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Patient-Focused Quality Improvement in Primary Health Care: Opportunities with the Patient Evaluation Scale

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Keyword:
Primary health care, Patient evaluation, Performance, Patient Evaluation Scale, Nigeria.

ABSTRACT

Background: Patient evaluation of primary health care (PHC) is an evidenced-based approach to quality assessment but its use in Nigeria is still minimal.

Objective: This article explored approaches for using the patient evaluation scale (PES) for PHC performance measurement, ranking, comparing sub-national PHC systems and undertaking patient-focused quality improvement of PHC in Nigeria.

Method: Secondary analyses of data obtained from a cross-sectional national representative exit survey of patients' experiences of PHC which was conducted with the PES. The PES QUALISTAT is an array of analytic procedures and approaches for presenting data on PHC performance. Colour coding of performance (red colour = severe underperformance requiring urgent action, yellow = suboptimal performance requiring action and green = optimal performance) in relation to thresholds of a standard performance scale were illustrated. The implications of this for practice and policy which shows the opportunities for patient-focused quality improvement using the PES were discussed.

Results: Raw analysis shows red colours in 0-38%, 4-29% and 0-16% of attributes across the various health centres, Local Governments Areas and States, respectively. The most frequently rated attribute as being satisfactory was neatness reported in 20.8% of health centres. A preponderance of health centres had deficiencies in relation to availability of electricity (58.3%) and water supply (58.3%).

Conclusion: This study demonstrates the opportunities in patient-based review using the PES for the development of PHC in Nigeria. The use of simple, clear and actionable presentation of finding may make it suitable and attractive for use by researchers, practitioners and policy makers. Implications are the imperatives for administrative and policy support needed to institutionalised periodic nationwide patient surveys, benchmarking, performance ranking of PHC facilities and trend analysis to enhance timely identification and remediation of problems in Nigeria's PHC system.

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INTRODUCTION

The trend in the use of patient for the assessment of the quality of primary health care (PHC) in Nigeria is on the increase.[1] This partly demonstrates the effects of a paradigmatic shift from paternalism to patient centricity and increasing awareness of accountability in PHC administration.[2] Although, stakeholders hold different perspectives to the notion of quality, there are strong arguments that for the concept of health care quality to make adequate meaning, it must consider the views of those impacted or affected by the processes in health care.[3] In this sense, patients' and caregivers' views of health care are important when defining quality of health care.

The need to improve patient participation in the delivery of health care is one of eight strategic goals for health system development in Nigeria.[4] This goal is congruent with global reforms in service delivery which is aimed at reorganising health services especially at the primary level, in line with peoples' expectations. This is intended to make these services more socially relevant and responsive to the current and changing needs of the population.[5]

Integral to patient participation in health care is the requirement for periodic surveys of their views on health care. Patients' views on health care are often expressed in their preferences (expectations or ideas about what should occur), evaluations (judgments or perceptions of health care), and reports (more objective observations on the organization or process of care).[6] The patient evaluation of PHC is a recognised means of quality assessment and setting agenda for quality improvement in PHC.[7, 8] Patient evaluation of health care can be conducted alone or alongside experts' assessment of health care quality. The involvement of patients or care-seekers in the evaluation of health care quality is enhanced not only when valid and reliable tools are available but also when there are appropriate standards that would guide interpretation of evaluation findings and aid meaningful actions.[6, 9]

Despite the potential shortcomings, patient evaluation of health care is underpinned by established standards in ethics, philosophy, law, politics and evidence of immense derivable benefits.[6, 10-12] The use of patient evaluation for quality improvement interventions depict a health system's commitment to patients' sovereignty,[13] autonomy[14] and also demonstrates the level of democratic accountability in health care.[15] Indeed, the extent of patient participation in health care mirrors political developments[16] and the level of modernisation of the society.[17] Furthermore, the level of patient participation in health care could predict their future behaviours with respect to health service utilization, compliance with treatment, continuity and the overall effectiveness of care.[10, 16, 18, 19]

There are potential platforms for promoting large-scale patient evaluation of primary health care in Nigeria. One obvious platform is the state peer review mechanism designed to accelerate the pace of development in states through periodic performance reviews in various sectors.[20] To support such large-scale patient evaluation of PHC, the patient evaluation scale was developed in Nigeria.[21] It is envisaged that since the contents of the PES questionnaire were inductively generated from the expectations of the Nigerian PHC patients, it could be an effective tool in determining gaps in the quality of PHC.[21, 22]The imperative for this is hinged not only on the fact that strengthening PHC services remains a key strategy for the development of Nigeria's health system but also because

undertaking patient-focused quality improvement in PHC may substantially improve the social relevance and demands for PHC services. Currently, periodic patient-based evaluation of sub-national PHC systems is neither undertaken by the local stewards nor is a part of the states' peer review mechanism. There is also no effective policy support for periodic patient-based evaluation of sub-national PHC systems

This article demonstrates the opportunities in large-scale patient evaluation of PHC and presentation of actionable reports using the patient evaluation scale. Specifically, the analyses sought to demonstrate how PES survey may be used to provide answers to the following research questions: (a) What aspects of PHC are evaluated positively by patients? (b) What is the performance of single primary health centre or the cluster of primary health centres in a Local Government Area and State? (c) How do these performances compare with a reference? This article is intended to drum support for policies that would institutionalise the conduct of periodic national/sub national patient evaluation surveys as a necessary precursor for patient-focused quality improvement on PHC in Nigeria.

METHODS

Study setting

Nigeria is located in West Africa sharing land borders with the Republic of Benin in the West, Chad and Cameroon in the east and Niger in the north. Nigeria is constitutionally subdivided into states, local government areas (LGAs) and wards. However, the six geopolitical zones are often point of reference in modern Nigeria. These geopolitical zones which contain between 5 states (in the South East) to 7 (in the North West) show greater homogeneity in culture, religion and language of the populace.

Formal health care across the country is provided through tertiary, secondary and primary health facilities administered by Federal, States and Local Governments, respectively. About 90% of the facility density of 2.2/10,000 are primary health facilities which are manned by community health workers, nurses, doctors and other skill mix of staff. [23, 24]

Study design

The study is a secondary research that involved the re-analyses of data obtained from a nationally representative patient exit survey.

Primary study

The primary study was conducted to uncover the predictors of patient evaluation of PHC in Nigeria.[25] The primary study recruited 1680 regular patients attending 24 health centres in 12 Local Government Areas in six states that represented each of the six geopolitical subdivisions in Nigeria. The 4-stage sampling approach involved the random selection of a state from each of the geopolitical zones in Nigeria in the first stage. Stratified random sampling was similarly used to select a rural and an urban local government area from each of the selected State and 2 primary health centres in each local government. The primary data was collected from regular adult visitors to selected primary health centres by trained research assistants using the PES.

The Patient Evaluation Scale

The Patients' Evaluation Scale (PES) was developed through multiphase, mixed method research which involved the generation of items from literature review and qualitative interviews with a broad range of

health centre users in Nigeria. Draft items were refined during the face and content validation by experts, cognitive testing with patients attending health centre and waves of quantitative surveys. The development resulted in the original PES and shortened (PES-SF) forms containing 27 and 18-items, respectively. The PES-SF was the product of item deletion following psychometric validation based on the classical test theory. The items deleted from the original PES did not meet the recommended Eigen value < 1, factor loading < 0.5, item-total, item-domain correlation < 0.4 and item-item correlation within domains of < 0.2. The internal consistency of the PES-SF measured by the Cronbach's alpha was 0.87 for entire questionnaire and 0.78, 0.79 and 0.81 for the three domains' (code named 'facility', 'organisation', and 'health care'), respectively. The multi-dimensional PES with multi-point response format (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent) was designed for exit assessment of patients' experiences with PHC in Nigeria.[21]

Ethical clearance for the collection of primary data was obtained from the research ethics Committee of the University of Port Harcourt. Permissions were also obtained from the Ministries of Health, Primary Health Care Boards or participating Local Government Areas depending on the requirements in each State. The time taken to obtain permissions in the six states ranged from 9 days in to 47 days. The patients recruited for this survey gave their consent after going through the details of the research and assurance of confidentiality.

Statistical analyses

The PES QUALISTAT is a combination of analytic techniques and reporting procedures on various attributes of PHC built around the levels of disaggregation of the data (e.g. facility, Local Government Areas and States). This article highlighted the array of analytic and presentation techniques with items in the PES scale representing needed attributes of PHC in Nigeria. For ease of comparability, rating scores were transformed to percentages and analysis was done with the Statistical Package for Social Sciences (SPSS) version 20.[26] The population reference was created from the entire dataset with missing data within cases substituted by linear interpolation.

Performance assessment from PES survey

Performance assessment of PHC units was undertaken to answer the following questions:

What aspects of PHC are evaluated positively by patients? The percentage of patients who endorsed any of the three positive response options (good, very good and excellent) for each attribute was calculated.

What is the performance of single PHC or cluster of PHC in local government and states? Simple descriptive statistics was used for analysis and findings on the performance of hierarchical units were displayed in simple actionable formats similar to what was earlier reported in a European practice setting.[27] Some of the available options for analysis and presentation are: Descriptive statistics (mean, standard deviation, median, and quartile deviation) of each unit with respect to attributes in the domain or entire PES scale. A distribution frequency table (with percent) of each response option in the 27 attributes contained in the PES questionnaire. An aggregated chart of the average value (mean ± SD or Median ± upper and lower quartile) for each attribute in the PES. The attributes are placed on the column and the PHC units on the row. The different level of performance on a particular attribute along various units is displayed horizontally while the level of

performance on all the attributes can be deciphered horizontally. An aggregated chart of the average value (mean ± SD or Median ± upper and lower quartile) for each of the eight domains (facility, geographic access, service organisation, financial access, staff, waiting time, consultation and benefits) of the PES questionnaire.

How do these performances compare with a reference performance? Performances of hierarchical units were compared to the reference for each attribute. This was achieved by calculating a reference performance on each attribute which then served as a standard for comparing the performances of the hierarchical units along the various PHC attributes. Some of the available options for computation of the performances of hierarchical units relative to the reference are as follows: Calculating the percentage of patients who endorsed excellent (highest rating) on each attribute relative to the reference. A similar approach had been used earlier in Switzerland.[27] Calculating the unit's percentile ranking relative to the reference parameter with means (μ) and standard deviation (σ). This was done by calculating their standardised score (Z) from the mean (x) of each attribute and transforming this result into percentiles of the standard normal cumulative distribution having a mean of 0 and a standard deviation of 1. Thresholds of 50 and 75 percentiles of this reference performance were then used to stratify units' performances as *red* = performance less than the 50th percentile of the reference indicating serious deficiencies; *yellow* = performance between 50 and 74th percentile of the reference indicating suboptimal performance; and *green* = units' performance equal to or above the 75th percentile indicating optimal performance. Simple colour-coded charts of units' performance along each of the attribute were presented. A similar approach will be to compare units' (individual PHC or cluster of PHCs) performance in relation to the 25th, 50th and 75th percentile of the reference on the same vertical plane. This is more suitable where illustration of a particular unit's performance on each attribute relative to the reference is in focus.[27]

How can the PES be used to trend PHC performance? The trends in units' performance following longitudinal surveys can be illustrated for each attribute in a graph showing the change in performance over time with or without a comparison with the reference.

RESULTS

The questionnaire response rate was 98.2% for the entire study and ranged from 96.1% in Anambra State to 100% in Bayelsa State. Table 1 shows that more of the respondents were of young age being less than 40 years old (85%, range 76-99%), female (73%, range 63-95%), not working (49%, range 36-76%) and had to pay for PHC services at the point of accessing the service (76%, range 17-98%).

Table 2 shows the percentage of patients that rated the various attributes of separate or the cluster of PHCs in Local government and States as at least 'good' (good, very good & excellent). This raw analysis shows the colour coding of the performance of hierarchical units through the eyes of the patient and along all PHC attributes captured in the PES scale. Red-coloured cells depicting where less than 50% of the patients gave positive feedback were observed in 0 to 38% of attributes across the various PHC centres. Yellow and green colour-coded performances were similarly observed in 8 to 63% and 0 to 92% of attributes across PHCs, respectively. The colour-coded performances on the various attributes for the cluster of PHCs in the Local government and each State also presented in Table 2 shows 4-

29% and 0-16% of PHC attributes in LGAs and State, respectively were red-coloured and would require improvements.

Table 3 shows the standardised mean performance scores on health centres' attributes along levels of disaggregation of the data. The values reported are the standardised mean ratings on the scale of 0 to 100 and with respect to the reference population. A summary of the colour-coding shows 0-25% of attributes had the green-coloured card among the selected health centres, while 0-33% of attributes among LGAs and 0-13% of attributes among selected states showed adequate performance. The attributes with the worst rating can be observed from the frequency of red colour code along the columns. The preponderance of PHC units had deficiencies related to availability of electricity (58.3%) and water supply (58.3%). There was a paucity of green-coloured attributes suggestive of satisfactory performance on an attribute from the ratings of the patients. The most frequently satisfactory rating of PHC attribute, reported in 20.8% of PHC facilities.

DISCUSSION

The article demonstrates opportunities for large-scale evaluation of PHCs against the expectations of the patients using the PES. Whilst there exists a number of approaches for analysis and presentation of data, the descriptive analyses presented here focused more on the performance of hierarchical PHC units along various attributes. This was to demonstrate to practitioners and policy makers how patients' needs are interpreted for PHC-based, patient-focused quality improvement.

The presentation and ease of interpretation of findings from patient evaluation of PHC is similar to the quick, simple and effective colour band Shakir strip used in the assessment of childhood nutritional status.[28] The Shakir strip can even be used by non-highly skilled professionals to measure the mid upper arm circumference, easily interpret findings and plan interventions. While there are enormous benefits in multi- periodic centre survey of patients' views on PHC, the few reports on patient evaluation of PHC in Nigeria were mostly conducted in single PHC practices.[8, 29-32]

The response rates following the administration of questionnaire across the various facilities were high. This is quite encouraging especially when viewed against the background of the direct relationship between the validity of survey research and the response rate.[33] While the response rate is a reflection of participants' willingness and ability to participate on the survey, the mode of administration of survey questionnaire[34] and the provision of incentives to responders can also influence the response rates. Indeed, the direct administration of survey instrument to potential respondents which is a prevalent tradition in this setting could exert subtle urges on some participants to return completed questionnaire to the survey administrator who oftentimes are within their physical reach while waiting to retrieve them.

There was a preponderance of young and female participants in the survey across the states. While this is clearly a departure from the reported structure of the Nigerian population,[35] there is however no report on the socio-demographic profiles of users of PHCs in Nigeria to compare this finding with. It is also pertinent to uncover the preferred sources of care for non-users of PHC.

Worst-rated attributes from the result were the availability of electricity and water in the PHC centres. This is not surprising as only four-fifths of houses including health facilities

in the entire country and one-third of those in rural areas are connected to the national electricity grid. The recent reforms involving unbundling and privatisation of public power infrastructure is yet to yield the expected results as power supply through the grid is still epileptic. Also, access to potable drinking water nationally stands at 60%[36] but this may be worse with PHC facilities as findings from the assessment of the structural quality of PHC in a rural LGA in Lagos, Nigeria revealed that four-fifth of health centres did not have adequate water, electricity and toilet facilities[37]

Like this study, previous research on patients evaluation of PHC analysed ordinal data using frequency of endorsement of various categories,[29, 31] rating scores[32] or as a combination of ratings and categorical analyses.[8] The debate on the appropriate approach of handling multipoint responses from questionnaire survey is still on-going and some contentious issues include:

Whether analysis should be on single-items or summation of items? - Single-item analyses as done in these illustrations are useful for patient-focused quality improvement along the various PHC attributes. However, summing the scores of a particular respondent under domains or entire PES scale is of more advantages. This is because analyses based on single-items have considerable random measurement error; are less reliable and lack precision. Clearly, individual items lack the scope to fully represent complex theoretical constructs like perceived quality. It is known that measurement error averages out when scores are summed to obtain total score for a PHC centre. In essence, single items rarely possess sufficient information for the estimation of validity, accuracy and reliability.[38-40]

The result also showed the performance of hierarchical units hosting a cluster of health centres. Patients recruited during national and sub-national surveys are nested in unique clusters such as health centres, local governments or states. There are compelling reasons to apply multilevel analyses especially when exploring individual and practice-related predictors of patient evaluation. This is because attempts to explore patient-level predictors in the absence of group context known to influence survey findings would limit the value of such process.[41] It is also useful to consider the validity of data from questionnaires administered by survey assistants. The use of bilingual research assistants for the administration of questionnaires to patients who are not fluent in the English Language would be required for large-scale surveys in a setting like Nigeria where 38% of women and 21% of men still lacking literary skills.[36] While the ability to communicate in the local dialect should be an important consideration when planning the skill mix of survey administrators, it is equally essential to train and conduct narrative accuracy checks using health staff with dual linguistic skills to validate translated data by team's interpreters in various study locations.

Opportunities with the use of the PES

The PES is potentially useful for cross-sectional and longitudinal surveys of patients' evaluation of PHC. Data can be analysed and presented as individual item response which describes aspects of PHC or a summation of these items in domains or entire scale. The PES is also useful for periodic nation-wide patient surveys, benchmarking, trend analysis, performance ranking and timely identification of problem in PHC systems. The contents of the PES questionnaire inform its suitability for measuring the structure,

process and outcome of care and also some core defining characteristics of PHC such as: accessibility (geographic, financial, organisational); comprehensiveness, preventive focus and effectiveness of care.[42]

Limitations

Potential limitations of this study are the fact that there is yet no consensus on the definition and measurement of quality through the eyes of the patient. The PES is an evaluative tool but had also shown discriminative abilities by differentiating performances on various attributes in individual PHC or across PHCs. The discriminative quality of the PES had not been verified using an appropriately designed study. The patients in this study were recruited from the health facilities and not the communities. There are evidence that facility-based patient survey show more positive feedback than community-based surveys.[1] Finally, patient evaluations like most human judgments are influenced by factors that can either inhibit a negative evaluation or promote positive evaluation.[43, 44] This could pose further limitations to patient-based review of health care especially where adequate rigors were not applied during such research.

Implications of the findings of this study

The contents of PES capture what matters to PHC patients and are suitable for determining potential gaps between the expectations and perceptions of PHC users. However, because patients' expectations and needs change with time, periodic exploration of PHC patient needs and expectations is required for the PES to remain contextually relevant. The conduct of PES survey can support quality improvement initiatives that would positively influence demand and social relevance of PHC in Nigeria because it will guide the reorganisation of PHC services around the peoples' needs and expectations. Importantly, patient evaluation can be the starting point of a cyclical process of continuous quality improvement of health care delivery systems and organisation. This is so because generated data can be used to facilitate choice of provider by other patients; for internal quality improvement by planners and clinicians; for setting standards for services and establishing relevant rules and regulations based on patients' values.[45]

This paper would be useful for local policy makers and practitioners who are interested in using clear and simple ways to identify gaps in quality through the eyes of patients, institute needed policies and practice in PHC. Critically important is the need to emphasise innovative home-grown approach to the quality quest that would guarantee better population health, improve responsiveness of PHC systems and optimise the use of resources especially in settings like Nigeria, where a significant proportion of the population use the health centres for their health needs.

CONCLUSION

This study demonstrates the opportunities in the use of PES for patient evaluation of PHC systems along various levels of health administration in Nigeria. The evaluative and discriminative properties of PES makes its use a useful add-on during sub-national comparison of PHC systems including the state peer-review process in Nigeria. The establishment of a national reference for patient-reported experiences of PHC, conduct of periodic nationwide patient surveys, comparing quality of services between PHC providers and utilizing findings for continuous quality improvement are recommended.

Conflict of interest

The author declared no financial or personal relationship(s) that may have inappropriately influenced the writing of this article.

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Table 1: Characteristics of patients in the study

States	N	Response (%)	Female (%)	[a]Young (%)	[b]Working (%)	[c]Paid for care (%)	[d]Good health (%)	[e]Contact >1yr (%)	[f]Consult with Dr (%)
Adamawa	274	97.9	67.7	85.2	36.8	89.8	76.5	67.3	23.5
Kaduna	276	98.6	63.0	84.7	43.3	97.5	67.1	49.1	3.3
Benue	277	98.9	73.3	83.3	36.4	83.3	63.3	60.9	4.7
Lagos	273	97.5	68.0	75.9	76.3	16.8	91.5	47.9	36.5
Anambra	269	96.1	69.0	82.1	53.5	87.3	94.1	32.3	1.9
Bayelsa	280	100.0	95.4	98.6	45.7	82.1	75.4	24.6	50.0
Total	1649	98.2	72.2	85.1	48.5	76.3	77.9	47.0	20.1

-a (less than 40 years of age), b (paid employment, either working for self, private or government), c (paid for healthcare at the point of access), d (Perceived health status rated at least good), e (Duration of contact with index PHC centre), f (Had consultation with a doctor in index visit)

Table 2 Categorical performance of hierarchical units' along various PHC attributes

	PHC Performance Attribute																								Summary		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Health Centres	Proportion of patients giving positive evaluation on each attribute in Health Centres																								AC	AL	AD
Ipakodo	43	64	51	51	47	43	54	89	86	87	96	87	86	87	90	86	83	94	81	86	86	93	89	87	13	17	71
Adeniyi j.	26	68	65	73	52	88	89	65	55	89	86	92	92	98	98	97	91	92	91	95	92	91	74	92	4	25	71
Itaelewa	31	28	39	37	34	45	46	63	66	57	72	67	72	70	69	45	48	64	61	67	69	63	58	63	37	63	0
Alausa	9	41	34	57	31	53	74	79	77	87	86	86	90	93	91	91	81	94	84	93	94	86	93	93	17	8	75
Kajuru	10	19	23	31	46	36	36	93	71	64	46	53	67	64	77	100	66	70	69	61	71	69	74	66	33	50	17
Mika rido	3	9	46	59	57	71	80	74	56	74	57	79	84	67	86	99	84	71	79	79	74	77	79	79	13	29	58
Gesi	4	15	31	71	65	81	91	81	43	82	12	74	75	82	84	100	74	74	79	74	76	81	78	78	21	25	54
Kakau	4	10	35	71	78	75	82	79	59	81	53	78	82	81	76	99	82	66	88	75	59	81	78	76	13	21	67
Agan	3	7	34	46	57	57	61	81	73	71	53	74	59	71	70	99	74	64	69	69	54	81	70	67	17	63	21
Wadata	4	12	29	23	10	32	52	97	51	64	25	83	55	68	72	97	29	74	64	55	48	84	86	84	38	38	25
Amaladu	27	30	57	71	70	81	87	74	67	89	43	80	81	79	79	89	69	86	76	66	60	90	94	81	13	29	58
Gboko	91	93	90	96	91	94	93	82	81	96	56	91	91	94	94	63	81	99	93	87	81	88	93	91	0	8	92
Dasin	54	57	96	97	49	97	100	94	67	97	84	100	99	100	97	99	71	97	96	61	48	100	87	100	8	21	71
Gurin	52	36	88	91	49	72	83	71	65	88	65	88	68	64	81	68	43	62	67	42	51	77	68	67	17	54	29
Nana asman	65	54	72	84	75	81	86	54	78	78	81	86	93	94	87	51	80	86	87	93	86	91	87	87	0	21	79
Shagari	72	70	76	85	72	87	84	88	87	78	82	82	85	85	94	85	90	84	81	82	87	90	81	84	0	13	88
Isunocha	9	57	67	67	69	34	67	99	76	89	90	91	89	87	91	100	90	77	86	83	93	89	81	91	8	21	71
Mgbachukwu	56	24	60	50	73	63	53	94	74	83	84	96	94	96	91	97	81	99	81	94	96	87	97	91	4	25	71
Nibo	78	76	88	86	85	78	85	86	76	78	81	75	90	80	85	69	76	85	78	83	73	81	80	92	0	8	92
Okpuno	23	24	46	54	60	66	80	96	86	86	74	69	56	71	81	91	73	80	79	79	76	64	69	77	13	38	50
Agudama	67	79	90	90	73	71	99	100	93	91	94	91	87	90	80	81	64	76	74	74	79	84	90	91	0	17	83
Yenezue	20	53	77	86	81	96	99	91	89	91	97	96	93	96	87	73	83	86	87	89	79	90	87	86	4	8	88
Otueke	53	71	86	84	71	74	100	100	100	100	100	93	80	77	73	99	80	73	74	79	80	84	83	79	0	21	79
Emeyal	10	37	73	89	53	84	100	99	96	97	99	94	93	93	84	97	89	91	89	77	84	83	83	84	8	8	84
LGAs	Proportion of patients giving positive evaluation on each attribute in LGAs																										
Ikorodu	37	47	45	45	41	44	50	76	76	72	84	77	79	79	80	66	66	80	72	77	77	78	74	75	25	25	50
Ikeja	17	54	49	65	41	70	82	72	66	88	86	89	91	96	95	94	86	93	88	94	93	88	84	93	12	21	67
Yenagoa	44	66	84	88	77	84	99	96	91	91	96	94	90	93	84	77	74	81	81	81	79	87	89	89	4	8	88
Ogbia	31	54	79	86	62	79	100	99	98	99	99	94	86	85	79	98	84	82	81	78	82	84	83	81	4	8	88
Awka South	48	48	65	69	72	71	82	92	82	82	79	71	71	75	83	81	74	82	78	80	74	72	73	83	8	33	59
Awka North	32	41	64	58	70	49	61	96	75	86	86	94	92	92	92	99	86	88	84	89	94	88	89	92	13	17	71
Yola South	68	62	74	85	74	84	85	71	82	78	82	84	89	90	90	68	85	85	84	88	86	90	84	85	0	21	79
Fofore	53	46	92	94	49	85	91	83	66	93	75	94	83	82	89	83	57	80	81	51	49	88	78	83	13	17	71
Makurdi	4	9	32	35	34	45	57	89	62	68	39	78	57	70	71	98	52	69	66	62	51	83	78	76	29	46	25
Gboko	59	61	73	83	80	88	90	78	74	92	49	86	86	86	86	76	75	92	84	76	70	89	93	86	4	17	79
Kajuru	7	17	27	51	55	58	63	87	57	73	29	63	71	73	80	100	70	72	74	67	74	75	76	72	17	63	21
Chikun	4	9	41	64	67	73	81	77	57	78	55	78	83	74	81	99	83	69	83	77	67	79	78	78	13	33	54
States	Proportion of patients giving positive evaluation on each attribute in LGAs																										
Lagos	27	51	47	55	41	57	66	74	71	80	85	83	85	87	87	80	76	86	79	85	85	83	79	84	13	25	63
Bayelsa	38	60	81	87	70	81	99	98	94	95	98	94	88	89	81	88	79	81	81	80	80	85	86	85	4	8	88
Anambra	40	44	64	64	71	59	71	94	78	84	83	83	82	84	87	90	80	85	81	85	85	80	82	88	8	21	71
Adamawa	61	54	83	89	61	84	88	77	74	85	78	89	86	86	90	76	71	82	82	69	68	89	81	84	0	25	75
Kaduna	5	13	34	58	61	66	72	82	57	75	42	71	77	74	81	99	76	70	79	72	70	77	77	75	16	42	42
Benue	31	35	52	59	57	66	73	84	68	80	44	82	71	78	79	87	63	81	75	69	61	86	86	81	12	42	46

1 = power supply, 2 = water supply, 3 = waiting area, 4 = seats provisions, 5 = Internal temperature, 6 = Centre attractiveness, 7 = Neatness, 8 = Travel during 9 = Ease of coming, 10 = Staff availability, 11 = Ease of paying, 12 = Opening times, 13 = Staff receptiveness, 14 = Staff performance, 15 = Provider-patient relationship, 16 = Waiting time, 17 = View on waiting time, 18 = Safety of care, 19 = Consultation, 20 = Health information, 21 = Clarity of communication, 22 = orderliness, 23 = Resource availability, 24 = Health benefit. Red signify serious problem that requires immediate action (AC), yellow = suboptimal so requires action (AL), green = optimal (AD)

Table 3 Hierarchical units' performance based on mean scores on PHC attributes

Health centre	Health centres' attributes																							Summary		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	AC	AL	AD
Ipakodo	68	72	38	44	42	30	36	55	57	56	59	55	49	58	57	57	64	66	57	59	58	60	52	53	25	75	0
Adeniyi j.	39	71	55	56	43	66	60	35	39	52	63	61	67	68	63	66	63	67	63	70	68	59	39	56	21	79	0
Itaelewa	42	33	24	21	24	29	18	33	40	25	46	28	34	29	28	13	24	30	29	41	43	26	27	32	100	0	0
Alausa	22	44	23	41	22	43	58	51	55	67	75	69	74	79	74	61	67	81	77	83	83	68	74	73	25	50	25
Kajuru	35	32	23	21	38	26	14	70	50	28	24	19	28	25	34	77	49	34	35	33	38	34	37	32	92	4	4
Mika rido	22	21	34	41	45	47	47	43	33	36	33	37	43	35	43	81	59	35	47	50	46	41	42	42	88	8	4
Gesi	23	26	32	46	57	61	60	53	30	43	11	32	38	46	45	71	53	43	51	49	46	50	49	44	67	33	0
Kakau	23	24	34	44	59	51	43	45	35	38	28	36	35	38	37	72	67	33	52	42	34	44	42	38	79	21	0
Agan	28	26	27	29	41	33	27	49	43	32	28	27	22	28	25	53	53	25	35	31	27	36	31	31	92	8	0
Wadata	25	30	29	20	13	23	22	50	27	26	16	48	23	28	32	61	20	34	28	26	25	41	51	39	88	13	0
Amaladu	46	39	45	48	54	59	48	36	40	46	25	45	39	44	43	45	41	55	40	36	36	62	59	47	79	21	0
Gboko	95	88	86	78	80	77	63	40	53	64	42	63	64	67	61	27	53	67	64	66	59	68	65	64	13	63	25
Dasin	73	69	77	74	47	78	79	40	32	66	62	78	75	74	81	66	44	62	64	33	29	71	50	64	25	54	21
Gurin	68	41	67	69	35	51	49	33	36	49	39	57	30	32	49	29	21	30	29	19	22	47	33	31	79	21	0
Nana asnan	72	64	65	71	67	55	57	22	53	57	59	54	71	68	58	18	50	54	57	62	65	52	61	55	13	88	0
Shagari	71	65	66	61	65	67	52	60	57	43	54	45	58	53	54	50	60	55	54	48	54	49	51	53	17	83	0
Isunocha	29	69	54	47	57	17	38	72	48	49	66	64	65	58	65	81	68	57	57	68	76	60	55	67	25	67	8
Mgbachukwu	67	35	48	35	54	41	25	50	54	44	61	63	66	71	69	65	55	69	52	71	72	50	73	69	25	75	0
Nibo	87	83	78	73	74	70	54	49	59	48	63	41	62	55	61	37	58	69	62	68	62	56	61	68	17	71	13
Okpuno	43	33	42	39	48	42	42	47	47	35	41	24	26	31	34	37	38	40	42	41	40	27	33	38	100	0	0
Agudama	77	75	70	69	65	55	76	71	77	74	76	61	60	54	45	30	41	48	46	52	58	54	64	62	21	63	17
Yenezue	38	48	63	63	71	74	78	49	61	62	74	62	58	59	55	25	53	55	60	58	58	56	55	55	17	79	21
Otueke	59	68	64	56	60	55	81	75	87	77	82	65	53	46	43	44	56	42	49	48	45	47	49	44	42	38	21
Emeyal	33	40	53	63	49	61	80	65	78	77	82	67	65	55	44	33	51	49	54	49	53	46	47	46	42	42	17
LGAs	**Local government performance assessment**																										
Ikorodu	56	54	31	32	33	29	26	45	49	40	52	41	41	43	42	33	44	48	43	50	51	43	39	42	79	21	0
Ikeja	30	58	38	49	32	54	59	42	47	60	70	65	71	74	69	64	65	74	71	77	76	64	57	65	25	67	33
Yenagoa	59	62	67	66	68	65	77	60	69	68	75	61	59	57	50	27	47	52	53	55	58	55	59	59	13	79	8
Ogbia	46	55	58	60	55	58	81	71	83	77	82	66	59	50	43	38	54	45	52	49	49	47	48	45	38	46	17
Awka South	66	57	58	54	61	54	47	48	53	40	51	30	40	41	45	36	46	53	50	53	49	38	45	51	50	50	0
Awka North	48	53	52	41	55	28	31	62	51	47	62	64	66	65	67	74	62	64	55	70	74	55	65	69	21	79	0
Yola South	72	64	66	66	66	61	54	40	55	50	57	50	65	61	56	32	54	54	56	55	59	50	56	54	17	83	0
Fofore	70	55	73	72	41	65	65	37	34	57	50	69	53	53	67	47	32	46	46	25	26	60	42	47	46	54	0
Makurdi	26	28	28	24	26	27	24	50	35	29	22	37	23	28	28	57	36	29	31	28	26	38	41	35	96	4	0
Gboko	78	66	68	64	68	68	56	38	46	55	33	54	52	55	51	36	47	61	52	51	47	65	62	56	25	71	4
Kajuru	29	29	28	33	47	42	34	61	40	35	17	25	33	35	40	74	51	39	43	41	42	42	43	38	88	13	0
Chikun	23	22	34	43	52	49	45	44	34	37	31	37	39	36	40	77	63	34	49	46	40	42	42	40	88	8	4
States	**State performance assessment**																										
Lagos	42	56	34	40	32	41	41	44	48	50	61	53	56	59	56	48	55	62	57	64	64	53	48	54	46	54	0
Bayelsa	52	58	63	63	62	62	79	65	77	73	79	64	59	53	47	32	50	49	52	52	53	51	54	52	13	75	13
Anambra	57	55	55	47	58	39	38	55	52	44	57	48	54	54	57	57	55	59	53	62	63	47	56	61	25	75	0
Adamawa	71	60	69	69	53	63	60	38	44	53	54	60	59	57	61	40	43	50	51	39	42	55	49	51	29	71	0
Kaduna	26	26	31	37	49	46	39	53	37	36	23	31	36	36	40	75	57	36	46	43	41	42	42	39	88	8	4
Benue	53	46	48	43	46	47	39	44	40	41	27	45	36	41	39	46	41	45	41	39	36	52	51	45	88	13	0

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