ASSESSING HOSPITAL PERFORMANCE USING A FOUR-YEAR INPATIENT SERVICE RECORDS AT A TEACHING HOSPITAL
(A Cross-sectional study)

[1]Ibrahim Ibn Saana ,[2]Mike D. Ashalley, [6]Bright K. Dzomeku,[8]Abdallah I. Yahaya [7]Olga Awuni [4]Audu Rauf, [5]Daniel A. Danquah, [3]Daniel N.A. Ankrah,

[1]B.Pharm. MPH, Specialist Public Health Pharm, Ph.D., *MPSGH*.[2]B. Pharm, M.Sc., Ph.D., Postdoc, FPCPharm., [3]Bsc, M.Sc., [4] B. Pharm, Pharm D, MSc, Ph.D., [5]Dip. Stats, B. Pharm, MSc, Ph.D., [6]Pharm. D., MPSGH, [7]MSc, Specialist Clin Pharm, MGCP, [8]BSc, MD, MSc, Ph.D.

[1]Department of Pharmacy, Korle Bu Teaching Hospital, Accra, Ghana
[2]Department of Surgery, Korle Bu Teaching Hospital, Accra, Ghana
[3]Department of Pharmacy, Korle Bu Teaching Hospital, Accra, Ghana
[4]Pharmacy Council, Accra Ghana
[5]Pharmacy Council, Accra Ghana
[6]Department of Pharmacy, Adabraka Polyclinic, Accra, Ghana
[7]Department of Pharmacy, Greater Accra Regional Hospital, Accra, Ghana
[8]Department of Public Health, University of Development Studies, Tamale, Ghana

***Abstract*- Evaluations of the impact of hospital accreditation have been previously hampered by the lack of nationally standardized data. One way to assess this impact is to compare accreditation status with other evidence-based measures of quality, such as process measures. The goal of this paper is to test for the presence of supplier-induced demand among patients who received care in private, hospitals accredited to provide care to insured patients and to examine the hospital performance using the number of days of patients' admissions, discharges, and deaths within a four-year (4) period: (2018-2021).**

Methodology: The study employed a cross-sectional study design utilizing retrospective secondary Performance data for the period under review 2018-2021. Data from seven (7) surgical wards of a tertiary teaching hospital in Ghana were collated. A redcap tool was used to collect the data from entries made which were edited, coded, transcribed, cleaned, and analyzed using Microsoft Excel tool 2019 and SPSS version.26.0 and the results were presented in descriptive statistics such as frequencies, percentages, tables, and figures. Comparative changes in performances of all other years were compared to the year 2020.

Results: The results showed that there were statistically significant differences in performances [p value = 0.00 < 0.05, alpha value (0.05)] in inpatient days, admission, discharges, and mortality rates in all the 4year periods. Analysis showed that there were significant differences comparing 2020 patient days to 2018, 2019, and 2021.

Conclusions: There was a decrease in performance for the year 2020 as compared to the rest. Nearly all the mean differences for the variables of the various years against the year 2020 were significantly different (p=0.00) except for the number of admissions and discharges in 2020 against 2018 and the number of deaths realized in 2020 against 2018 and 2019.

Keywords: **Hospital performance, In-patient records, Evaluations**

Introduction

Enhancing the quality of hospital care is driven mostly by measurement. To validate what hospitals actually do or otherwise in terms of performance is provided by measurement. Measurements actually enable comparison with baselines and targets to identify opportunities for improvement. Among the key methods of measuring hospital performance are statistical indicators aside from public satisfaction, regulators' inspection, other third-party assessments, etc. [1]. "Measurement implies objective assessment but does not itself include the judgment of values or quality; these may be added by those who later present and interpret the data" [1]. The top ten hospital metrics that mark hospital performance are admission rates, average daily census (patient days), and the number of deaths, and from these basics, others will be derived such as mortality rates, and bed occupancy rates [2]. However, scholars have been divided into the best approaches to assess healthcare performance [3].In recent times as, as clients of care or patients focuses on the cost-effectiveness of health care delivery, health professionals in health facilities also have invested in evidence-based practice to meet such dynamics of patients' needs [4]. This is when records or data available are much more or appropriately utilized to inform them to make the right decisions and as well track their performances over time. Hospital performance metrics involve many diverse indicators that are derived from basic activities carried out by health facilities, without these basic records of the activities all metrics cannot be derived. For instance, simple records of clinical service activities are "number of admissions", "number of discharges"," patients census", and "number of transfers in and out" Healthcare quality is the degree to which healthcare services for individuals and populations, "number of deaths" etc. in a specified period. Certain metrics can be derived from this basic information and these metrics are "discharge rate", "mortality rate", "bed occupancy rate" "average length of stay" etc. According to Jan Mainz (2003), "monitoring and evaluation of Quality of healthcare are impossible without employing the use of clinical indicators. They form the foundation for quality improvement and referencing in the delivery of health care. In other to achieve the reliability and validity of clinical indicators, they must be well defined, designed, and implemented with scientific consistency" [5].

Methodology

Study Design

The study employed a cross-sectional study design utilizing retrospective secondary Performance data for the period under review 2018-2021. The data came from seven (7) surgical wards of a tertiary teaching hospital in Ghana. A redcap tool was used to collect the data from entries made which were edited, coded, transcribed, cleaned, and analyzed using Microsoft Excel tool 2019 and SPSS version.25.0 and the results were presented in descriptive statistics such as frequencies, percentages, tables, and figures. Comparative changes in performances of all other years were compared to the year 2020.

Inclusion Criteria: Data from all patients seen between January 2018 to December 2020

Exclusion Criteria: All patient data before January 2018 and after December 2020

Study Area

The surgery department is a surgery offering department under the Korle bu Teaching Hospital. It has several specialties such as Hepatobiliary services, Genito urinary services, Paediatric surgical, services, etc. The department has in all Eight (8) inpatient wards, with each with a mean of 30 beds. The department has over 100 permanent staff and currently, the doctor-nurse ratio stands at 1:4. The crude bed occupancy rate of the department is 54.6%, and has an average patient service day of 43,618. Several specialties and subspecialties offer consultation services on outpatient clinical days. The department admits a minimum of 5,000 patients per year and has an average discharge rate of 75% [6].

Study population

Data Collection:

The study pulled and harmonized data from all the wards; Neuro ward, General Surgery wards (5wards), Genito urinary ward, and Paediatric Ward. General surgery wards comprise breast care specialists, thyroid specialists, hepatobiliary specialists, and colorectal specialists. Data included admission, discharges, deaths, transfers, in and Transfers outs. Each unit has a minimum bed state of 30 beds. The secondary data involved all characteristics of inpatients who were on admission within this period under review regardless of their length of stay, age, sex, or medical condition. There was no interview guide involved. Reports during this period were also taken into consideration to aid in in-depth insight.

Statistical Analysis

Data cleaning management was done appropriately to deal with erroneous issues this was done without tempering the original values. Data was exported from Excel 2019 and analyzed in SPSS version 26. The data were summarized into frequency tables and pictorial graphs. In comparing differences of performance within the 4 years Welch's Anova to compare differences. Welch's ANOVA is used to compare means to see if they are equal in cases where the independent variable violates the homogeneity of variances [7]. The Welch Anova was used due to the Anova assumptions being violated. To determine where the specific difference came from a postdoc test was further used to derive which year periods had significant mean differences. The statement of the null hypothesis is below;

H_0: The group means performances for the four years are equal ($\mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$)

Ho_3: *That there is no difference in means occupancy rates between groups defined by the years*

Ethical Considerations:

Ethical Clearance was sought from the Institutional Review Board of the Korle Bu Teaching Hospital.

Results:

There were seven clinical wards all undergoing similar activities of admitting, discharging, etc. as seen in the table below. The heaviest count of patient days was 40,377 however that same ward with this figure scored one of the lowest numbers of admissions (1959). SW6 was an extra special ward that had a smaller number of beds therefore the admissions were the lowest recorded.

Table 1: Characteristics of Service Data

Ward	Pts. Days	Admission	Discharge	Trans in	Trans out	Deaths
SW1	40,377	1959	1817	507	460	176
SW2	26,976	3298	2950	478	538	279
SW3	26,018	3400	2987	595	649	315
SW4	25,180	2999	2642	480	503	217
SW5	22,373	2779	2562	428	465	149
SW6	10,851	1638	1661	361	284	28
WG	22,697	3236	2979	107	122	130
Total	17,4472	19,309	17,598	2,956	3,021	1,294

Characteristics Of 4-Year Clinical Service Indicators

The results of the analysis are shown in the below tables. Welch ANOVA was used to determine group mean differences for 4years period using the variables a number of patient days, admission, discharge, and death. The table below shows the descriptive characteristics of sample size for each record i.e. Patients' days, deaths, Discharge, etc. as seen in the table. The mean number of patients a day on the ward was 15.41 in 2020 lower than compared with the other year's means.

Table 2: Descriptive Results Of -Year Clinical Service Indicators

	Years	N	Mean	Std. Dev	95% C.I for Mean	Range
Pts. Days	2018	2546	16.90	7.76	16.59-17.19	1-94
	2019	2555	18.01	7.23	17.72-18.29	1-35
	2020	2555	15.41	7.34	15.12-15.69	0-34
	2021	2555	18.03	7.24	17.74-18.30	0-119
	Total	10211	17.09	7.47	16.94-17.23	0-119
Deaths	2018	2545	0.11	0.34	0.09-0.12	0-3
	2019	2555	0.12	0.34	0.10-0.13	0-3
	2020	2548	0.11	0.34	0.09-0.12	0-3
	2021	2553	0.16	0.54	0.14-0.18	0-10
	Total	10201	0.13	0.40	0.11-0.13	0-10
Discharge	2018	2546	1.69	1.66	1.62-1.75	0-30
	2019	2552	1.76	1.59	1.69-1.82	0-12
	2020	2555	1.60	1.58	1.53-1.65	0-13
	2021	2555	1.84	1.61	1.78-1.90	0-12
	Total	10208	1.72	1.61	1.69-1.75	0-30
Trans out	2018	2546	0.24	0.55	0.21-0.26	0-6
	2019	2554	0.27	0.59	0.24-0.29	0-6
	2020	2555	0.26	0.59	0.23-0.28	0-6
	2021	2555	0.41	0.77	0.38-0.44	0-6
	Total	10210	0.30	0.63	0.28-0.30	0-6
Trans in	2018	2545	0.24	0.53	0.21-0.25	0-4
	2019	2554	0.26	0.59	0.23-0.28	0-9
	2020	2555	0.26	0.61	0.23-0.28	0-7
	2021	2554	0.40	0.74	0.37-0.42	0-6
	Total	10208	0.29	0.62	0.27-0.30	0-9

Performance At the Surgical Department, KBTH

Table 1 above shows the results of Welch Anova's analysis to determine whether there was a significant difference between the 4years group means for patient days, admissions, deaths, and discharges. It showed that there were statistically significant differences between the yearly groups' mean for each of the variables [p value = 0.00 < 0.05, alpha value (0.05)]. This implies that there were statistically significant differences in performances on inpatient days, admission, discharges, and mortality rates in all the 4years periods.

Table 3: Robust Tests of Equality of Means -Welch Anova

Variable		Statistic	df1	df2	Sig.
Patients Days	Welch	72.80	3	5668	0.00
Admission	Welch	9.62	3	5667	0.00
Discharges	Welch	10.85	3	5668	0.00
Deaths	Welch	7.06	3	5606	0.00

A pairwise comparison using the Turkey HSD test was used to find where there were differences with a focus on the year 2020 since the whole of the year 2020 was a pandemic crisis. The results indicate significant differences comparing 2020 patient days to all the other years 2018, 2019, and 2021.

Table 4: Pairwise Comparisons for Mean Difference (Turkey HSD)

Dependent Variables	Year(I)	Years(J)	Mean Diff. (J-I)	Sig.	95% Confidence Interval	
					L. Bound	U. Bound
Patients	2020	2018	1.48*	0.00	0.95	2.01
		2019	2.60*	0.00	2.06	3.13
		2021	2.61*	0.00	2.08	3.14
Admission	2020	2018	0.11	0.31	0.05	0.27
		2019	0.23*	0.00	0.07	0.39
		2021	0.31*	0.00	0.15	0.46
Discharge	2020	2018	0.10	0.14	0.02	0.21
		2019	0.16*	0.00	0.05	0.28
		2021	0.25*	0.00	0.13	0.36
Deaths	2020	2018	0.00	0.98	0.03	0.03
		2019	0.01	0.88	0.02	0.04
		2021	0.05*	0.00	0.02	0.08

*. The mean difference is significant at the 0.05 level.

Discussion

The assessment of the performance using the patients' days, admission, discharge, and deaths was seen to be significantly decreased in the year 2020 compared or relative to the other prior to and after years. A similar was reported in an Israeli National Program for Quality Indicators that there was a decrease in measurable cases in 2020 relative to 2019 they stated also that few other indicators had lower compliance rates associated with COVID-19 pandemic regulations [8]. Drop in hospital performance metrics or indicators were also reported in several other countries around the world. These reductions were reported in several health facilities in different countries such as Haifa University, Haifa, Israel [9], [10]in Dutch hospitals [11], in Germany [12] and in other parts of Israel [13]. A major contributing factor to the significant decrease in admissions in 2020 relative to the other years was the strategy in managing the facility by suspending the intake or admitting patients with elective surgical conditions, instituting pre-triage monitoring of patients, suspension of clinical internship staff, suspension of all conferences or gatherings including clinical review gathering sine die, the rapid edge of discharge patients, etc. in order to avoid and reduce the risks of Covid 19 infection rate [14]. Since Quality is described as a non-synonym of performance but rather an important component of healthcare systems' performance, these mechanisms provision of optimum healthcare delivery at our various facilities across the country. [15]

Limitations of the study: Some variables in the data were missing.

Conclusion

There was a significant difference in performance patient days, number of admissions (admission), and number of discharges for all the years in review. There was a decrease in performance for the year 2020 as compared to the other years. Nearly all the mean differences for all the variables in the various years against the year 2020 were significantly different (p=0.00) except for the number of admissions and discharges for 2020 against 2018 and the number of deaths realized in 2020 against 2018 and 2019.

Conflict of interest: Authors have no conflict of interest to declare.

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