

A Quality Assessment of Clinical Service Utilization in a Geriatrics Unit in West Africa: 2014-2018

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Abstract

Background: Quality healthcare requires learning organizations who demonstrate commitment to evaluation and improvement. The Geriatrics Unit in the 850-bedded University of Benin Teaching Hospital (UBTH), Nigeria, was set up in 2014 to provide quality healthcare to older persons. The goal of this evaluation was to assess the extent to which that initiative met its objectives.

Methods: Using the Donabedian's framework, we undertook a formative review of key service elements in the Geriatrics Unit of UBTH from April 1, 2014 to March 31, 2018, using data from routine ward documentation.

Results: The unit had a multidisciplinary team of doctors, nurses, physiotherapists, occupational therapists, pharmacists, medical social workers and support staff throughout the period in focus. All records were manually kept. In-patient numbers more than doubled within the first year, from 62 to 133. Increasing utilization was also evident in bed occupancy rates that rose from 20.1% in 2014 to a peak that exceeded the maximum capacity of open beds (112%) in 2017, and required closed beds to be opened. Bed turnover rates increased from 3.7 in 2014 to 22.2 in 2017. The median average length of stay was 13.9 days.

Gross mortality rate ranged between 23% and 31.8%; annual fall rates between 0.4 and 3.0 falls per thousand patient days, and discharges against medical advice (DAMA) between 0.8% and 6.1%.

Conclusion: Multi-disciplinary care was maintained in the geriatrics unit, and available beds were oversubscribed within the 4 years reviewed. Opportunities for improvement include moving on to electronic patient records; increasing the number of functional beds; achieving lower mortality rates. Our findings also provide benchmarks against which future evaluations and quality improvement interventions will be measured.

Background

Healthcare service evaluation is critical in the measurement of quality of healthcare services and the level of attainment of the set goals and objectives of a healthcare system. It is a rigorous process that entails detailed assessments of the degree to which predetermined service objectives have been accomplished^[1]. According to Posavac and Carey, service evaluation requires methods, skills, and sensitivities to determine "whether a human service is needed and likely to be used...whether the service is offered as planned, and whether the service does help people in need"^[2].

Service evaluations are technically not designed as "research", but should be conducted with enough scientific rigour to enable decisions about quality improvement^[3]. They can be used to assess current practices to generate useful information to enhance local decision making. They could also provide baseline metrics for future audits, research or benchmarking. Formative evaluation can be carried out during an ongoing healthcare intervention so that the findings of the evaluation can inform

improvements in ongoing programmes^[3]. In implementing healthcare services evaluations, it is essential to note that every evaluation situation is unique, and approaches to be utilized would be determined by local peculiarities and the goals of evaluation^[4].

The geriatrics unit in University of Benin Teaching Hospital (UBTH) was set up in October 2013 to provide specialized, quality care to older persons with medical and other co-morbidities, in an environment that fosters a pleasant healthcare experience^[5].

The goal of this evaluation was to describe trends in the utilization of clinical services, using standard metrics such as total in-patient days, average length of stay, bed occupancy rates, discharge, death, and fall rates. The Donabedian approach which evaluates services in terms of inputs, processes, outputs and outcomes was utilized^[6].

Methods

Setting

University of Benin Teaching Hospital (UBTH) is an 850-bedded Federal Government-owned tertiary hospital in Edo State, southern Nigeria, and serves as a referral centre to 5 surrounding states in the region. The geriatrics ward in UBTH is located on the ground floor of one of the blocks in the hospital. At the inception of this service in March 2014, an existing ward was modified to make it more elder-friendly with lower beds, a clutter-free corridor, living potted plants, attractive furnishing in the dining area, with a television set, and other fixtures to ensure that healthcare is provided in an environment that simulates a home with good ambience. A geriatric physiotherapy unit is also located on the ward, which ensures total rehabilitation of the elderly with ease due to accessibility of the facility. Occupational therapy is also provided as needed.

The geriatrics team comprises doctors, nurses, physiotherapists, occupational therapists, medical social workers, a pharmacist and health assistants. This multidisciplinary team, along with other medical staff from different disciplines across the hospital provide 24-hour care, seven days a week.

The ward admits male and female patients in separate bays; they use separate conveniences. Admissions were capped at a maximum in-patient number of 15 because of challenges with increasing the nursing and supporting the workforce. Criteria for admission included age equal to, or greater than 60 years and multiple medical (and other) conditions^[5].

Documentation of regarding bed occupancy and bed stays, transfers in and out, discharges and deaths are routinely done by the geriatric nursing staff.

Ethics

Administrative approval to undertake this evaluation was obtained from the Deputy Chairman, Medical Advisory Committee, University of Benin Teaching Hospital.

Methods

We reviewed service data for patients for the period between April 1, 2014 and March 31, 2018. All data were entered in Microsoft Excel and analyzed.

Figure 1 is a schematic representation of the key service elements that are reported in this evaluation, based on Donabedian's framework^[6].

Results

Some "structure", "process" "balancing" (output) and "outcome" elements – according to Donabedian's model – for the period April 1, 2014, to March 31, 2018 are depicted in Table 1 which highlights the multidisciplinary workforce and bed disposition. The numbers of admissions, discharges and deaths are represented in Table 2. Bed occupancy rates; the average length of stay, and fall rates are also highlighted (Table 2). A total of 835 in-patients were managed in the unit between April 1, 2014 and March 31, 2018. There were several disruptions of clinical services within this period, occasioned by national and local industrial (strike) actions – 244 days on the whole, during which patients were not admitted into the unit.

Increasing utilization of clinical services in the unit was evident in the total numbers of in-patients annually, from 62 in 2014 to 348 in 2017 (a 561% increase). This trend was also evident in bed occupancy, and bed turnover rate rates (Table 2), Demand for beds in the unit exceeded available open beds in 2017, and on some occasions, closed beds had to be opened to admit patients. Bed occupancy rates, therefore, exceeded 100% in 2017.

Bed turnover rates similarly peaked in 2017: each of the beds in the unit catered for about 22 patients in that year (Table 2). DAMA rates were highest in 2018 (6.1%) and least in 2015 (0.8%). Death rates were also highest in 2018 (31.8%)

Fall rates were highest in 2014 and 2018 – 2.3 falls per thousand in-patient days in 2014, and 3.0 falls per thousand in-patient days in 2018.

Median average length of stay was 13 days (Table 2).

Table 1
Staff and bed metrics in UBTH Geriatrics Ward: April 1, 2014 - March 31, 2018

Service elements	2014	2015	2016	2017	2018
Available beds	15	15	15	15	15
Closed beds	5	5	5	5	5
No. of doctors*	20	17	21	24	21
No. of nurses	19	18	19	19	20
No of physiotherapists	1	1	1	1	3
No. of occupational therapists	1	1	1	1	1
No. of pharmacists	1	1	1	1	1
No. of medical social services staff	1	1	1	1	1
No. of health assistants	8	8	8	8	9
<i>*Inclusive of house officers who underwent 12-week rotations (1–2 at a time), resident doctors who underwent 4–8 weekly rotations, and medical officers who spent a minimum of one year, respectively.</i>					

Table 2
a: Clinical service metrics in UBTH Geriatrics Ward: April 1, 2014 - March 31, 2018

Service metric	2014	2015	2016	2017	2018	Total
Admissions	28	102	186	306	74	696
Transfers in	34	31	24	42	8	189
Total number of in-patients	62	133	210	348	82	835
Discharges	39	86	144	235	55	559
Transfers out	8	9	19	14	4	54
*DAMA	1	1	3	7	5	17
Deaths	15	33	44	91	28	211
No. of falls	2	1	1	6	3	13
Total in-patient days	863	1668	2571	4620	994	10,716
Total number of working days**	287	351	304	275	90	1,307
<i>*Discharge Against Medical Advice</i>						
<i>**Patients were only admitted on these days because of industrial (strike) actions on other days</i>						

Table 2
 b: Computed clinical service metrics in UBTH Geriatrics Ward: April 1, 2014 - March 31, 2018

Computed service metric	2014	2015	2016	2017	2018
Falls per thousand in-patient days	2.3	0.5	0.4	1.3	3.0
Average length of stay (days)	15.7	13.9	13.5	13.9	11.3
Bed occupancy rate (%)	20.1	31.7	56.4	112	73.6
Bed turnover rate	3.7	8	12.7	22.2	5.9
DAMA rate (%)	1.6	0.8	1.4	2.0	6.1
Gross death rate (%)	27.3	27.5	23	27.3	31.8

Discussion

The Geriatrics Unit in University of Benin Teaching Hospital (UBTH) in Nigeria was established in an effort to provide quality healthcare to older persons with co-morbidities, using the Acute Care for Elders (ACE) model^[5]. The service review reported in this paper is formative and was designed to assess the extent to which the initiative of setting up the unit had achieved the purpose; to disseminate lessons learned and make adjustments to the structures and processes, with a few to improving clinical outcomes^[7].

Quality healthcare requires that skilled professionals are retained, the best possible clinical outcomes are ensured, and clients are satisfied. It also includes prioritizing a clean, quiet, comfortable and pleasant environment for providing and receiving care, and commitment to improvement^[8]. These have been the key ethos in the running of the multidisciplinary geriatrics unit in UBTH from its inception.

Donabedian's model describes structures, processes and outcomes as essential measures in healthcare^[8, 9]. Staffing, buildings and beds are examples of structures; documentation of patient records, bed occupancy and referral patterns are examples of processes; discharges and deaths are examples of outcomes. According to Donabedian's model, outcomes are the gold standard for measuring impacts of healthcare interventions. However, all three measures are inter-related^[9]. For example, structures impact on processes, and either or both of these impact on outcome^[8]. Without process or structure measures, outcome measures do not give a full picture about the quality of healthcare provided^[8].

"Balancing measures" in Donabedian's model describe broader consequences of healthcare interventions which may be positive or negative^[10]. Examples are monitoring number of falls after interventions to reduce falls, and monitoring length of stay after interventions to ensure early discharge planning. Some aspects of the structures, processes, outputs/balancing measures and clinical outcomes in the geriatrics unit of UBTH have been highlighted in this report.

Bed occupancy rates describe utilized beds as a percent of available beds for the year^[11]. Year-to-year comparisons in bed occupancy rates showed remarkable increases between 2014 and 2017: occupancy rates almost tripled between 2014 and 2016 (from 20.1–56.4%), There were 3 other adult medical wards in the hospital at the time the geriatrics unit was created, explaining the initially low bed occupancy rate in 2014. Demand for beds in 2016 could be described as moderate, (occupancy rate of 56.4%)^[12], but by 2017, we exceeded 100% bed occupancy, and there was pressure to open the five closed beds. Sometimes it was impossible not to yield to such pressure, and on some occasions, beds were temporarily opened to admit additional patients. This explains a bed occupancy rate that exceeded 100% in 2017.

The National Institute for Health and Care Excellence (NICE) states that hospital-wide bed occupancy rates in excess of 86% portend potential bed crises, with increased likelihood of healthcare acquired infections^[13] Ward bed occupancy rates of up to 70% are desirable, but occupancy rates less than 60% is recommended^[14]. Increasing utilization of the geriatrics ward beds put pressure on the workforce. The impact of this pressure on staff satisfaction and overall quality of life will be reported differently.

Average length of stay (ALOS) - reported in days - is the total number of in-patient days of care divided by total discharges, where total in-patient days of care is the summation of the number of days that patients stayed in the hospital for the period in focus^[15]. Median ALOS was 13.9 days.

Inferences about ALOS in hospitals should be balanced against the multiple factors that determine length of stay. For example, patients who are more ill and who develop complications are likely to spend longer times in hospital than those who are less ill and who do not develop complications. In parts of the world where reduced length of stay is used to assess efficiency of healthcare and utilization of healthcare resources, ensuring shorter hospital stays may be influenced by financial incentives^[16]. Average length of stay in countries within the Organisation for Economic Co-operation and Development (OECD) in 2015 was eight days^[17].

It is noteworthy that the highest lengths of hospital stays are reported in older persons^[18]. A prospective study of elderly patients who died between 2005 and 2007 at University of Ilorin Teaching Hospital, Nigeria, showed an average length of stay of 6.8 ± 8.6 days^[19]. ALOS of 15.6 ± 13.8 days was reported from a retrospective study of elderly patients admitted into the same hospital between 2001 and 2004.

We reported gross death rates between 23% and 31.8% in the four years (2014–2018) of this evaluation. Sanya et al. reported a death rate of 31.7% in elderly patients admitted into University of Ilorin Teaching Hospital, noting that a large proportion of deaths occurred within a few days of admission^[19]. Onwuchekwa and Asekomeh reported a gross death rate of 26.7% in older persons admitted into medical wards in University of Port Harcourt Teaching Hospital between 2002 and 2006^[20], whereas Adebusoye and Kalula however reported lower death rates (15%) in elderly patients admitted in a hospital in South Africa^[21]. A much lower death rate of 4.6% was reported by Goh et. al from an acute geriatric ward in

Singapore^[22]. Our future evaluations will focus on comparative analyses of deaths in older persons between the geriatrics unit and other medical wards in UBTH. Data will also be disaggregated by gender and other socio-demographic characteristics to enable broader inferences.

It is estimated that 1% and 2% of all medical admissions result in a Discharge Against Medical Advice (DAMA)^[23]. DAMA rates in the geriatrics unit in UBTH were between 0.8 and 6.1%. Lelieveld et al. reported DAMA rates of 0.4% in older persons in the United States, noting lower rates in older compared to younger patients, and that being Black or Hispanic, as well as being poor, are risk factors for DAMA in older persons^[24]. We hope to analyze trends in DAMA and characterize patterns in order to better understand risk factors, and proffer mitigating recommendations, in future evaluations.

Retention of competent, motivated staff is the key to maintaining quality healthcare. The interdisciplinary workforce was mostly comprised of healthcare professionals who had had prior team training in geriatrics^[5]. Apart from this cohesive team, patients in the ward also received care from several consultants from several other disciplines in the hospital. These additional numbers were not captured in this evaluation.

Falls are one of the major challenges of older persons and geriatric centres^[25]. The risk of falls increases during hospitalization due to the unfamiliar environment, illnesses, and treatments^[26]. In the four years evaluated in this report, the maximum fall rate per 1,000 in-patient days was 3.0 with the minimum being 0.4. We are not aware of any reports of fall rates in hospitalized older persons in Nigeria. A rate of 3 to 5 falls per 1,000 bed stays was reported in retrospective study in United Kingdom^[27]. Rubenstein, Josephson and Robbins reported a rate of 1.5 falls per bed per year in institutional settings^[28]. In Nigeria, Bekibele and Gureje reported a falls prevalence of 23% in community-dwelling older persons^[29]. The findings from our evaluation have provided baseline data regarding fall rates in hospitalized older persons, which could be used as a benchmark in future quality improvement interventions.

This review would have been undertaken and concluded more efficiently if electronic patient records had been available - a gap that will be addressed in our future quality improvement efforts.

Limitations

Healthcare costs and patients' experiences of healthcare were not included in this evaluation.

Conclusions

This formative, retrospective evaluation of clinical services in the geriatrics unit in University of Benin Teaching Hospital, Nigeria enabled a description of structure, process and outcome metrics. It showed an impressive acceptance of Geriatrics as a specialized discipline in a teaching hospital, evident in consistent increases in utilization metrics. Some deficiencies in processes were also identified, with

opportunities for improvement, and for future evaluations. We recommend service evaluations as a scientific way to assess quality of healthcare in Africa.

Abbreviations

ACE

Acute Care for Elders

ALOS

Average Length of Stay

DAMA

Discharge Against Medical Advice

NICE

National Institute for Health and Care Excellence

OECD

Organization for Economic Co-operation and Development

UBTH

University of Benin Teaching Hospital

Declarations

Ethics Approval and Consent to Participate

The Research and Ethics Office of University of Benin Teaching Hospital, Nigeria approved exemption from ethical clearance and gave administrative approval to undertake this service evaluation.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analysed during this evaluation are available in the Geriatrics Unit and Medical Records Department of University of Benin Teaching Hospital, and may be obtained from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests.

Funding

No funding was obtained for this study.

Authors contributions

AO: conception, data interpretation, manuscript preparation and editing.

OF, KO, EO: data interpretation and manuscript editing.

AB, UE, AJ: data collection and interpretation; manuscript editing.

All authors have read and approved the manuscript.

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Figures

Structure	Process	Output	Outcome
<ul style="list-style-type: none"> • Staff • Beds 	<ul style="list-style-type: none"> • Patient records • Bed occupancy • Referral patterns 	<ul style="list-style-type: none"> • No. of patients receiving treatment • Change in bed occupancy • Length of hospital stay • No. of falls 	<ul style="list-style-type: none"> • Discharge • Mortality

Figure 1

Framework summarizing service elements in the UBTH Geriatrics Unit (2014-2018)