RESEARCH ARTICLE

Clinical Pharmacy Key Performance Indicators (cpKPI) for Hospital Pharmacists in Nigeria

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ABSTRACT

Background: There are no clinical pharmacy Key performances Indicators (cpKPIs) that can be used to measure hospital pharmacy performance in Nigeria.

Objective: To identify clinical pharmacy Key Performance Indicators (cpKPIs) that can be used for benchmarking clinical pharmacy services provided in the Nigerian hospital setting.

Methods: The study was carried out in two phases. The first phase employed Delphi technique to identify cpKPIs and the second phase; stakeholders from twenty-seven tertiary hospitals were surveyed using the twenty-one identified cpKPIs from the first phase. They were asked to rate each cpKPIs using a five-point Likert scale based on agreement, importance and measurability. Returned questionnaires were coded and entered into Microsoft Excel, then exported and analysed using IBM SPSS Statistics 23. Descriptive statistics (frequencies, percentages, mean and standard deviation) was used to describe socio-demographics and each cpKPIs.

Key findings: Five members panel participated in the two rounds of meeting and reached consensus of 21 cpKPIs. The stakeholder's response rate was

(27/80=33.75%). cpKPIs with the highest rating of agreement was drug information enquires (Mean=4.22). Similarly, the cpKPIs that was rated highest for importance were drug therapy problem resolved (Mean=4.26) and drug information enquires (Mean=4.19). Finally, with respect to measurability, medication errors reported (Mean=4.00) had the highest cpKPIs rating.

Conclusion: Five members panel reached a consensus of 21 cpKPIs. Stakeholder had good perception of 17 cpKPIs that could demonstrate the value of pharmacists in improving quality of care in Nigeria.

Key Words: Clinical pharmacy, Key performance indicator, Hospital, Clinical services, Pharmacist intervention

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INTRODUCTION

The consistency of service delivery in the healthcare setting is of utmost importance and as such assessing the quality of service provided has drawn significant attention [1]. As a result, quality metrics have been developed to measure and benchmark the performance of pharmacists in the healthcare delivery spectrum [2-6]. The assessment of quality professional practice involves the measurement of processes by which health care is provided through the health care professionals' activities [3], and as such, health care–related Key Performance Indicators (KPIs) are employed. KPIs are quantifiable measures of quality used to track an organization's progress with specific, essential processes and outcomes [7]. Key performance indicators serve to inform policy development, aid policy-makers' decision for allocation of resources, improve quality of care, ensure accountability, improvement of patient safety and aid patients in making informed decisions while receiving healthcare services [1,3,8].

Key Performance Indicators are discrete events that when they occur can result in positive outcomes for patients. Therefore, clinical pharmacy Key Performance Indicators (cpKPIs) will lead to optimization medication therapy, health promotion and disease prevention [3,8,9] Ideally, each cpKPIs should have five important aspects: Desired quality practice, link to direct patient care, have evidence supporting an impact on meaningful patient outcomes, be pharmacy or pharmacist sensitive, and be feasible to measure [3].

Studies from all around the world have reported on the identification and or use of clinical pharmacy Key Performance Indicators (cpKPIs) to demonstrate clinical pharmacist contribution to patient care across a variety of conditions. Stakeholders from 21 District Health Boards in New Zealand identified the relevance and measurability of 52 recommended cpKPIs [6]. Ryan et al., [10], identified three cpKPIs following Delphi consensus. In Canada, Fernandes et al., [3], developed 8 cpKPIs after three Delphi rounds. Lloyd et al., [5] identified the importance, relevance and measurability of 7 cpKPIs for hospital pharmacists in Australia [5]. Cillis et al., [2] identified 10 cpKPIs and 38 contextual factors for pharmacists in Belgium. CpKPIs were employed to quantify clinical pharmacists' contribution to patients care in Saudi Arabia and this led to improvement, standardization, and benchmark of clinical pharmacy activities [11].

Currently, disease-specific cpKPIs were developed to ensure adequate quality of care. Shawahna developed 8 KPIs for measuring the impact of pharmacists caring for People with Epilepsy (PWE) in an outpatient primary health care in Palestine [9]. Boutin et al., [12] identified 17 consensuses renal Quality Indicator-Drug Therapy Problems (QI-DTPS) for renal clinical pharmacists to ensure quality of care for renally impaired patients. Schmidt et al., [13], developed and implemented performance metrics to measure pharmacists' activities and their impact on patient care in ambulatory care clinics. In 2020, Shawahna surveyed 50 healthcare professionals from various integrative healthcare facilities in Palestine to achieve consensus of 8 KPIs to measure the impact of pharmaceutical care [1].

The profession of pharmacy in health care settings in Nigeria has evolved since 1980s, with a shift from drug dispensing responsibilities to drug information services, unit dose dispensing systems and provision of direct patient care in some hospitals [14]. Clinical pharmacy practice is yet to be institutionalised in Nigeria; the Pharmacist Council of Nigeria (PCN) in 2005 set the minimum standards to assure pharmaceutical care practice in pharmacy premises [15]. However, despite this, not all pharmacists provide patient centred care [16]. Currently, there is a white paper on the implementation of Pharmaceutical Care (PC) in all hospitals in Nigeria to ensure standard pharmaceutical care practice [17]. Literature has clearly shown there has been investigation into KPIs to demonstrate clinical pharmacists' contribution to care. Currently, there is no study measuring the KPI of clinical pharmacy services in Nigerian hospitals. Hence there is a need to develop clinical pharmacy key performance indicators for hospital pharmacists to justify the services they provide and ensure provision of quality care. The second

aim of the study was to assess the perception of heads of pharmacy in tertiary hospital about the cpKPIs

METHODOLOGY

Study design

The study was carried out in two phases. The first phase employed Delphi technique by expert pharmacists to consolidate the KPIs identified from literature. The second phase used the consolidated KPIs as a tool to assess the perception of heads of pharmacy in tertiary hospitals in Nigeria.

Study setting

Nigeria is the most populous country in West Africa on the Gulf of Guinea which covers an area of 923,768 square kilometres. It consists of 36 states and the Federal Capital Territory (FCT) Abuja which is the capital. The population is about 196 million. The Country is made up of six geo-political zones; South-East, South-West, South-South, North-West, North-Central, North-East. The country has about 85 tertiary hospitals [18].

The Delphi

Fifty-one cpKPIs were identified from extensive literature search. A Delphi technique adopted from a study by Ng and Harrison (2010) [6] was used a panel of five pharmacists with experience in academia and hospital pharmacy practice. The panellists met physically and they were provided with materials regarding the subject matter to ensure that they have an understanding. The primary goal of the Delphi process was to consolidate the cpKPIs that were relevant to clinical pharmacy practices within the hospital setting. A priori definition of Delphi Consensus was a mean score ≥ 3.5 [2].

Heads of pharmacy in tertiary hospitals (data collection)

An online questionnaire was used to collect data during the second phase of the study. The questionnaire consists of two sections; socio-demographic characteristics, 21 questions on cpKPIs (identified by the Delphi panel) and 1 qualitative question (Other suggested KPIs). Respondents were asked to rate each cpKPIs based on these three dimensions (Agreement, importance and measurability) using a five-point Likert.

Hospital pharmacists (Heads of Pharmacy in tertiary hospitals in Nigeria) were invited to through telephone calls to participate in the survey. The online questionnaire was sent via emails to those that gave their consent. After two weeks, a reminder was sent through telephone calls and text message. The survey was open for a period of 8 weeks.

Data analysis

Phase one: A Likert scale from 1 (strongly disagree) to 5 (strongly agree) was used by the Delphi panellist to rate each cpKPIs. A score of 1 show that the panellist strongly disagrees with the indicator and a score of 5 indicated that the panellist strongly agrees with the indicator. The mean of each cpKPIs was obtained by summing up the total value and dividing by the number of responses for that indicator.

Phase two: Data collected were coded and entered into Microsoft Excel, then exported and analysed using IBM SPSS Statistics 23. Socio-demographics data were analysed using descriptive statistics (frequencies and percentages). Each of the five-point Likert option of the cpKPIs rating for agreement, importance and measurability was given a value of 1 to 5 and the mean of each cpKPIs was obtained by summing up the total value and dividing by the number of responses for that indicator.

Ethical clearance: Ethical approval was obtained from the Health Research and Ethics Board Committee of University of Nigeria Teaching Hospital, Enugu State. Informed consent was obtained from all participants; they were made to understand that participation was voluntary and that there was no consequence for non-participation. All information was kept confidential.

RESULTS

Delphi

In the first round of Delphi, the cpKPIs were harmonised and in the second round of Delphi, a consensus for 21 cpKPIs was reached (Table 1).

Table 1 : The Delphi method of analysis.

Type of information (cpKPIs)	Overall mean likert score	Overall median likert score
Documented admission medication reconciliation by a pharmacist	4.2	4
Participation in inter professional patient care rounds to improve medication management	5	5
Clinical pharmacists have completed a pharmaceutical care plan	5	5
Drug therapy problems resolved by pharmacists	5	5
Patient care by a pharmacist in collaboration with the health care team	4.2	4
Documented discharge medication reconciliation by a pharmacist	4.4	4
Medication counselling by a pharmacist at discharge	5	5
Education from a pharmacist about their disease(s) and medication(s) during their hospital stay	4.8	5
Medicine charts reviewed by a pharmacist	4	4
Accurate list of their current medications (including over the counter and complementary medications) documented	5	5
Complaints that pharmacy department has received	3.8	4
Drug information enquiries that have been answered by a pharmacist	4	4
Clinical interventions by a pharmacist that were accepted by the physician	4.6	5
Ward meetings attended by the pharmacist	4.2	4
Patients reviewed by clinical pharmacy services per month	4	4
Medication errors	4.6	5
In-service education (grand rounds, journal clubs) for both healthcare professional	3.8	4
Students/ Residents precepted	4.2	4
Reviews for guidelines and protocols	4.4	4
Record (medication and reaction) of prior ADR and allergy documented	4.6	5
Prescribing errors	4.4	4

There were a total of 27 respondents (33.75%) from 80 respondents that was approached for the study. More than half of respondents were female (63.0%) and more than two-thirds had more than one postgraduate qualification (Table 2).

Table 2 : Socio-demographics Characteristics (n=27).

Variable	Frequency	Percentage (%)
Gender		
Male	10	37
Female	17	63
Age		
<40 years	8	29.6
41-50 years	10	37
51-60 years	9	33.3
***Academic credentials (more than option)**		
B. Pharm	27	100
Pharma. D	7	26.67
M. Pharm	9	33.33
MPH	3	6.67
PhD	2	6.67
FPC Pharm	8	40
Working experience		
<10 years	9	33.3
11-20 years	9	33.3
>21 years	9	33.3

Geopolitical zone (Hospitals)		
North-East	9	33.3
North-Central	6	22.2
North-West	7	25.9
South-West	1	3.7
South-East	4	14.8

Note: * ticked more than one option

The cpKPIs with high level of agreement from respondents were the number of drug information enquiries answered (Mean=4.22 ± 0.80), and number of accepted pharmacist intervention (Mean=4.15 ± 1.13). Similarly, the cpKPIs that were rated highest for importance were number of drug therapy problems resolved (Mean=4.26 ± 1.02) and number of drug information enquiries answered (Mean=). Finally, with respect to measurability, medication errors (4.00 ± 1.00) had the highest rating. The cpKPIs with the lowest level of agreement and importance from respondents were the number of patients reviewed by clinical pharmacy services in each month (3.22 ± 1.05) and (3.67 ± 1.00 respectively). With respect to measurability, the cpKPI, documentation and review of current medication including over the counter and complementary medicines had the lowest rating. Details are shown in Tables 3-5.

Table 3 : Ranked value of agreement of CpKPIs for hospital pharmacists (N=27).

CpKPIs	SD	D	N	A	SA	Mean	SD
Number of patients who receive formal documented admission medication reconciliation by a pharmacist	2 (7.4)	2 (7.4)	8 (29.6)	7 (25.9)	8 (29.6)	3.63	1.21
Number of pharmacists who actively participate in inter professional patient care rounds to improve medication management	1 (3.7)	4 (14.8)	6 (22.2)	6 (22.2)	10 (37.0)	3.74	1.23
Number of patients for whom clinical pharmacists have completed (executed/implemented) a pharmaceutical care plan	2 (7.4)	5 (18.5)	6 (22.2)	7 (25.9)	7 (25.9)	3.44	1.28
Number of total drug therapy problems resolved by pharmacists	2 (7.4)	1 (3.7)	4 (14.8)	9 (33.3)	11 (40.7)	3.96	1.19
Number of patients receiving comprehensive direct patient care by a pharmacist in collaboration with the health care team.	3 (11.1)	1 (3.7)	5 (18.5)	11 (40.7)	7 (25.9)	3.67	1.24
Proportion of patients who receive formal documented discharge medication reconciliation and resolution of identified discrepancies by a pharmacist	2 (7.4)	0 (0)	8 (29.6)	10 (37.0)	7 (25.9)	3.74	1.09
Number of hospital patients who receive medication counselling by a pharmacist at discharge	1 (3.7)	2 (7.4)	6 (22.2)	6 (22.2)	12 (44.4)	3.96	1.16
Number of patients who have received education from a pharmacist about their disease(s) and medication(s) during their hospital stay	0 (0)	3(11.1)	7 (25.9)	8 (29.6)	9 (33.3)	3.85	1.03
Proportion of medicine charts reviewed by clinical pharmacists within 24 hours of admission	2 (7.4)	2 (7.4)	9 (33.3)	8 (29.6)	6 (22.2)	3.52	1.16
Number of patients who have a complete and accurate list of their current medications (including over the counter and complementary medications) documented	2 (7.4)	4 (14.8)	5 (18.5)	11 (40.7)	5 (18.5)	3.48	1.19
The number of complaints that pharmacy department has received	0 (0)	3 (11.1)	3 (11.1)	8 (29.6)	13 (48.1)	4.15	1.03
The number of drug information enquiries that have been answered	0 (0)	0 (0)	6 (22.2)	9 (33.3)	12 (44.4)	4.22	0.8
Number of attempted clinical interventions by the pharmacists that were accepted by the clinician	1 (3.7)	2 (7.4)	3 (11.1)	7 (25.9)	14 (51.9)	4.15	1.13
The number of ward meetings attended by the pharmacist	2 (7.4)	3 (11.1)	8 (29.6)	5 (18.5)	9 (33.3)	3.59	0.92
Total number of patients reviewed by clinical pharmacy services per month	1 (3.7)	6 (22.2)	9 (33.3)	8 (29.6)	3 (11.1)	3.22	1.05
Number of medication errors reported	2 (7.4)	2 (7.4)	6 (22.2)	5 (18.5)	12 (44.4)	3.85	1.29
Number of instances of in-service education (Journal clubs, Staff education)	3 (11.1)	2 (7.4)	8 (29.6)	9 (33.3)	5 (18.5)	3.41	1.22
Number of students/ Residents perecepted	2 (7.4)	1 (3.7)	2 (3.7)	12 (44.4)	10 (37.0)	4	1.14
Number of reviews for guidelines and protocols	2 (7.4)	1 (3.7)	9 (33.3)	9 (33.3)	6 (22.2)	3.59	1.12
Number of patients who have a correctly completed record (medication and reaction) of prior Adverse Drug Reaction (ADR) and allergy documented	2 (7.4)	1 (3.7)	10 (37.0)	8 (29.6)	6 (22.2)	3.56	1.12
Prescribing errors: Identification and resolution of unintentional departure from recommended prescribing practices	2 (7.4)	2 (7.4)	5 (18.5)	10 (37.0)	8 (29.6)	3.74	1.19

Table 4 : Ranked value of importance of CpKPIs for hospital pharmacists (N=27).

CpKPIs	Not important	Slightly important	Moderately important	Important	Very important	Mean	SD
Number of patients who receive formal documented admission medication reconciliation by a pharmacist	0 (0)	2 (7.4)	7 (25.9)	7 (25.9)	11 (40.7)	4	1
Number of pharmacists who actively participate in inter professional patient care rounds to improve medication management	0 (0)	3 (11.1)	7 (25.9)	7 (25.9)	5 (37.0)	3.89	1.05
Number of patients for whom clinical pharmacists have completed a pharmaceutical care plan	0 (0)	1 (3.7)	8 (29.6)	8 (29.6)	10 (37.0)	4	0.92
Number of total drug therapy problems resolved by pharmacists	1 (3.7)	1 (3.7)	2 (7.4)	9 (33.3)	14 (51.9)	4.26	1.02
Number of patients receiving comprehensive direct patient care by a pharmacist in collaboration with the health care team.	0 (0)	3 (11.1)	7 (25.9)	8 (29.6)	9 (33.3)	3.85	1.03
Proportion of patients who receive formal documented discharge medication reconciliation and resolution of identified discrepancies by a pharmacist	0 (0)	2 (7.4)	8 (29.6)	7 (25.9)	10 (37.0)	3.93	0.99
Number (or proportion) of hospital patients who receive medication counselling by a pharmacist at discharge	1 (3.7)	2 (7.4)	6 (22.2)	7 (25.9)	11 (40.7)	3.93	1.14
Number of patients who have received education from a pharmacist about their disease(s) and medication(s) during their hospital stay	0 (0)	2 (7.4)	8 (29.6)	5 (18.5)	12 (44.4)	4	1.04
Proportion of medicine charts reviewed by clinical pharmacists within 24 hours of admission	0 (0)	1 (3.7)	8 (29.6)	7 (25.9)	11 (40.7)	4.04	0.94
Number of patients who have a complete and accurate list of their current medications (including over the counter and complementary medications) documented	00780 (0)	3 (11.1)	7 (25.9)	7 (25.9)	10 (37.0)	3.89	1.05
The number of complaints that pharmacy department has received	1 (3.7)	2 (7.4)	6 (22.2)	8 (29.6)	10 (37.0)	3.89	1.12
The number of drug information enquiries that have been answered	0 (0)	1 (3.7)	6 (22.2)	7 (25.9)	13 (48.1)	4.19	0.92
Number of attempted clinical interventions by the pharmacists that were accepted by the clinician	0 (0)	2 (7.4)	5 (18.5)	8 (29.6)	12 (44.4)	4.11	0.97
The number of ward meetings attended by the pharmacist	1 (3.7)	2 (7.4)	5 (18.5)	9 (33.3)	10 (37.0)	3.93	1.28
Total number of patients reviewed by clinical pharmacy services per month	0 (0)	2 (14.8)	7 (25.9)	10 (37.0)	6 (22.2)	3.67	1
Number of medication errors reported	1 (3.7)	1 (3.7)	5 (18.5)	5 (18.5)	15 (55.6)	4.19	1.11
Number of instances of in-service education (Journal clubs, staff education)	2 (7.4)	2 (7.4)	6 (22,2)	10 (37.0)	7 (25.9)	3.67	1.18
Number of students/ Residents perecepted	0 (0)	2 (7.4)	2 (7.4)	13 (48.1)	10 (37.0)	4.15	0.86
Number of reviews for guidelines and protocols	1 (3.7)	0 (0)	10 (37.0)	8 (29.6)	8 (29.6)	3.81	1
Number of patients who have a correctly completed record (medication and reaction) of prior Adverse Drug Reaction (ADR) and allergy documented	1 (3.7)	2 (7.4)	8 (29.6)	8 (29.6)	8 (29.6)	3.74	1.09
Prescribing errors: Identification and resolution of unintentional departure from recommended prescribing practices	1 (3.7)	1 (3.7)	7 (25.9)	6 (22.2)	12 (44.4)	4	1.11

Table 5 : Ranked value of Measurability of CpKPIs for hospital pharmacists (N=27).

CpKPIs	Impossible to measure	Difficult to measure	Possible to measure	Easy to measure	Very easy to measure	Mean	SD
Number of patients who receive formal documented admission medication reconciliation by a pharmacist	0(0)	5 (18.5)	10 (37.0)	5 (18.5)	7 (25.9)	3.52	1.09
Number of pharmacists who actively participate in inter professional patient care rounds to improve medication management	0 (0)	2 (7.4)	12 (44.4)	8 (29.6)	5 (18.5)	3.59	0.89
Number of patients for whom clinical pharmacists have completed a pharmaceutical care plan	0 (0)	4 (14.8)	8 (29.6)	8 (29.6)	7 (25.9)	3.67	1.04
Number of total drug therapy problems resolved by pharmacists	1 (3.7)	0 (0)	7 (25.9)	11 (40.7)	8 (29.6)	3.93	0.96
Number of patients receiving comprehensive direct patient care by a pharmacist in collaboration with the health care team.	1 (3.7)	0 (0)	11 (40.7)	8 (29.6)	7 (25.9)	3.74	0.98
Proportion of patients who receive formal documented discharge medication reconciliation and resolution of identified discrepancies by a pharmacist	1 (3.7)	3 (11.1)	10 (37.0)	7 (25.9)	6 (22.2)	3.52	1.09
Number of hospital patients who receive medication counselling by a pharmacist at discharge	2 (7.4)	1 (3.7)	8 (29.6)	10 (37.0)	6 (22.2)	3.63	1.12
Number of patients who have received education from a pharmacist about their disease(s) and medication(s) during their hospital stay	1 (3.7)	1 (3.7)	11 (40.7)	8 (29.6)	6 (22.2)	3.63	1.01
Proportion of medicine charts reviewed by clinical pharmacists within 24 hours of admission	1 (3.7)	4 (14.8)	7 (25.9)	9 (33.3)	6 (22.2)	3.56	1.12

Number of patients who have a complete and accurate list of their current medications (including over the counter and complementary medications) documented	0 (0)	5 (18.5)	10 (37.0)	8 (29.6)	4 (14.8)	3.41	0.97
The number of complaints that pharmacy department has received	0 (0)	3 (11.1)	6 (22.2)	9 (33.3)	9 (33.3)	3.89	1.01
The number of drug information enquiries that have been answered	0 (0)	2 (7.4)	10 (37.0)	6 (22.2)	9 (33.3)	3.81	1
Number of attempted clinical interventions by the pharmacists that were accepted by the clinician	0 (0)	2 (7.4)	8 (29.6)	10 (37.0)	7 (25.9)	3.81	0.92
The number of ward meetings attended by the pharmacist	0 (0)	3 (11.1)	7 (25.9)	11 (40.7)	6 (22.2)	3.74	1.11
Total number of patients reviewed by clinical pharmacy services per month	1 (3.7)	5 (18.5)	9 (33.3)	7 (25.9)	5 (18.5)	3.37	1.12
Number of medication errors reported	1 (3.7)	0 (0)	7 (25.9)	9 (33.3)	10 (37.0)	4	1
Number of instances of in-service education (Journal clubs, staff education)	1 (3.7)	3 (11.1)	6 (22.2)	13 (48.1)	4 (14.8)	3.59	1.01
Number of students/ Residents precepted	0 (0)	2 (7.4)	5 (18.5)	13 (48.1)	7 (25.9)	3.93	0.87
Number of reviews for guidelines and protocols	1 (3.7)	2 (7.4)	9 (33.3)	12 (44.4)	3 (11.1)	3.52	0.94
Number of patients who have a correctly completed record (medication and reaction) of prior adverse drug reaction ADR and allergy documented	1 (3.7)	2 (7.4)	10 (37.0)	10 (37.0)	4 (14.8)	3.52	0.98
Prescribing errors: Identification and resolution of unintentional departure from recommended prescribing practices	2 (7.4)	1 (3.7)	6 (22.2)	13 (48.1)	5 (18.5)	3.67	1.07

DISCUSSION

The concept of key performances indicators or quality indicator is a relatively new concept in Africa especially Nigeria. Most studies examine patients' satisfaction with pharmaceutical services and/or the quality of pharmaceutical services [19-22]. There exists paucity of information to measure pharmacists' activities that improve the quality of care they provide. The aim of this study was to develop clinical pharmacy Key Performance Indicators (cpKPIs) for hospital pharmacists in Nigeria using Delphi technique and also assess heads of pharmacy perception/ perspective of the cpKPIs.

There was a high response rate with the Delphi panel. This corroborates with other studies [6,23]. This high response is due to the limited number of panelists since there are no universal agreement for the number of panelists in Delphi and also the time frame when the Delphi was conducted at the peak of Covid 19 pandemic in Nigeria. In the first round of Delphi, similar cpKPIs, were harmonised, cpKPIs that do not yet reflect the current practice and those that were medication and/or disease specific were excluded (round 1). In the second round of Delphi, the panelists rated the cpKPIs and also gave a description of each indicator. The 21 cpKPIs selected by the panelists were based on the pharmaceutical care protocol being taught in Nigerian that is pharmacy schools, West-African Postgraduate College of Pharmacists (WAPCP) and Mandatory Continuous Professional Development (MCPD). Most of the selected cpKPIs had a mean of four except for two indicators; compliant that pharmacy department received and in-service education for healthcare professional had a mean of 3.8 because one of the panelists neither disagreed nor agreed. These cpKPIs were not excluded from the list since it was above the mean cut-off point.

Most of the cpKPIs were rated by the heads of pharmacy as importance and measurable to assess clinical pharmacy services in Nigerian hospitals. The total number patients reviewed by clinical pharmacy services per month ranked lowest in opinion (agreement), importance and measurability to be a cpKPIs. The fact that clinical pharmacy practice is yet to be fully institutionalised in Nigeria and the shortage of pharmacist workforce in hospitals may have contributed to this.

The number of drug information enquiries that have been answered by a pharmacist ranked highest in opinion (agreement) to be a cpKPIs. This is in line with that reported by Satibi et al., [23], who selected drug information service as one of the KPI in assessing pharmacy service quality at primary health centres in Yogyakarta, Indonesia.

Drug therapy problems resolved by a pharmacist had the highest rating of for importance as a cpKPIs. Other studies have reported similar high rating of drug therapy problem as a cpKPIs [3,9]. This is not surprising; evidence in the literature supports the importance of pharmacists in resolving drug therapy problems [24-27].

The number of patients for whom clinical pharmacists have completed a pharmaceutical care plan was rated low (agreement) and high for importance and measurability. Pharmaceutical care is one of the core indicators for pharmacy practice in Canada [3] and cpKPIs for epileptic patients receiving care in primary health care [9]. The low opinion rate (agreement) of pharmaceutical care as a cpKPIs in this study could be attributed to the afore-mentioned fact that institutionalisation of clinical pharmacy practice in Nigeria is not fully developed yet.

The cpKPIs, number of patients who have a complete and accurate list of their current medications (including over the counter and complementary medications) documented and verified within a day of admission by a pharmacist was rated low in respect to agreement and in measurability. This is not in line with that reported by Lloyd et al. [5] this cpKPIs was rated high in terms of importance, relevance and measurability. The difference in the rating could be in the availability of manpower and the country of study.

Out of the 21 consolidated cpKPIs developed from the Delphi, the hospital pharmacists' stakeholder had good perception of 17 of the cpKPIs. Other suggested KPIs from the stakeholders were number of drug and therapeutics committee meeting attended, number of prescriptions reviewed by a pharmacist and monitoring of drug therapy after discharge from the hospital. When standardised KPI are to be developed, decisions about their use need to be determined. Should KPIs be used to assess individual pharmacist or individual pharmacy department? Or compare with other hospital pharmacy department?

CONCLUSION

Some limitations to the study were observed. There was a low response rate to the online questionnaire survey and the findings should be interpreted with care. This low response may be due to the rather high number of items of the survey, participants' poor email-checking habits and lack of interest or knowledge of key performance indicators. Also, only stakeholders, i.e. heads of hospital pharmacy were included in the survey and this could have created a selection bias and their responses might not reflect those of other hospital pharmacists. Future research should consider other stakeholders' perception including doctors,

nurses and management board of the hospital, there is need to develop specifics set of KPIs for each pharmacy specialty. Twenty-one cpKPIs was developed from the Delphi process and Twenty-seven-hospital pharmacists' stakeholder had good perception of seventeen cpKPIs that can improve the quality of care in Nigeria.

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