically, with

a low literacy rate, a high concentration of rural communities, and low population density[34].

We calculated the sample size for the study using the formula in equation1 below:

Minimum sample size (per state),

n= D_{eff} * $\frac{Z^2P(1-P)}{d^2}$ = 318 head of households ---------- equation 1.

Where:

Z= Z-score corresponding to the level of statistical significance desired (0.05) = 1. 96.

P= Proportion of rural dwellers diagnosed by formally trained PPMV= 0.078 (Prach et al., 2015).

d = *Desired level of precision= 0.05.*

D_{eff} *= Design effect= 2.5.*

The respondents were selected using a multi-stage sampling method involving a simple random selection of two states (Kaduna and Jigawa) and then a systematic random sampling of 40 underserved communities (20 per state) with probability proportionate to size from 8 purposively selected Local Government Areas (3 in Kaduna, 5 in Jigawa), based on the density of underserved communities they are made up of, from these selected states. Available literature suggests there is no universal definition for medical under-service. Weitz and colleagues [35] define underserved communities as "populations that face systemic and institutional barriers which prevent them from accessing health care and/or receiving the same quality of health care as people not facing those barriers". Warigon [36] previously described underserved in Nigeria as residents of hard-to-reach communities with limited access to primary healthcare services. According to the Minimum standards for primary healthcare in Nigeria [37], every community of up to 500 residents should have a health post/dispensary headed by at least a JCHEW, who supervises Community Resource Persons (CORPs) to meet the residents' health needs. For this study, we defined an underserved community as any rural community designated "hard-to-reach" by the local health authority and lacks a government-owned health facility or has a government-owned health facility with less than 2 staff.

A minimum of 17 households were then selected from each of the 40 underserved communities, and the household heads were interviewed by trained data collectors using a semi-structured questionnaire that was digitized and deployed on the KOBO toolbox (an open-source platform for field data collection in challenging environments). The questionnaire adopted the 3-item Likert-like scale developed and validated by Fishman and colleagues [38] for assessing the potential adoption of new initiatives. We also asked questions adapted from Haddad and colleagues' 20-item questionnaire to measure the underserved's perception of the quality of care provided by PPMVs; the Health perception questionnaire [39] and the revised healthcare relationship trust scale [40].

The data were analyzed with STATA version 16. The primary outcome variable for the study (Intention to receive expanded basic health services from PPMVs) was computed from the responses to the three item-scale: (a) *I intend to request these expanded services from the trained chemist (PPMV) in my community; (b) I will request these expanded services from the trained chemist (PPMV) in my community; (c) How likely are you to request these expanded services from the trained chemist in your community.* For ease of interpretation, after ascertaining the distribution of the intention scores using the *Shapiro–Wilk test*, the total intention scores were dichotomized into "Favorable" and "Non-Favorable" following the technique described by Barua and colleagues [41]. The Chi-square test was used to investigate the relationship between the characteristics (individual and household) of the respondent and 'intention.' We used Person's Spearman Ranked correlation to ascertain the relationship between intention scores and general health perception scores, healthcare relationship scores, and perception of quality of care provided by PPMVs. Binary logistic regression was thereafter used as the

predictor of intention. The level of statistical significance was determined at P<0.05. The study was reviewed and approved by the ethics review committees of the two study states.

Results

Profile of Respondents and Households in Underserved Communities

In total, 665 (326 in Kaduna and 339 in Jigawa) heads of households in underserved communities participated in this study. Table1 shows that of the respondents were male (541, 84%), aged between 25 and 54 years (513, 77.1%). More than half of the respondents (366, 51%) had completed a primary level of education at the time of the survey, and 431 (65.7%) were farmers. Islam was the most predominant religion among the respondents (600, 90.2%), and slightly above half (341, 51.3%) were Hausa. Only 33 (5.5%) of the respondents were single (not married).

Table 1. Sociodemographic Profile of Respondents and Households in Underserved Communities

Characteristics	**Kaduna State**	**Jigawa State**	**Total**
	Frequency (%)	**Frequency (%)**	**Frequency (%)**
Sex			
Male	313(96.0)	228(67.3)	541(81.4)
Female	13(4.0)	111(32.7)	124(18.6)
Age-group			
18-24	5(1.5)	46(13.6)	51(7.7)
25-34	58(17.8)	111(32.7)	169(25.4)
35-44	111(34.10	96(28.3)	207(31.1)
45-54	94(28.8)	43(12.7)	137(20.6)
54-64	34(10.4)	25(7.4)	59(8.9)
65+	24(7.4)	18(5.3)	42(6.3)
Highest Level of Education			
None	5(1.5)	42(12.4)	47(7.1)
Qur'anic	67(20.6)	31(9.1)	98(14.7)
Primary	136(41.7)	230(67.9)	366(55.0)
Secondary	96(29.5)	30(8.8)	126(19.0)
Tertiary	22(6.7)	6(1.8)	28(4.2)
Occupation			
Unemployed	18(5.5)	55(16.2)	73(11.0)
Self-employed	34(10.4)	32(9.4)	66(9.9)
Artisan/Petty trading	22(6.8)	31(9.1)	53(8.0)
Farming	229(70.2)	208(61.4)	437(65.7)
Labourer	12(3.7)	10(3.0)	22(3.3)
Civil service	11(3.4)	3(0.9)	14(2.1)
Religion			
Christianity	65(19.5)	0(0.0)	65(9.8)
Islam	261(80.1)	339(100.0)	600(90.2)
Tribe			
Hausa	205(62.9)	136(40.1)	341(51.3)
Fulani	47(14.4)	47(34.8)	165(24.8)

Kanuri	2(0.6)	84(24.8)	86(12.9)
Others	722(22.1)	1(0.3)	73(11.0)
Marital Status			
Married	319(97.8)	313(92.3)	632(95.0)
Single	7(2.2)	26(7.7)	33(5.0)
Total	**326(49.0)**	**339(51.0)**	**665(100.0)**

Table 2 shows that most (377, 56.7%) of the 665 households represented in the study had 10 or fewer members, and 604 (90.8%) reside in owned family residences. Of the total households, 116 (17.4%) possess a means of mobility. Less than half (291,43.8%) of the households had a member who was pregnant at survey time, while most (618, 92.9%) had at least one child less than 5 years old.

Table 2. Household Characteristics of Respondents

Characteristics	**Kaduna State**	**Jigawa State**	**Total**
	Frequency (%)	**Frequency (%)**	**Frequency (%)**
Household Size			
1-10	165(50.6)	212(62.5)	377(56.7)
11-20	126(38.7)	113(33.3)	239(35.9)
≥21	35(10.7)	14(4.2)	49(7.4)
Type of Abode			
Permanent(owned)	280(85.9)	324(95.6)	604(90.8)
Semi-Permanent(rented)	43(13.2)	4(1.2)	47(7.1)
Temporary(make-shift)	3(0.9)	11(3.2)	14(2.1)
Ownership of a Means of transport			
Yes	29(8.9)	87(25.7)	116(17.4)
No	297(91.1)	252(74.3)	549(82.6)
Pregnant Member			
Yes	156(47.9)	135(39.8)	291(43.8)
No	170(52.1)	204(60.2)	374(56.2)
Child Under-5 Member			
Yes	302(92.6)	316(93.2)	618(92.9)
No	24(7.4)	23(6.8)	47(7.1)
Health insurance Cover			
Yes	77(23.6)	41(12.1)	118(17.7)
No	249(76.4)	298(87.9)	547(82.3)
Total	**326(49.0)**	**339(51.0)**	**665(100.0)**

Description of Intention(to Received health services from PPMV) Scores

The mean intention score among the underserved was 11.58 (±1.8) out of a maximum of 15 points. The intention scores ranged from 4 to 15, and 38.8% of the underserved expressed favourable intention for receiving expanded basic healthcare services through the PPMVs (Table 3).

Table 3. Descriptive of Respondents' Intention Score by the State of Residence

State	Mean (SD)	Median (IQR)	Min, Max
Kaduna	11.80 (1.66)	12 (11-13)	5, 14
Jigawa	11.38 (1.91)	12 (11-13)	4, 15
Total	11.58 (1.80)	12 (11-13)	4, 15

Correlates of Intention to Receive Healthcare Services from PPMVs

Findings revealed that the intention to receive healthcare services is correlated with the state of residence and sex of the head of household (Table 4).

Table 4. Relationship between Sociodemographic Characteristics and Intention to receive Basic Health Services from Medically trained PPMVs

	Intention				
	Non-favorable	**Favorable**	**Total**		
Characteristics	**Frequency (%)**	**Frequency (%)**	**Number**	**χ2-value**	**P-value**
State					
Kaduna	185(56.8)	141(43.3)	326		
Jigawa	222(65.5)	117(34.5)	339	5.344	0.021*
Age-group					
<25	38(74.5)	13(25.5)	51		
25-34	109(64.5)	60(35.5)	169		
35-44	129(62.3)	78(37.7)	207		
45-54	73(53.3)	64(46.7)	137		
55-64	33(55.9)	26(44.1)	59		
65+	25(59.5)	17(40.5)	42	9.042	0.107
Sex					
Male	317(58.6)	224(41.4)	541		
Female	90(72.6)	34(27.4)	124	8.31	0.004*
Education					
None	31(66)	16(34.0)	47		
Quranic	228(62.3)	138(37.7)	366		
Primary	51(52.0)	47(48.0)	98		
Secondary	80(63.5)	46(36.5)	126		
Tertiary	17(60.7)	11(39.3)	28	4.377	0.357
Religion					
Christianity	43(66.2)	22(33.8)	65		
Islam	364(60.7)	236(39.3)	600	0.744	0.388
Tribe					
Hausa	203(59.5)	138(40.5)	341		
Fulani	102(61.8)	63(38.2)	165		
Kanuri	56(5.1)	30(34.9)	86		
Others	46(63.0)	27(37.0)	73	1.083	0.781
Marital status					

Married	390(61.7)	242(38.3)	632		
Single	17(51.5)	16(48.5)	33	1.373	0.241
Total	**407(61.2)**	**258(38.8)**	**665**		

Table 5 also revealed that the household's type of abode is statistically associated with the intention to receive expanded basic health services from medically trained PPMVs.

Table 5. Relationship between Household Characteristics and Intention to try to Receive Basic Health Services from Medically Trained PPMVs

	Intention				
	Non-favorable	**Favorable**	**Total**		
Characteristics	**Frequency (%)**	**Frequency (%)**	**Number**	**χ2-value**	**P-value**
Number in household					
1-10	239(63.4)	138(36.6)	377	1.797	0.407
11-20	140(58.6)	99(41.4)	239		
21+	28(57.1)	21(42.9)	49		
Type of abode					
Permanent	386(64.1)	216(35.9)	602		
Semi-perm(rented)	16(32.7)	33(67.4)	49	22.808	0.000*
Temporary	5(35.7)	9(64.30	14		
Have pregnant women in HH					
Yes	186(63.9)	105(36.1)	291	1.098	0.295
No	212(59.9)	142(40.1)	354		
Child Under-5 Member					
Yes	372(60.2)	246(39.8)	618	3.748	0.053
No	35(74.5)	12(25.5)	47		
Health insurance Cover					
Yes	64(54.2)	54(45.8)	118	2.931	0.087
No	343(62.7)	204(37.3)	547		
Total	**407(61.2)**	**258(38.8)**	**665**		

We also found that Healthcare trust, Perception of quality of care provided by PPMVs, and General Health rating index were correlated with intent- scores (Table 6).

Table 6. Other Correlates of Intention

	Intention to try	**Healthcare trust**	**Perception of quality of care**	**General health rating index**
Intention to try	1.000	-	-	-
Healthcare trust	0.491, 0.000	1.000	-	-
Perception on quality of care	0.206, 0.000	0.422, 0.000	1.000	-
General health rating index	0.217, 0.000	0.434, 0.000	0.310, 0.000	1.000

Predictors of Intention to try to Receive Expanded Basic Health Services

The study also found that the intention to receive expanded health services from this cadre of health providers was significantly higher among respondents from underserved communities in Kaduna, those living in rented or temporary shelters, and those who had a higher level of trust in PPMVs, than others (Table 6).

Those who reside in the underserved communities of Jigawa State are 2.2 times less likely to intend to receive expanded services from PPMVs than those in Kaduna (AOR= 0.45, 95%CI:0.29 – 0.69). Underserved who reside in a rented building have 2.4 times more chances of expressing favourable intentions for receiving expanded services from PPMVs than those who live in owned houses (AOR=2.41, 95%CI: 1.20 – 4.81). Similarly, those who reside in temporary shelters are 4.2 times more likely to intend to receive expanded basic health services from PPMVs than those in owned houses (AOR=4.17, 95% CI: 1.22-14.24). Those who have a high level of trust in PPMVs are 5.8times more likely to try to receive expanded basic health services from them than those who have low trust in the PPMV (AOR=5.80, 95% CI:3.72 – 9.02). Only 38.8% (258/665) of the respondents perceived the services provided by PPMV to be of good quality. Although not statistically significant (P=0,054), perceived quality of care appears to strongly influence intention. The underserved who perceived the quality of care provided to be good had a 27% higher chance of expressing favourable intention than those who do not (AOR= 1.127, 95% CI: 0.759 – 1.672).

Table 6. Determinants of Intention to try to receive expanded Basic Health Services

Characteristics	Favorable intention (n, %)	Odds Ratio (95% CI)	P-value
State			
Kaduna	141(43.3)	1.00	-
Jigawa	117(34.5)	0.449 (0.292 – 0.691)	0.000
Sex			
Male	224(41.4)	1.000	-
Female	34(27.4)	1.024 (0.600 – 1.746)	0.931
Type of abode			
Permanent	216(35.9)	1.000	-
Semi-perm(rented)	33(67.4)	2.406 (1.202 – 4.814)	0.013
Temporary	9(64.3)	4.174 (1.224 – 14.239)	0.022
Under-5			
Yes	246(39.8)	1.000	-
No	12925.5)	1.536 (0.749 – 3.151)	0.241
Health insurance			
Yes	54(45.8)	1.000	-
No	204(37.3)	0.900 (0.568 – 1.426)	0.654
General health rating			
Poor rating	175(67.8)	1.000	-
Good rating	83(32.2)	1.05 (0.698 – 1.578)	0.815
Perception of quality of care			
Poor perception	165(64.0)	1.000	-
Good perception	93(36.1)	1.127 (0.759 – 1.672)	0.554
Health care trust			
Low trust	135(52.3)	1.000	-

High trust	123(47.8)	5.795 (3.724 -9.019)	0.000

Discussion

This study revealed that only about 38.8% of the underserved indicated an intention to receive healthcare services from the PPMVs. This confirms the fact that bringing the point of care closer to the people isn't the only consideration that drives the uptake of healthcare services. This agrees with the submission by Adam and Awunor [42] in their study on perception and factors affecting the utilization of healthcare services in a rural community in Nigeria, where they conclude that "the presence of health facilities alone is not enough to guarantee use as other socioeconomic factors could influence access and utilization". These factors have been variously described in previous studies, including operating hours, quality, and cost of service [43], attitude of health workers [44-46], and sociocultural, traditional, and religious beliefs [47].

The present study found that those who live in rented houses or temporary shelters have a higher level of intention to receive services from the PPMVs. This emphasizes the role socioeconomic status plays in the choice of where to seek care, agreeing with the finding of Goudge and colleagues [48] and Akande and Owoyemi [49], who both reported that low-income persons patronize drug sellers for treatment than people in higher-income strata. Prach and colleagues [22] had also earlier established that care-seeking behavior differs across wealth strata even among individuals who seek care from informal healthcare providers. This could mean that a fraction of the 60.2% who recorded non-favorable intention towards receiving expanded services from PPMVs either have been outrightly refusing to seek care at all or patronize other informal healthcare providers options[45] or travel to long distant health facilities of their choice [42].

The lower proportion of underserved intending to receive expanded healthcare service found in this study is not surprising given the paltry proportion of respondents who perceived the quality of healthcare provided by PPMVs as good. Other authors in Nigeria and elsewhere have established the fact that most people will seek care in places where they perceive the quality of care to be good [51, 52].

We found trust in PPMVs predicts intention to receive expanded healthcare services from PMMV, and this agrees with the finding of Ensor and Cooper [52], who established healthcare trust relationship as a correlate of healthcare-seeking. Though not found as predictors of intention in this present study, the perception of the quality of healthcare provided by PPMV and health status perception were positively correlated with intention. The concern about the quality of care offered by PPMV was earlier reported in a study conducted in the North-central region of Nigeria [53], where both clients and regulators highlighted serious regulatory infractions in service provided by PPMVs. The interconnectedness between the perception of quality, trust, and intention to receive expanded basic health services can be explained by the Levesque conceptual framework for healthcare access [54]. Levesque predicted that the ability to perceive (trust and expectations) leads to the ability to seek(intention) healthcare and this, in turn, culminates in the ability to reach (healthcare reaching) that eventually influences health outcomes. This underscores the fact that the tiering policy can contribute to improvement in the health outcome profile of the underserved communities in Northern Nigeria, but the magnitude of this influence will depend on how this initiative is coherently scaled to complement other initiatives and policies (especially the basic healthcare provision fund and the state social health insurance schemes).

The finding that state of residence predicts the level of intention among the underserved implies that a "one-size fit all" approach to the design

and rollout of the tiering policy can only yield minimal success. There is a need to pay very close attention to demographic, administrative, cultural, religious, and other state-specific contexts when rolling out the initiative to fully realize its value.

Overall, this initiative can help reach a little above one-third (38.8%) of the underserved in the North-west region of Nigeria. However, the health administrators at all levels need to cautiously design and implement the initiative and complement it with more targeted interventions that can further guarantee larger coverage of the underserved in Northern Nigeria with the needed basic health services.

Conclusion

We concluded, based on the finding of this study, that the implementation of the patent medicine vendors' tiering, and licensing initiative, can potentially reach almost two-fifths (38.8%) of the underserved with basic health services. However, the health administrators at all levels need to cautiously design and implement the initiative to complement other existing interventions and policies that are targeted at the underserved in order to derive maximum gain in reaching the unreached in Northern Nigeria with the needed basic health services. More importantly, the study underscores that conducting a formative assessment of the implementation outcomes of policy initiatives can provide useful evidence to guide their rollout for maximum impact.

Conflict of Interest

The authors declare that there is no conflict of interest.

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References

[1] Abubakar, I., Dalglish, S. L., Angell, B., Sanuade, O., Abimbola, S., Adamu, A. L., Adetifa, I. M. O., et al. (2022). The Lancet Nigeria Commission: investing in health and the future of the nation. https://doi.org/10.1016/s0140-6736(21)02488-0.

[2] National Population Commission (NPC) and ICF. (2019). *Nigeria Demographic and Health Survey 2018*. NPC and ICF. Abuja, Nigeria, and Rockville, Maryland, USA.

[3] United Nations Iinter-Agency Group for Child Mortality Estimation. Levels and Trends in Child Mortality, 2020. Available: https://www.unicef.org/media/79371/file/UN-IGME-child-mortality-report-2020.pdf.pdf.

[4] World Health Organization. (2019). Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division: executive summary. World Health Organization. https://apps.who.int/iris/handle/10665/327596. License: CC BY-NC-SA 3.0 IGO.

[5] Ope BW. (2020). Reducing maternal mortality in Nigeria: addressing maternal health services' perception and experience. *Journal of Global Health Reports*. 2020;4: e2020028. doi:10.29392/001c.12733.

[6] Gulumbe, U., Alabi, O., Omisakin, O. A., & Omoleke, S. (2018). Maternal mortality ratio in selected rural communities in Kebbi State, Northwest Nigeria. *BMC pregnancy and childbirth*, *18*(1), 503. https://doi.org/10.1186/s12884-018-2125-2.

[7] Abimbola S, Okoli U, Olubajo O, Abdullahi MJ, Pate MA (2012). The Midwives Service Scheme in Nigeria. PLoS Med 9(5): e1001211. https://doi.org/10.1371/journal.pmed.1001211.

[8] World Health Organization. (2020, May). Background paper for the regional technical consultation on Monitoring the Health-Related Sustainable Development Goals (SDGs). WHO Southeast Asia. https://web-

prod.who.int/docs/default-source/searo/hsd/hwf/01-monitoring-the-health-related-sdgs-background-paper.pdf?sfvrsn=3417607a_4&download=true.

[9] Adeloye D., David RA., Olaogun AA., Adesokan AA., Gadanya M., Opele JK., Owagbemi O, Iseolorunkanmi A. (2017). Health workforce and governance: the crisis in Nigeria. Human Resources for Health. June, vol. 15, no.32. DOI:10.1186/s12960-017-0205-4

[10] World Health Organization. (2021, April 1). *Universal health coverage (UHC).* WHO. https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc).

[11] Edache I. (2021). Access to healthcare: The right of every Nigerian. ONE Campaign Blog Post. Available: https://www.one.org/africa/blog/access-to-healthcare-the-right-of-every-nigerian. Accessed June 2,2021.

[12] Nigerian Federal Ministry of Health (2014). Task-Shifting and Task-Sharing Policy for Essential Healthcare Services in Nigeria. Abuja, Nigeria.

[13] Ike SO. (2007). The health workforce crisis: the brain drain scourge. *Niger J Med.* 16(3):204-11. PMID: 17937154.

[14] Roger Strasser (2003). Rural health around the world: challenges and solutions, *Family Practice*, 20 (4). 457–463. Accessed from: https://doi.org/10.1093/fampra/cmg422.

[15] Webster. P (2017). Drug shops as the primary point of care—the case of Nigeria. The World Report. July, vol. 390. www.thelancet.com.

[16] Uneke C., A Ogbonna, A Ezeoha, P Oyibo, F Onwe, B Ngwu. (2007). Innovative Health Research Group. The Nigeria health sector and human resource challenges. *The Internet Journal of Health,*8(1).

[17] Barnes J, Chandani T, Feeley R. (2008). Nigeria private sector health assessment. Bethesda: Private Sector Partnerships-One project, Abt Associates Inc. Retrieved from: https://shopsplusproject.org/sites/default/files/resources/5137_file_Final_Nigeria_Private_Sector_Health_Assessment_rev.pdf.

[18] Liu J, Beyeler N, Prach, LM, Sieverding M, Isiguzo C, Nwokolo E, Anyanti, J. (2015). The Landscape of Patent and Proprietary Medicine Vendors in 16 States of Nigeria. Abuja, Nigeria: Society for Family Health. Accessed 17 March 2021. https://www.sfhnigeria.org/wp-content/uploads/2017/05/PPMV-Landscape-report-web.pdf.

[19] Brieger WR, Osamor PE, Salami KK, Oladepo O, Otusanya SA (2004). Interactions between patent medicine vendors and customers in urban and rural Nigeria. Health Policy Plan 19: 177–182. PMID: 15070866.

[20] Beyeler N, Liu J, Sieverding M. (2015). A systematic review of the role of proprietary and patent medicine vendors in healthcare provision in Nigeria. *Plos One*. January, vol. 10, no.1. Accessed 02 March 2021. DOI: doi: 10.1371/journal.pone.0117165.

[21] Daini, B.O., Okafor, E., Baruwa, S., Adeyanju O., Diallo R., Anyanti J. (2021). Characterization and distribution of medicine vendors in 2 states in Nigeria: implications for scaling health workforce and family planning services. *Hum Resource Health* 19(60). https://doi.org/10.1186/s12960-021-00602-2.

[22] Prach, L.M., Treleaven, E., Isiguzo, C., Liu J. (2015). Care-seeking at the patent and proprietary medicine vendors in Nigeria. *BMC Health Services Research.* **15(**231). https://doi.org/10.1186/s12913-015-0895-z.

[23] Mangham LJ, Cundill B, Ezeoke O, Nwala E, Uzochukwu BS, et al. (2011) Treatment of uncomplicated malaria at public health facilities and medicine retailers in south-eastern Nigeria. *Malar J* 10: 155. doi:10.1186/1475-2875-10-155 PMID: 21651787.

[24] Um L, Ba G, Na N (2007) Knowledge and use of combination therapy for the treatment of malaria amongst patent medicine vendors (PPMVS) in Kano State. *Borno Medical Journal* 4: Pp. 7–11.

[25] Jimmy EO, Achelonu E, Orji S (2000) Antimalarials dispensing pattern by patent medicine dealers in rural settlements in Nigeria. Public Health 114: 282–285. Accessed 11 December 2020. PMID: 10962592.

[26] Oyeyemi AS, Ogunnowo BE, Odukoya OO (2014) Patent medicine vendors in rural areas of Lagos Nigeria: compliance with regulatory guidelines and implications for malaria control. *Trop J Pharm Res* 13:163–169. PMID: 24734068.

[27] Daini BO, Anibi AU, Akin-Kolapo B, Fajemisin OA. (2018). Joint Effect/Interaction of Detailing and Training on Coverage of Family Planning Products Among Selected PPMV Shops in Nigeria. *International Journal of Public Health Research*, 6(2): 26-34.

[28] Ujuju C, Adebayo SB, Anyanti J, Oluigbo O, Muhammad F, Ankomah A. (2014). An assessment of the quality of advice provided by patent medicine vendors to users of oral contraceptive pills in urban Nigeria. *Journal of Multidisciplinary Healthcare* 7: 163–171. doi: 10.2147/JMDH.S57117 PMID: 24748802.

[29] Adojutelegan YA, Coughlin AJ., Shellenberg K., Oginni AB., Okeke B., Ogueji O. (2022*). BMJ Sexual and Reproductive Health*; 48: e44–e52. doi:10.1136/bmjsrh-2020-200955.

[30] Pharmacists Council of Nigeria Website (2020) Pharmacists Council of Nigeria. Available: http://pcn.gov.ng/index.htm. Accessed 2021 Mar 21.

[31] Uchendu OC, Ilesanmi OS, Olumide AE. (2013). Factors influencing the choice of health care providing facility among workers in a local government secretariat in south-western Nigeria. *Ann Ib Postgrad Med.* 11(2):87-95. https://doi.org/10.4314/aipm.v11i2.

[32] Makinde OA, Sule A, Ayankogbe O, Boone D. (2018). Distribution of health facilities in Nigeria: Implications and Options for Universal Health Coverage. *International Journal of Health Planning and Management*, 33(4). pp.1179-1192. Accessed 8 April 2021. doi: 10.1002/hpm.2603. PMID: 30091473.

[33] Chace Dwyer, S., Baruwa, S., Okafor., Daini BO., Ubuane- S., Jain A. (2022). How do changes in motivation to prevent pregnancy influence contraceptive continuation? Results from a longitudinal study with women who receive family planning services from Community Pharmacists and Patent and Proprietary Medicine Vendors in Nigeria. *Reprod Health* **19,** 39. https://doi.org/10.1186/s12978-022-01326-9.

[34] BudgIT (2020). State of States Report. Retrieved from: https://yourbudgit.com/wp-content/uploads/2020/11/State-of-States-2020-Revised-Edition.pdf.

[35] Weitz T.A., Freund K.M., Wright L. (2001). Identifying and caring for Underserved Populations: Experience of the National Centers of Excellence in *Women's Health. Journal of Women's Health & Gender-Based Medicine*,10(10).

[36] Warigon C. (2019). Braving the waves to reach underserved populations with immunization services in the Niger Delta. https://www.afro.who.int/news/braving-waves-reach-underserved-populations-immunization-services-niger-delta.

[37] National Primary Healthcare Development Agency. (2015). Minimum Standards for Primary Healthcare in Nigeria. http://www.nphcda.gov.ng/Reports%20and%20Publications/Minimum%20Standards%20for%20Primary%20Health%20Care%20in%20Nigeria.pdf.

[38] Fishman, J., Lushin, V., Mandell, D.S. (2020). Predicting implementation: comparing validated measures of intention and assessing the role of motivation when designing behavioral interventions. *Implement Sci Commun* **1(81)**. Available: https://doi.org/10.1186/s43058-020-00050-4.

[39] McPherson F, Melvin KC, Belew DL, McGraw LK. (2016). Health Perception and Wellness Behavior Survey among Military Beneficiaries. *Ann Psychiatry Mental Health* 4(2): 1060.

[40] Bova, c., Fennie, K. P., Watrous, E., Dieckhaus, K., & Williams, A. B. (2006). The health care relationship (HCR) trust scale: Development and psychometric evaluation. *Research in Nursing & Health*, 29(5),477-488. doi: 10.1002/nur.20158. PMID: 16977644.

[41] Barua A., Kademane K., Gubbiyappa KS., Verma RK., Iqbal MS., Al-Dubai SAR. (2014). A Tool for Decision-Making in Norm-Referenced Survey Questionnaires with Items of Ordinal Variables. *International Journal of Collaborative Research on Internal Medicine & Public Health* 6(3). Pp 52-63. Retrieved from: https://ideas.repec.org/a/asi/joasrj/v3y2013i11p1109-1118id3572.html.

[42] Adam V.Y., and Awunor N.S., (2014). Perceptions and Factors Affecting Utilization of Health services in a Rural Community in Southern Nigeria. *Journal of Medicine and Biomedical*

Research 13(2), 117-124. Retrieved from: https://www.ajol.info/index.php/jmbr/article/view/118413.

[43] Afolabi BM, Brieger WR, Salako LA. (2004). Management of childhood febrile illness prior to clinic attendance in urban Nigeria. *J Health Popul Nutr*., Mar;22(1):46-51. PMID: 15190811. Accessed 5 Jan 2021.

[44] Mashego TA, Peltzer K. (2005). Community perception of quality of (primary) health care services in a rural area of Limpopo province, South Africa: a qualitative study. Curationis 28, Pp. 13–21.

[45] Abdulraheem I.S., & Parakoyi D.B. (2009). Factors affecting mothers' healthcare-seeking behavior for childhood illnesses in a rural Nigerian setting, Early Child Development and Care. July, vol. 179, no. 5, pp. 671 683. DOI: 10.1080/03004430701500885. Accessed 20 January 2021.

[46] Uzondu CA, Doctor HV, Findley SE, Afenyadu GY, Ager A. (2015). Female health workers at the doorstep: a pilot of community-based maternal, newborn, and child health service delivery in northern Nigeria. *Glob Health Sci Pract.* Vol.3, no.1. pp.97–108.

[47] Alabi O, Doctor HV. (2015). The potential role of a health and demographic surveillance system in rural northern Nigeria to reduce maternal and child deaths. Health,7:1741–1746. Retrieved from: https://doi.org/10.4236/health.2015.712189. Accessed 16 Dec. 2020.

[48] Goudge J, Gilson L, Russell S, Gumede T, Mills A. (2009). The household costs of health care in rural South Africa with free.

[49] Akande TM., and Owoyemi JO. 2009. Healthcare-Seeking Behaviour in Anyigba, North-Central, Nigeria. *Research Journal of Medical Sciences* 3(2), 47-51. Retrieved from: https://medwelljournals.com/abstract/?doi=rjmsci.2009.47.51.

[50] Ameh, S., Akeem, B.O., Ochimana, C. et al. 2021. A qualitative inquiry of access to and quality of primary healthcare in seven communities in East and West Africa (Seven CEWA): perspectives of stakeholders, healthcare providers, and users. *BMC Fam Pract* 22, 45. https://doi.org/10.1186/s12875-021-01394-z.

[51] Arije OO. (2016). Quality in Primary Health Care Services in Sub-Sahara Africa: Right or Privilege? *Journal of Community Medicine and Primary Healthcare* vol 28 no 1, Retrieved from: https://www.ajol.info/index.php/jcmphc/article/view/139399.

[52] Ensor T, Cooper S. (2004). Overcoming barriers to health service access: influencing the demand side. Health Policy Plan, 19, Pp 69–79.

[53] Usar J.I. (2020). Universal Health Coverage for Rural Communities in Nigeria: How may patent medicine vendors be engaged? Social Science Research Council, New York, USA. Available: https://www.ippapublicpolicy.org/file/paper/1433972172.pdf . Last Accessed: 31st May 2021.

[54] Levesque J-F, Harris MF, Russell G. (2013). Patient-centred access to health care: conceptualizing access at the interface of health systems and populations. *International Journal for Equity in Health*, 12(18). Accessed from: https://equityhealthj.biomedcentral.com/track/pdf/10.1186/1475-9276-12-18.pdf.