KORLE-BU TEACHING HOSPITAL: BED OCCUPANCY AND MANPOWER STATISTICS (1991 AND 1992)

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SUMMARY

In 1991, the daily bed occupancy rate for the hospital was 75.2% with bed turnover rate of 2 per month and bed turnover interval of 4 days. There was a daily average of 57 floor-patients in the hospital. Nurses and other medical staff on admission formed about 2% of the daily population. The seriously ill patients formed 6.4% of the patient population. The average daily patient population was 1166 with average daily admissions of 92 patients (SD 21.2), discharges of 87 (SD 9.7) and the daily deaths of 11 (SD 3.7). The corresponding figures for 1992 were very close. In 1992, daily patient population was 1151, daily admissions was 103, discharges 90 and daily deaths was 11. Thus, about 10% of the hospitals daily patient population is admitted daily and about 1% die daily.

With respect to the individual wards or departments, the highest daily admission rate was at Chenard Ward A, for gynaecological emergencies with about 10 patients a day. Children's wards followed with a rate of about 5/day, then Medical wards with about 3/day, Maternity wards and Surgical wards with 2/day and Orthopaedic wards (Allied Surgical wards C, D, H, I and N) with about 1/day.

The highest number of deaths occurred in emergency wards, (Children's emergency, Neonatal Intensive Care Unit (NICU), Surgical/Medical emergency, Korle-Bu Polyclinic and Accident centre). The ranking order of departments with deaths in the wards were Children's, Medical, Chest, Surgical and Obstetrics (Maternity).

On average there were 16 nurses and 7 orderlies to a ward running three shifts a day. Excluding housemen, Surgical wards had an average of 3 doctors to a ward, Medical wards had 8 doctors per ward, Obstetrics and Gynaecology had 6 doctors to a ward, Children's block had 8 doctors to a team and Allied Surgical wards had an average of 6 doctors to a ward.

The policy implications of these statistics are discussed.

Key words: Bed occupancy rate, Bed turnover rate, Case fatality rates, Health manpower.

INTRODUCTION

Hospitals form a vital part of the health system of the country for timely referral of patients from the peripheral level of the health infrastructure. The quality of care at health institutions in the country has been of great concern despite the limited resources of the Ministry of Health[1].

The desire to improve the quality of medical care has been bedevilled by lack of easily accessible information on measurements of good care. Majority of the current measurements of medical care are concerned with efficiency[2]. For example, nursing time must not be wasted; laboratory services must be rapid, precise and provided at minimum cost; patients and physicians waiting time must be kept at a minimum; hospital beds must be saved for the patients who really need them[2]. Waiting time or the demand for care is related to available hospital beds, health manpower and the management of the patients already in the hospital. Though measures of efficiency are easy to describe, it is stated that making medical care efficient does not necessarily improve its quality[2].

User charges have been introduced in all Government health institutions with the aim of eventually making large curative services financially self sustaining[3,4]. This calls for better use of all available hospital resources, beds, laboratories and manpower. It is therefore imperative to have information on regular basis on the efficiency with which hospital resources are being used. Charging for hospital care as a means of funding the hospitals may be seen as leading to increased inequality in health[3]. However, if quality of care is improved and efficiency is achieved, the cost of care could be tolerable to the majority of the population.

Despite the huge volumes of data generated in the health system, they are not made available to policy makers in a format that can guide policies and strategies. Often, data collecting activities are carried out daily as rituals with no questions asked. Useful and valuable estimates of measures of quality of care can be made available if periodic reviews and analysis are done.

The lack of reliable and timely information has been the major drawback in health care delivery in most developing countries[2]. Efficiency and quality of care cannot be demonstrated in such an environment. Inventory of what is being collected, by whom and for what purpose must be done and made available to all sections of the establishment as a first step in any programme to improve quality of care at health institutions[2].

Korle-Bu Teaching Hospital is a national referral hospital and also the teaching hospital for the Ghana Medical School. It has a total bed capacity of 1560 (1200 beds and 360 cots). There are 48 wards where hospital beds are located, including Korle-Bu Polyclinic. Daily bed state data are well maintained by the nursing division of the hospital.

The objective of the study was to present and relate bed occupancy statistics to clinical manpower in a form that would aid planning and resource allocation in the hospital.

METHODOLOGY

The bed state data, i.e. daily census, usually counted at midnight and maintained by the hospital matron formed the raw data for this study. The daily summary information on bed state for all the combined hospital's reporting wards was keyed into a computer and analysed for 1991 and 1992. In addition, the daily data for each of the individual wards for September 1991 (one of the months selected at random) were also analysed. Data on nursing and orderly staff per ward were obtained from the report submitted by Management Services Division - Korle-Bu Teaching Hospital in 1990 and supplemented with information from the hospital matron and ward sisters. The number of doctors per ward was obtained from departmental secretaries. The manpower information should not be expected to be exact but close to what pertained in 1991, corresponding to bed state data of this study. The variables collected and analysed from the bed state books, included the following: the date, total beds, daily number of patients, admissions, discharges, number of floor patients, empty beds, nursing staff on admission, other medical staff on admission, patients detained, patients absconding, seriously ill patients, and number of deaths.

STATISTICAL ANALYSIS

The average daily statistics were calculated for the entire hospital for the two years. These were produced as simple arithmetic means of admissions, deaths, etc. However, bed occupancy rates by ward were calculated for the month of September, 1991 using terms as defined below. These included per centage bed occupancy, bed turnover, turnover interval and average length of stay by ward. Information for all theatre recovery wards and Korle-Bu Polyclinic were excluded, since they are not traditionally to admit patients but rather detain patients for short periods prior to admission to other wards.

Definition of Terms

Percentage occupancy
Occupied bed-days in a given period multiplied by 100 and divided by available bed-days in the same period.

Bed Turnover
The average number of patients managed per bed in a given period, i.e. discharges and deaths divided by available beds.

Turnover Interval
The average number of days beds lie vacant between successive patients, i.e. the number of vacant bed-days divided by number of discharges and deaths.

Average length (duration) of stay
Average number of days patients occupy a bed during admission, i.e. total occupied bed-days divided by number of discharges and deaths.

RESULTS

Average daily bed occupancy statistics for 1991/1992, Korle-Bu Teaching Hospital

In 1991, the average daily population of patients was 1166 with 92 admissions and 87 discharges. Eleven patients died every day. There were 313 empty beds/cots and average of 57 floor patients. About 2 per cent of the daily patient population was made up of nurses and other medical staff. Seriously ill patients (as categorised by the admitting physician) formed 6.4% of daily patient population. The bed occupancy rate was 75.2 per cent. The corresponding figures for 1992 were very close. The average daily patient population was 1156 with daily admissions, discharges and deaths being 103, 90 and 11 respectively (Table 1).

From the 1992 monthly data (Table 2), there was no seasonal variation in the daily patient population, admission, discharge and deaths figures by month, except that, the month of December recorded the lowest average daily admissions. One interesting feature is that in November and December, there were more discharges than admissions. It is also important to note that there were fewer floor patients in 1992 compared to the figure for 1991.

The estimate of bed turnover per month was 2 and the turnover interval was 4 days for the entire hospital. The average length of stay was 11 days.

Table 1.: KORLE-BU TEACHING HOSPITAL-AVERAGE DAILY BED OCCUPANCY STATISTICS FOR 1991 AND 1992

	BED STATE 1991		BED STATE 1992	
	Average	SD	Average	SD
Patient Population	1166	100.3	1153	133.3
Admissions	92	21.2	103	65.8
Discharges	87	22.4	90	33.5
Tranfers in	40	9.7	43	13.1
Transfers out	43	11.4	42	15.7
Floor Patients	57	27.3	27	18.5
Empty Beds	313	69.0	382	108.0
Nurses on Admission	15	4.1	14	4.5
Other Medical Staff	6	2.0	6	4.0
Detained patients	15	29.7	15	21.0
Absconding patients	0.4	0.6	1	3.4
Seriously ill patients	75	12.2	73.0	38.2
Deaths	11	3.7	11	5.4

Table 2.: AVERAGE DAILY PATIENT, ADMISSIONS, DISCHARGES AND DEATHS BY MONTH (1992)

	PATIENTS	ADMISSIONS	DISCHARGES	DEATHS
January	1136	102	86	16
February	1235	98	88	13
March	1239	106	104	12
April	1260	119	109	14
May	1325	111	101	10
June**	N/A	N/A	N/A	N/A
July	985	103	72	10
August	1081	114	75	8
September	1131	89	87	9
October	1145	125	94	9
November	1146	91	100	9
December	1032	75	81	10

***Data for June was not available*

Bed occupancy, and manpower statistics by Department/Ward

Table 3 shows the percentage bed occupancy by ward. In general, maternity wards had bed occupancy rate of over 90%, Surgical wards had bed occupancy rate close to 90%, Allied Surgical wards for orthopaedics with occupancy rate of between 80% and 90% , and Medical with about 80%. Wards with low bed occupancy rates were Surgical 6th floor (45.9%). Cardio thoracic unit (43.0%), Children's chest Ward (40.3%) and Maternity 6th floor (46.2%). Fevers unit had bed occupancy rate of 55%. Some of the wards had bed occupancy rate over 100% these wards obviously had floor patients, these included Allied Surgical Ward H for orthopaedics, Accident Centre, Children's Emergency, Maternity Ward 2 and Chenard Ward A.

Bed Turn Over Rate Per Month

The highest bed turnover rate was at Chenard A ward (gynaecological emergencies) with a rate of 5.6, high bed turnover rates between 4.5 and 5.5 were at maternity wards with exception of Maternity ward 6 which had a rate of 1.1. Medical wards had higher turnover rates compared to the main Surgical wards. Surgical Ward 1 for neurosurgical cases and Allied Surgical Wards for orthopaedics were also among the wards with low turn over rates.

Turnover Interval

The turnover interval is a real indicator of the demand for beds by the respective wards. The interval for the main Surgical wards (2,3,4, and 5) was shorter than the interval for the Medical wards. In general,

Table 3: KORLE-BU TEACHING HOSPITAL: MANPOWER AND BED OCCUPANCY RATES, SEPTEMBER, 1991

DEPARTMENT	BED OCCUPANCY RATES					ADMISSION/OUTCOME			MANPOWER		
	No. of Beds	Percent Occupied	Bed Turnover	Turnover Interval	Average length of stay	Admission	Discharge	Deaths	Doctors	Nurses	Orderlies
Surgical 1	40	76.3	0.5	15.8	50.9	14	15	3	2	17	8
Surgical 2	36	88.0	1.4	2.6	18.6	55	46	5	2	18	7
Surgical 3	36	88.8	1.1	3.7	24.0	42	36	4	3	22	8
Surgical 4	36	88.0	1.8	1.9	14.4	67	65	1	4	18	7
Surgical 5	35	89.0	1.5	2.8	18.0	55	51	1	3	20	8
Surgical 6	22	45.9	0.4	46.3	33.7	12	8	1	++	16	9
Cardio-Thoracic Unit	26	43.0	0.5	28.5	25.8	9	11	2	3	19	7
Allied Surgery A	25	60.3	2.0	5.3	9.0	51	47	3	8	12	5
Allied Surgery B	26	68.7	2.2	4.2	9.2	63	57	1	8	12	6
Allied Surgery C	25	92.3	0.5	5.4	57.7	12	10	2	5	12	4
Allied Surgery D	25	86.7	0.5	7.6	50.0	16	13	0	++	13	8
Allied Surgery G	30	74.4	1.0	7.5	21.6	26	20	11	6	12	5
Allied Surgery H	32	105.6	0.3	8.6	92.2	17	11	0	++	12	9
Allied Surgery I	42	81.1	0.6	8.6	42.6	19	24	0	++	13	7
Allied Surgery N	14	80.7	0.4	15.4	67.8	6	5	0	++	14	6
Surgical/Medical Emergency	32	96.0	**	4.7	16.2	35	35	22	++	27	3
Accident Centre	34	100.9	**	2.1	31.2	15	20	13	++	22	10
Medical 1	35	69.6	2.3	4.1	9.3	82	60	19	7	19	7
Medical 2	35	82.6	1.7	3.4	14.2	63	42	19	9	20	8
Medical 3	35	85.0	2.0	2.1	12.7	101	56	14	9	20	6
Medical 4	35	74.2	2.3	4.3	9.9	92	60	19	7	19	8
Fevers Unit	22	55.9	0.6	22.8	30.8	14	8	4	++	28	13
Chest Children	24	40.3	0.2	86.0	58.0	10	5	0	++	10	5
Chest Adult	42	97.3	0.9	1.3	33.1	35	24	13	6	14	8
Children's Emergency	30	138.7				0		49	++	24	4
Children's 1	44	71.7	1.4	5.9	15.0	61	60	3	2	26	8
Children's 2	47	80.0	3.9	1.0	6.2	191	169	13	18	24	9
Children's 3	71	63.5	2.3	4.3	8.5	165	134	26	8	37	8
Neonatal I.C. Unit (NICU)	36	79.8	3.7	1.8	6.5	159	99	34	2	21	4
Maternity 1*	41	89.8	5.1	0.8	5.3	60	207	1	6	12	4
Maternity 2*	41	110.5	5.2	0.3	6.4	64	213	0	6	14	5
Maternity 3*	41	94.2	5.5	1.2	5.1	51	226	1	6	12	5
Maternity 4*	41	97.7	5.2	0.7	5.6	57	212	2	6	12	6
Maternity 5*	48	93.3	4.5	0.7	6.2	46	217	1	7	13	7
Maternity 6*	22	46.2	1.1	13.6	12.2	17	25	0	++	10	5
Ward E	34	67.8	1.1	8.4	19.2	35	36	0	++	19	28
Chenard A (Gynae Emergency)	50	141.2	5.6	0.1	7.6	293	274	5	++	22	10

++ Ward is coverd by doctors of other related ward(s). *** Not calculated since most patients were recorded as detained.*

** Most of the discharges for Maternity wards were **TRANSFERED-IN POST LABOUR** patients from the Labour wards 1 and 2 rather than routine admissions to the Maternity wards.*

Maternity wards had shorter turnover intervals, beds did not lie free for too long before being occupied. Turnover interval was also short for Children's Floor 2 and Neonatal Intensive Care Unit (NICU) compared to the other Children's wards.

The private wards had long bed turnover intervals of 46.3 days for Surgical 6th floor and 13.6 days for Maternity 6th floor. Cardio-Thoracic Unit, Children's Chest ward, Fevers unit and Allied Surgical Ward N had long bed turnover rates.

Length of Stay

The length of stay per patient per ward followed a characteristic pattern, i.e. the values were around 6 days for Maternity Wards, 8 days for Children's Floors, 10-14 days for Medical wards. Surgical wards had a duration of between 14 and 24 days and Allied Surgical orthopaedics in the range of 42 to 92 days. Allied Surgical wards for Ear Nose Throat (ENT), Eye and Dental cases had an average value of 9 days. The within departmental differences could be related to the type of cases being managed at the wards. Long staying patients are found in Surgical ward 1 for neurosurgical cases, the orthopaedic wards and in Accident Centre. Some of these long staying patients may be termed 'Bed Blockers' [5], i.e. patients who stay on wards for 31 days or more and who in the opinion of the medical staff no longer required the facilities of an acute ward.

Admissions

Admissions were highest in Children's Floors 2, 3, and NICU in the range of 99 to 169 for the month. They were followed by admissions in Medical Wards with an average of about 80 patients for the month and then followed by admissions in Surgical of about 50 per month. Allied Surgical orthopaedic Wards had lower admission rate of around 20 for the month.

Discharges

In general, discharges mirrored the admissions except in the Maternity Wards where there were more discharges than admissions due to the large number of patients transferred into the Maternity wards from the Labour Wards to be discharged following delivery. These patients are referred to as 'Transfer in' instead of being admitted to the wards. The difference between admissions and discharged patients should be equal to the number of deaths and the number of absconding patients.

Deaths

The highest number of deaths occurred in emergency wards, (Children's emergency, Neonatal Intensive Care Unit (NICU), Surgical/Medical emergency, and Accident Centre). The ranking order of deaths in the departments were Child Health department, followed by deaths in the Medical wards and in the main Surgical wards. Deaths in Genito-urinary (GU) ward, i.e. Allied Surgical Ward G were as high as the deaths in Medical Wards. Deaths in Maternity wards were very few.

Manpower by Wards

Excluding housemen, Surgical wards had an average of 3 doctors to a ward, Medical wards and Children's Floors 2 and 3 had about 8 doctors per ward. Ear Nose and Throat (ENT)/Eye wards also had about 8 doctors. Maternity had an average of 6 doctors per ward. The relationship between the number of doctors and the work load by ward is not too clear from the data available. That is, it cannot be inferred from the data in this study that more doctors per ward means more admissions per ward.

Nurses and Orderlies by Wards

On average there were 16 nurses and 7 orderlies to a ward running three shifts. Private wards like the Maternity and Surgical 6th floors have more nurses than expected compared to the size of the patient population, due to the fact that individual nursing is practised in such specialised wards.

Total Manpower distribution for the Hospital

Table 4 summarises the manpower situation of Korle-Bu Teaching Hospital from the work of Management Services Division of Korle-Bu Teaching Hospital. The actual designations of the staff (about 260 grades of staff) have been re-grouped into the block of categories for easy comprehension. The work force for the hospital was at 3401. The recommended number, according to the Management Services Division was fixed at 2875. Twenty four per cent of the staff at post was made up of nursing staff and 13% made of orderlies and ward maids. Sweepers and labourers form 26.5% of the staff. Administrative support staff formed 12%, artisans and engineers also formed 12% and rest forming 12%. It must be noted that the number of doctors was not included in the report.

Table 4.: KORLE-BU TEACHING HOSPITAL— MANPOWER STATISTICS (1990)

CATEGORY OF STAFF	AT POST	RECOMMENDED
Accounts Officer / Assistants	26	13
Executive Officer / Secretary	19	15
Revenue Collector / Inspector	63	51
Storekeeper / Assistant / Sales girl	28	25
Typist / Clerk / Messenger	119	86
Biostat. / Records Officer / Coder	167	96
Artisan Foreman & Unspecified	80	58
Artisan Driver	77	77
Artisan Mason	12	11
Artisan Painter	13	13
Artisan Plumber	12	7
Artisan Carpenter	9	9
Engineer / Electrical / Auto / Lift	204	145
Sweeper / Labourer / Drains	904	793
Security / Watchman	40	37
Dietician / Kitchen staff	79	68
Laundry	50	37
Seamstress	10	3
Pharmacy / Dispensary Assistants	62	52
Nursing Officer and above	199	182
Nurse Midwife	222	215
Nurse Staff / State	101	98
Enrolled Nurse / Midwife	298	265
Orderly Male / Female	299	240
Ward Maid / Assistant	160	129
Laboratory / Dental / X'ray / Physio	146	138
Others	14	12
Total	3401	2875

Source: *Summary of Job Inspection Report* submitted by Management Services Division — Korle-Bu Teaching Hospital (June 1990).

DISCUSSION

The study has quantified the work load (admissions, patient population) and performance (bed occupancy, bed turn over, etc.) of the Korle-Bu Teaching Hospital as a whole and that of the individual wards in such a way that would make comparisons between and within departments of the Hospital possible. The information provided can form a basis to striving for improvements. Statements on the work load and performance of the entire Hospital will require a comparative study with other Hospitals of similar set up.

From the results of the study, it can be inferred that the hospital may be operating below the optimum, though a few departments may be overstretched. About 10% of the hospital's daily patient population are new admissions and about 1% of the daily population die each day. Considering the bed occupancy rate of 75.2% obtained from this study, it should be possible to consider a policy of increasing the admission rate of some departments, for example, Medical Wards. Despite the need to have free beds during the duty days, the daily average of 4 beds vacant in all the Medical wards (after the day's admissions) indicates conservative admission practice. There is a general desire to be conservative on the use of hospital beds that is to reserve beds for patients who really need them. However, in the situations where Hospitals are to generate their own funds, the management of hospital beds must be of special interest.

Information in this study will be useful when it comes to re-arrangements of beds in the hospital and within departments. The information must be used by each department to re-shape the department's specific admission policy before moving across to other departments for additional beds. For example, despite the pressure on Maternity wards and Chenard Ward A, the bed occupancy rate for Ward E of the same department was low. The inter-departmental re-allocation of beds following the intra-departmental re-organisation could then be done on evidence of need and economic consideration of income from admissions. The lower than average per centage bed occupancy in the Fever's Unit and Children's Chest Wards gives a clear indication for more economic use of beds and space in these departments. The low occupancy in the Maternity and Surgical 6th floors and the Cardio Thoracic unit may be explained by the fact that they are much more expensive than the other wards and also that special wards or beds have to be kept for special circumstances.

Another area of concern in addressing the use of hospital beds is the duration of stay in hospital. This is related to the reasons for admission[6] as well as the management style of the doctors. There is no doubt that most orthopaedic cases require long hospital stay. However, recent advances in other areas have cut down the duration of stay of certain conditions like uncomplicated herniorrhaphy drastically. Further breakdown of the duration of stay by the various diseases which should be possible through the analysis of admission and discharge data can be useful in interpreting the figures of duration of stay by the various departments and in arriving at where savings could be made.

The bed turnover rate is inversely related to the duration of stay by patients in the ward as well as the availability of beds in the wards. This statistics cannot be used to demonstrate performance across departments but can be used for assessing performance within departments especially if similar cases are handled by the wards. For example, Maternity ward 5 had a bed turn over rate of 4.5 compared to a rate of 5.5 for Maternity ward 3 even though they all have the same bed occupancy rate, giving the average duration of stay as 6.2 and 5.1 respectively. If the same type of cases are managed by the two wards then the problem may be reduced to the management style of the two teams and other factors such as demands for teaching.

In the situation of a teaching hospital, the economic considerations of the hospital should not be taken in isolation. More occupied beds would ensure wide spectrum of cases for the students[7]. It may even be possible that cases are kept in the hospital a few days longer to assist in the teaching and examination. Thus, in shaping the policy on the use of hospital beds, physicians must be given full responsibility and scope to do what is best for the patients and students. Increasing speed of turnover means that some students never have the opportunity of spending time with their patients[7]. However,, the need to teach should not lead to general poor estimates of the indicators.

The prevalence of floor patients and empty beds in other wards should be reconciled after detailed study and discussions by all departments. The existence of floor patients is an indicator of poor quality of care with respect to the administration of the hospital and efforts must be made to discourage the practice. Corridor beds[8] have been used in some hospitals to address temporary pressure on hospital beds rather than keeping patients on the floor. In the case of Maternity wards it can be stated that floor patients may be avoided by use of private maternity homes and the polyclinics for delivery of uncomplicated pregnancies. In addition a policy to allow doctors on duty to admit to other wards with empty beds may help to check floor patients.

Mortality data in some circumstances reflect on quality of care at the hospital. Deaths are linked to the type of diagnosis and patient's characteristics on the wards and here again, the inter-departmental and even intra-departmental comparison may not yield useful information without data on types of cases by ward. Deaths in Medical wards which in this study were about 20 per ward for the month of September (21% of admissions for the month) is comparatively high. One reason may be that most cases which are deemed incurable in other hospitals in Accra and indeed Ghana get referred to Korle-Bu, and the Medical Department in particular. These include renal and liver failure, strokes and cancers. Deaths in children's wards are more likely to be due to acute conditions, most of which are preventable. Deaths from preventable causes are considered as unnecessary deaths, and they constitute an index of poor quality of care[2]. They may show a failure of public health education and immunisation programmes.

It should be realised that in comparing the deaths in the departments, the deaths must be related to admissions (case fatality rates). Medical wards had a case fatality rate of 21% compared to a rate of 22% in Children's Wards. Case fatality rate for Surgical Wards was 6.1% and that for Maternity was 1.7%. These estimates somehow sum up the risk of dying in the various departments.

Health manpower of institutions is an important area needing policy review. There is no doubt, that Hospital Nursing Administrators demand for more nurses per ward to ensure quality of care. The desire is to have 1 nurse to 4 patients per shift, however, the data indicate a ratio of about 1 to 5 patients per shift in most of the wards. The numbers must be related to the work being done by the ward and whether individual nursing is being practised. Operational research can be carried out using different combinations and sizes of staff to ward over a period of time to study the implication on work load in order to arrive at the optimum number for both nursing and Hospital Administration. It will not be possible to discuss whether the manpower per ward is adequate or inadequate or excessive in this study, but the Medical Wards and Children's Wards appear to be well endowed with doctors compared to Surgical Wards. The issue of slow turn over of beds in Surgical Wards could be due to the fewer numbers of doctors per ward and therefore heavy workload per doctor. However, surgical cases generally may need longer pre-and post-operation stay in hospital. There is a need for many Doctors on Emergency duties in the Child Health Department including NICU.

Thus, in conclusion, Korle-Bu Teaching Hospital, with a bed capacity of about 1500 and health manpower of about 3700 admitted about 35000/year, and recorded about 4000 deaths/year in the study period. The average bed turnover per month was about 2 and the mean duration of stay was 11 days with bed turnover interval of 4 days. The bed occupancy rate was 75%.

Data on in-patient load and outcome as displayed in this study can complement data on disease pattern to justify the staffing pattern and to ensure optimum health expenditure. However, lack of comparable data for similar institutions makes it difficult to interpret the indicators of hospital efficiency and for the purpose of assessing the quality of care in the hospitals.

There is a strong inclination to state that the hospital's resources could be used more efficiently than at present. The indicators obtained in this study must be used as yard stick to strive for better estimates in future. There is urgent need to study the changes that are essential for enhancing the efficient and effective use of available resources.

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