ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF SERVICE UTILIZATION AMONG INPATIENT SERVICES IN PUBLIC HOSPITALS OF ADDIS ABABA CITY, ETHIOPIA

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Assessment of Service Utilization among Inpatient Services in Public Hospitals of Addis Ababa City, Ethiopia

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List of Abbreviation

AACHB:	Addis Ababa City Health Bureau
AAU:	Addis Ababa University
ALS:	Average Length of Stay
BOR:	Bed Occupancy Rate
BTR:	Bed Turnover Rate
CHS:	College of Health Sciences
EFY:	Ethiopian Fiscal Year
EHRIG:	Ethiopian Hospitals Reform Implementation Guideline
FMOE:	Federal Ministry of Education
FMOH:	Federal Ministry of Health
FMHACA:	Food, Medicine and Healthcare Administration and Control Agency
IPD:	In Patient Department
MOH:	Ministry of Health
OPD:	Out Patient Department

Abstract

Background: Inpatient service is a part of hospital system and operates its available inputs to produce the desired outputs. Usually utilization refers as use of inputs in terms of beds and patient turnover to produce outputs in terms of discharges and inpatient days. Actually efficient utilization is associated with optimal use of available inputs and more production of outputs. However most of the hospitals' inefficient utilization was not identified with appropriate methodology; routine inpatient data didn't used exhaustively; inpatient indicators, its analysis and interpretation as well as the implication of variations were not fully understood.

Objective: To assess service utilization among inpatient services in public hospitals of Addis Ababa city in April 2013.

Method: A retrospective record review study design was employed and all inpatient records during past three years selected to assess service utilization among inpatient services in public hospitals of Addis Ababa city. A structured checklist developed, pretested and the required data elements collected from all inpatient registers and reports.

All monthly based collected inpatient data checked for data clearance and entered into EXCEL database that computed each data elements into annual total and three years average then utilization indictors were calculated with their correct nominator and denominator values. Computed results further analyzed with SPSS version 20 software procedures that generated descriptive statistical data and it was summarized in tables. Finally relative ranks of wards compared against the average indicators value and categorized into four quadrants by applying PABON LASSO compartmentalize technique.

Results: Average utilization in bed occupancy was 53.2% and bed turnover was 40 patients per bed per year during past three years. Among PABON LASSO quadrants the majority 36% of wards lie on inefficiently utilized in contrast 28% of wards lie on efficiently utilized during the past three years.

Conclusion: The study findings clearly identified that 54% of wards underutilized their inpatient services in public hospitals of Addis Ababa City due to an excess of unused beds and longer hospitalize days during the past three years.

1. Introduction

1.1. Background

Inpatient service is a part of hospital system and it is usually operates its available inputs to produce the desired outputs. Usually utilization refers as the use of inputs in terms of beds and turnover which transfers appropriately into the production of outputs in terms of discharges and inpatient days. Actually efficient utilization is associated with optimal use of inputs and more production of outputs in contrast underuse of inputs is also associated with less production of outputs subsequently it contributed to inefficiently utilization of inpatient services (1).

Utilization is measured with indicators such as bed occupancy, turnover and average length of stay and it indicates the level of services uses and whose use varies significantly across wards/hospitals. The variation of utilization in higher or lower rates it associated with not only differences in hospital typology in terms of allocation budget, staff pattern, case mix, technology used but also in their relative use of inputs efficiently (2).

However most of hospitals' inefficient utilization was not identified with appropriate methodology; routine inpatient data didn't used exhaustively; inpatient indicators and its analysis and interpretation as well as the implication of variations were not fully understood. Actually the reliability of inpatient data didn't cheeked routinely. Inpatient indictors' analysis and interpretation and the implication of variations were not fully understood (3).

There is very limited in use of occupancy and turnover in graphical/tabular forms (i.e. PABON LASSO model) to identify profiles of efficiency, formulate hypotheses on causes to find solutions and test them by monitoring their progress in additions inpatient indicators were not applied as a parameter for resources allocation, activities planning, monitoring and performance evaluation (4).

Therefore the aim of the study was to reviews documents during past three years recorded in all inpatient services to assess the level of utilization among inpatient services in public hospitals of Addis Ababa City. Data analysis based on indicators which are relevant for inpatient such as bed occupancy and turnover rates with applying a PABON LASSO model. It provided a meaningful and comparable information on utilization which contributes to improve evidence based decision making practices on the provision of efficient and effective inpatient services.

1.2. Statement of the problem

Inpatient service is the most poorly utilized healthcare intervention so that most of hospitals are failed to meet their patient demand. Because, low occupancy and turnover are a cause for underutilization due to inappropriate uses of available hospital beds (5).

Most of studies identified that half percent of bed occupied in most of hospitals meaning one out of two beds lay idle across period of time. Low occupancy had been causing very low utilization because the demanding of inpatient care is limited within fewer patients. Where patients admitted a longer stay than necessary it could be caused lower turnover and less discharges but it results a high occupancy while it doesn't associating with full service capacity (6).

In the same way high occupancy is not always necessarily a positive aspect because high occupancy could be associated with poor quality of service due to patient overcrowding and staffs over workload it might be observed higher mortality rate (7).

Overutilization can be determined with high occupancy and turnover rates while it might be associated with too fast discharging of patients in less than the required length of stay in this case the probability of higher degree of complications after discharge and the rate of readmission increased. High bed occupancy rate associated with unnecessarily high average length of stay in poor quality of care because patients stayed in lengthy days due to poor inpatient service management (8).

Both unused bed and unnecessary occupied bed are the root cause of poor hospitals utilization while occupancy and turnover are the most measure of hospital efficiency but the failure it lacks policy makers to identify area of inefficiency that absorbed resources to transform inputs into outputs because full utilization of beds and high turnover produced more discharges and inpatient days (9).

Therefore inpatient utilization indicators such as bed occupancy and turnover rates are markers that derived from real number to visualize a full picture of inpatient service utilization so the study contributed evidences that should be required to identify problems and to design appropriate strategies in order to solve the problem of inpatient service utilization as well as to monitor the progress of actions that taken to improve the level of utilization across wards and hospitals.

1.3. Rationale of the study

Actually, inpatient service utilization indicators such as bed occupancy rate and bed turnover rates are markers that derived from the real numbers to visualize the full picture of wards/hospitals.

Most of previous studies their study unit was hospital because the difference level of utilization among individual wards within the hospital is difficult to observe so it masked the problem of inefficient utilization across wards as a result it is not easy to take specific actions to correct wards problems specifically.

Moreover utilization review could be assessed the appropriateness of admission, provided length of stay and discharge practice on a retrospective basis however most of previous studies reviewed only one fiscal year so it makes difficult to observe how the data reliable because to check inpatient data reliability at least it needs a three years consecutive data to observe the trend whether it is consistent or inconsistent over a period of time.

In health service research it is advisable to analysis and interpret data with simple and easy procedures because it has high probability to apply at the working area so PABON LASSO model is the usual preference to analyze and interpreted of inpatient indicators with a tabular technique that compartmentalize hospitals/ wards into four category based on their relative rank moreover it is the best for quick investigation and identification of poorly performed inpatient services and finding appropriate strategies to correct them.

Therefore the study assess inpatient indicators based on past three years reviewed records from all wards in public hospitals of Addis Ababa city and it provided up-to-date meaningful comparable information on inpatient service utilization which contributes to improve the current inpatient management practice through applying the study finding for the purpose of inpatient service problem identification, planning, resource allocation, activity monitoring and performance evaluation across all hospitals in order to achieve a better results in improving inpatient service utilization.

2. Literature Review

2.1. Inpatient service indicators

Romanian university hospital's internal medicine, nephrology, surgery, urology and intensive care unit recorded document reviewed in two years period. The study shows there was 255 beds capacity in the respective wards and the trend of admission decreased from 7434 to 7147 although bed occupancy and turnover rates were increased from 67% to 87% and 31.67 to 39.79 patients per bed respectively whereas average length of stay slightly increased from 7.72 to 7.98 days. When comparison of individual wards, average length of stay was longer in internal medicine than surgery and urology; bed occupancy was also the highest in urology and maximum turnover scored in the surgery while a minimum score in internal medicine scored (10).

The review on 23 Iranian public hospitals records it had capacity of 3890 active bed with the range of 25 to 502 beds among study hospitals. Overall average bed occupancy was 74.50%, bed turnover 56 patients per and average length of stay 4.9 days. The position study of hospitals in the PABON LASSO graphic model it located as 18% at quadrant one, 8% at quadrant two, 18% at quadrant three and 22% at quadrant four (11).

Three years records of 16 central and regional hospitals reviewed in South Africa and it identified 75% bed occupancy, 39 patients per bed per year bed turnover and 7 days of average length of stay. In PABON LASSO graphic model the study hospitals were located at 29% quadrant one, 6% quadrant two, 40% quadrant three and 33% quadrant four. While plotting of PABON LASSO graph to interpret efficiency of utilization according to hospitals occupancy and turnover rate make sense only if the hospitals have similar characteristics (12).

In Malawi capacity utilization was assessed in 40 public and mission district hospitals and it showed that 50% bed occupancy rate, 51 patients per bed per year bed turnover rate and 4 days average length of stay. In the PABON LASSO diagram they located at 27.5% of in the desirable region (right upper region), while close to 50% at the left lower region where the most undesirable and it indicated the presence of a significant proportion of unutilized capacity due to either excess bed supply or less need for hospitalization or low demand for or utilization of hospital services (13).

Two years records of 8 public and private for-non-profit hospitals reviewed in Uganda and the overall average bed occupancy was 60% and bed turnover 38 patients per bed per year. The PABON LASSO graph analyzed that 50% at Sector 1 (lower left) is considered relatively inefficient and 27.5% at Sector 3 (upper right) more efficient (14).

In our country, national hospital performance indicator assessment conducted in 47 public and private for non-profit hospitals and the national average bed occupancy was 50.8%, 27.8 inpatients turnover per bed and 6.7 days of average length of stay. The PABON LASSO graphic demonstrated as among 7 regional hospitals 4 (57%) of Quadrant-III where the most efficiently utilized, 2 (29%) at Quadrant-II mixed utilization and 1(14%) was Quadrant-I where inefficient utilization (15).

2.2. Inpatient services process

Hospitals equipped with higher asset performed a better quality of care than those less equipped. The study conducted in Indian Tertiary, Multi-Specialty and Secondary care hospitals and it revealed that there is a positive correlation its quality of care where severe and complicated patient care hospitals that spend more to invest on infrastructure, machinery and property than those less. Even well equipped and availability of clean drinking water, toilet facilities improved the chances of patient survival (16).

Higher staff to bed ratio reduce the need for intensive care services and medical equipment support as long as provides a better quality of care to reduce the average length of stay. This related with the study conducted in Palestinian six hospitals and it shows that 63.03 average beds capacity working with 0.69 nurses per bed the hospital performed higher 76.8% of average bed occupancy rate (17).

Improved staff distribution associated with improving the efficacy in hospitals service delivery and it leads to increasing service utilization. The study of Ghanaian government and mission hospitals productivity which expressed as inpatients days per staff members so in the study hospitals 3,236 inpatient days per doctor and 401 inpatient days per nurse served. This pattern seem consistent with other developing countries; like Sri Lanka, the productivity ranged between 1,510 and 2,529 inpatient days per doctor and between 465 and 694 inpatient days per nurse (18).

A measurement is reliable if it provides the same value when it is repeated under identical conditions. The reliability of hospital data was assessed in 67 public hospitals of South Africa and the finding indicated that over-estimation of occupancy and turnover was more common than under-estimation. The numbers of admissions, discharges, deaths, deliveries and adult beds were more reliably reported than the numbers of transfers, juvenile beds, cribs and incubators.

Most hospitals over-estimated their utilization because of an under-reporting of beds and or an over-reporting of inpatient days and discharges. Unreliable reporting was due to different interpretation about what should be included and excluded in the counting of each variable such as useable bed, and how consistently the criteria were applied within each hospital and across hospitals. Another source of variation was due to the file transformation when the data were sent from each hospital to the district level and from the district to the central level (19).

2.3. PABON LASSO Model

PABON LASSO model is a technique that demonstrated inpatients services into four quadrants by two lines drawn according to the average bed occupancy rate and bed turnover rate. The bed occupancy rate is represented in the horizontal axis and bed turnover rate in the vertical one. As illustrated in figure 3, compartmentalize category is described into four quadrant (20, 21):-

Quadrant-I: is characterized by low occupancy and turnover and therefore underutilization (or inefficient utilization). This may be related to a higher number of beds than needs and/or a low demand for hospitalization. It demonstrate as underuse of inputs in terms of available beds due to less need/demand for hospitalization or/and the number of beds is high relative to the current demand, the hospital demonstrates poor performance or/and surplus of ward beds relative to the current demand or/and excess bed supply or/and less production of outputs in terms of discharge and inpatient days.

Quadrant-II: is characterized by a higher than average turnover and a lower than average occupancy and therefore mixed-utilization. This may related to a higher number of beds than need and/or unnecessary hospitalization and/or a high number of normal deliveries. It demonstrates as multiple patients requiring short-term hospitalization or/and predominance of normal delivery or/and applying the hospital beds for simply observing patients, many patients admitted for observation or/and misuse of inputs in terms of beds due to surplus bed capacity among these hospitals or/and an oversupply of beds, excess bed capacity, related to higher

number of bed than need or/and potential for unnecessary hospitalization or/and also production of more discharge but less inpatient days.

Quadrant-III: is characterized by efficient utilization (or optimal utilization) because the occupancy and turnover higher than the average. It demonstrates as optimal use of inputs in terms of beds due to these hospitals have reached an appropriate efficiency with the minimum number of beds used or/and an appropriate level of efficiency, with relatively few vacant beds at any time or/and small proportion of unused bed or/and more production of outputs in terms of disgorges and inpatient days due to optimal level of productivity.

Quadrant-IV: is characterized by a higher than average bed occupancy and a lower than average turnover and therefore mixed-utilization. A higher proportion of server patients and/or a high proportion of long term cases, and/or unnecessary stay may cause this situation. It demonstrates as long-term hospitalization of the patients, perhaps under-using or/and admitting chronic patients or unnecessarily, Unnecessary long stay or/and large proportion of severe cases or/and predominance of chronic cases.

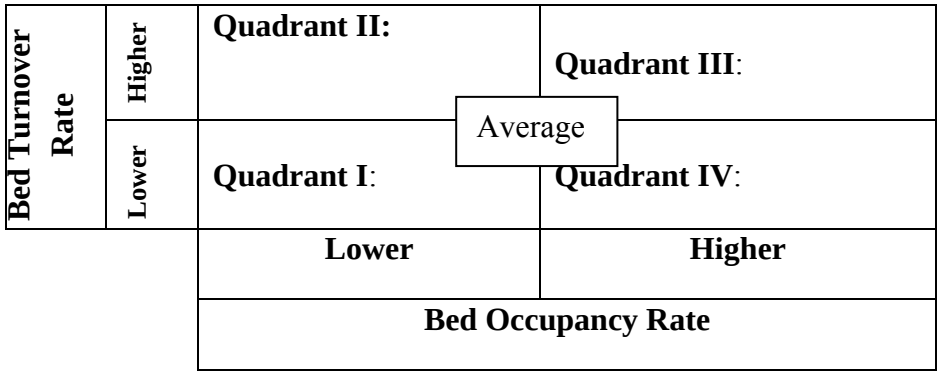

Figure 1: PABON LASSO model

This graphical illustration of the hospitals can be used for rapid investigation and identification of those with poor performance and is helpful to offer the ideas for reducing inefficiency. However it is significant to consider that these three indicators constructing PABON LASSO model can be influenced by some inevitable and non measurable factors, so this limitation reminds and emphasizes on applying this model together with the other assessment techniques to achieve a real and more complete image of the hospital performance even thought a single indicator can misleading conclusions so it is necessary to make use of all three indicators simultaneously so as to have a better picture (22).

Conceptual framework for inpatient service utilization

The relationship of inpatient services utilization expressed as optimal use of available inputs in terms of beds and turnover is associated with the production of more outputs in terms of discharges and inpatient days and in the contrast suboptimal (underuse) of available inputs in terms of beds and turnover is associated with the production of less outputs in terms of discharges and inpatient days (23) (24).

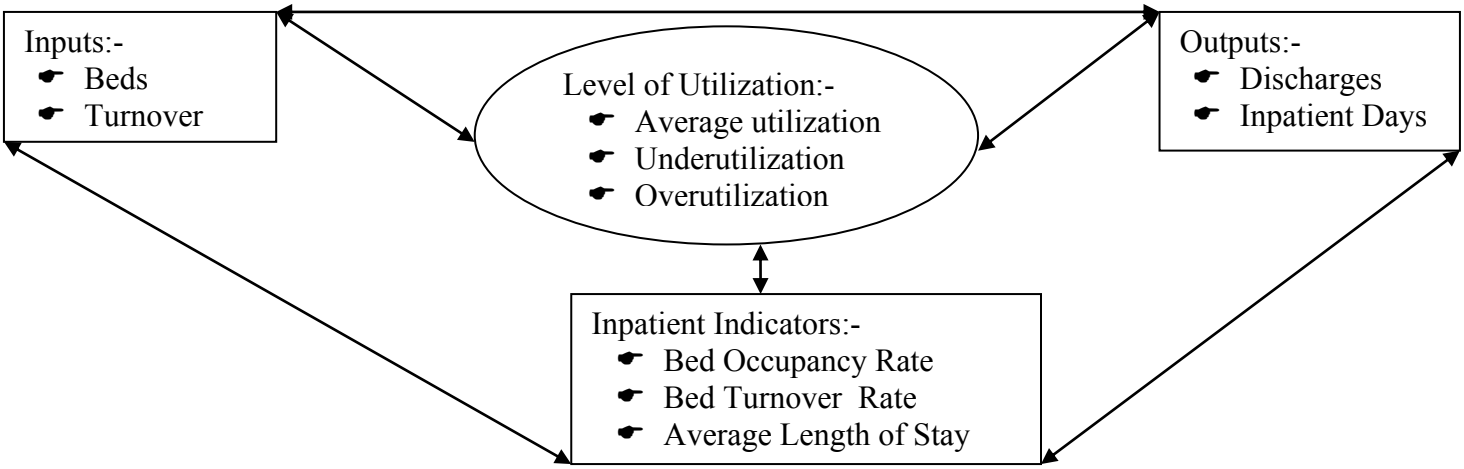

Figure 2: Conceptual framework for inpatient service utilization

Bed occupancy rate is indicating the level of bed filled (occupied). Hospital beds once available, no matter how there are provided, it should be used optimally. Full occupied beds with short hospital days produced more inpatient days and contribute to higher occupancy rate or increased utilization (23,24).

Bed turnover rate is indicating the frequency of patient contact. Even if all beds occupied at all times, the beds must be served for the required number of patients' turnover so high turnover produced more discharges (23,24).

Average length of stay is indicating hospitalize days. Advanced in inpatient technology have led to a considerable reeducation in the average length of stay of patient. This has lead to an overall reeducation in number of hospital beds and a higher turnover in patients subsequently it produced more discharges and inpatient days (23,24).

Full utilization of beds and high turnover produced more discharges and inpatient days contributed overutilization which is too much use of services or an excess of some optimal rate and vies versa for underutilization (23,24).

3. Objectives of the study

3.1. General objective of the study

- To assess service utilization among inpatient services in public hospitals of Addis Ababa City.

3.2. Specific objectives of the study

- To review admission and discharge records among inpatient services in public hospitals of Addis Ababa City.
- To estimate bed occupancy and turnover rates among inpatient services in public hospitals of Addis Ababa City.
- To compare the relative categories among inpatient services in public hospitals of Addis Ababa City.

4. Methods and materials

4.1. Study area and period

There are six public hospitals found in the Addis Ababa city and the city health bureau had an administration role to all of them.

4.2. Source population

Source population constitutes all inpatient records in public hospitals of Addis Ababa City.

4.3. Study population

Study population constitutes all inpatient records in public hospitals of Addis Ababa City where inpatients that documented records during past three years from 2002 to 2004 EFY**.**

4.4. Study design

Retrospective record review was employed to all inpatient records in public hospitals of Addis Ababa City.

4.5. Inclusion criteria

All inpatient records had documented during past three years from 2002 to 2004 EFY**.**

4.6. Sample size determination

All inpatient records that documented during past three years were included in the study. Based on "WHO health facilities assessment guideline" it recommended that all hospitals inpatient records should be included in the study where total number of health facilities that existed in the study when less than ten. Therefore suggested number of health facilities to be selected in the study according to the summary table all inpatient records documented during past three years in public hospitals of Addis Ababa city included in the study. See WHO health facilities assessment guideline how to determine sample size in the reference list number (25).

4.7. Sampling procedures

All inpatient records that documented during past three years in public hospitals of Addis Ababa city where reviewed with followed the sampling procedure here below. All inpatient records that documented during past three years found in all inpatient services those meet set inclusion criteria in public hospitals of Addis Ababa city participated in study. Records that documented

during past three years from 2002 to 2004 EEF selected from all inpatient services (wards) and then all recorded data reviewed at monthly basis from the respective inpatient services' (wards') that documented in all admission and discharge registers and reports records. See the standard recording format (26).

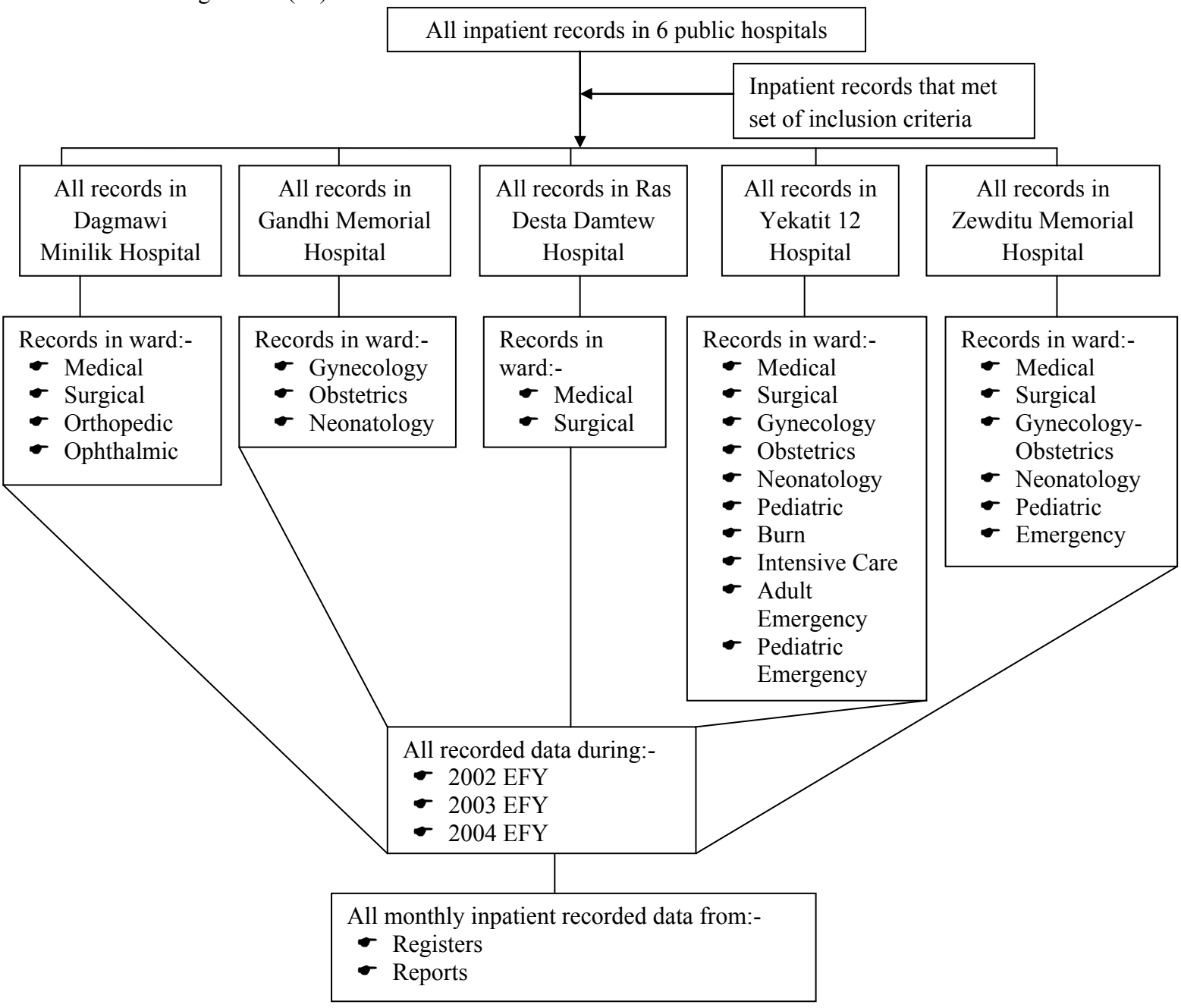

Figure 3: Sampling procedure illustration

4.8. Data collection tools and technique

A structured checklist used to collect inpatient recorded data elements. The checklist was prepared in English version that adapted from admission and discharge register and report formats. The checklist had two parts that obtained general information and specific inpatient activities that monthly recorded during past three years from 2002 to 2004 EFY from all respective inpatient services (wards). The required inpatient data elements consist of number of beds, admission, discharge, death and inpatient days during past three years (see annex 11.1: Inpatient services utilization assessment checklist).

The study recruited one first degree qualification supervisor and three diploma qualification data collectors. A two days training provided on familiarizing the checklist from inpatient register and report formats; relevant skills on how to reviewing records, interpersonal communication as well as on basic ethical principles. Finally the checklist pretested in five wards (inpatient services) and the necessary correction had made accordingly.

4.9. Data processing, analysis and interpretation

All collected monthly inpatient data elements checked for data clearance then entered into EXCEL database that computed each monthly data elements into annual total and three years average then the necessary inpatient utilization indictors calculated with their correct nominator and denominator and generated the necessary computed results. All inpatient numerical data analyzed with SPSS version 20 software and generated descriptive statistical results then finally analyzed data summarized in tables.

Inpatient data further analyzed into comparing relative rank based on the average value of indicators and categorized into four quadrants of PABON LASSO model. This model is a compartmentalize technique that located wards/hospitals into four quadrants according to score value of bed occupancy and turnover rates. Finally inpatient data interpreted into intended study findings based on the result that analyzed as required. Therefore major study problems discussed, concluded as well as recommended accordingly in the respective section of research thesis report.

4.10. Variables of the study

4.10.1. Dependent Variable

- Level of inpatient service utilization

4.10.2. Independent Variables

- Admission
- Discharge
- Bed occupancy
- Bed turnover

4.11. Operational definition and indicators formula

Inpatient: a patient who admitted in the hospital and stay overnight or for several weeks or months (12,17).

Bed occupancy rate (BOR): is the ratio of inpatient days per bed days. It indicates the percentage of beds occupied by patients in a defined period of time, usually a year. It is computed using the following formula:

$$\text{Bed Occupacy Rate (BOR)} = \left[\frac{Number\ of\ inpatient\ days}{Number\ of\ bed\ days}\right] \times\ 100$$

- *Where; an inpatient day is the sum of total length of patients stayed in the hospital. bed days is the product of number of bed that available in the inpatient wards to the total number of annual working days it usually recorded as 365 (number of days in a year). This is a method commonly used in assessing hospital performance. Hospitals would be operating efficiently at an occupancy rate of 85-90 percent (20).*
- *The unit of BOR measured in percent*

Bed turnover Rate (BTR): is the ratio of total number of admission or the sum of alive discharge and death per number of beds. It represents the number of patients treated per bed in a defined period of time (usually a year). It is computed using the following formula:

$$\text{Bed Turnover Rate (BTR)} = \frac{Total\ number\ of\ admission}{Number\ of\ beds}$$

- *Turnover ratio in acute care hospitals is expected to be higher than that of chronic hospitals. It is also expected to be higher in lower-level hospitals as compared to higher-level ones (20).*
- *The unit measured in patient per bed per year*

Average length of stay (ALS): This measure refers to the average number of days that a patient stays in a hospital. It is calculated using the following formula (20):

$$\text{Average Length of Stay (ALS)} = \frac{Total\ number\ of\ inpatient\ days}{Total\ number\ of\ admssion}$$

- *Where; an inpatient day is the sum of total length of patients stayed in the hospital.*
- *The unit measured in days*

4.12. Data quality management

During data collection the data collectors checked at spot and the principal investigator hold a daily review meeting with data collectors and supervisor as necessary. Inpatient recoded data checked for its completeness in terms of type of raw data elements and specific period of recorded time with the respective inpatient services (wards) and the amount and pattern of results. The reliability of data was also checked whether it was consistent or inconsistent during past three years.

4.13. Ethical consideration

Ethical clearance secured from the Research and Ethics committee of School of Public Health, College of Health Sciences Addis Ababa University. Then permission obtained from Medical Service Directorate of Federal Ministry of Health; Curative and Rehabilitative Core process of Addis Ababa City Health Bureau; the study public hospitals had done their intuitional review and they permitted the study to proceed on time.

5. Result

5.1 Inpatient service characteristics

The study reviewed all records of inpatient registers and reports when documented during past three years from 2002 to 2004 EFY. Record review was carryout in five public hospitals of Addis Ababa City and the required inpatient raw data collected from all wards (number of inpatient services) where provided in those studied public hospitals.

As summarized in table 1 blow; there were 10 types of inpatient services in those wards among of them gynecology-obstetrics where the most frequent 5 (20%). This ward separated into gynecology and obstetrics wards in Gandhi and Yekatit 12 hospitals but integrated as a single ward in Zewditu hospital. Type of inpatient service like orthopedic, ophthalmology, burn and intensive care where provided less frequent 1 (4%) during past three years.

Table 1: Characteristics of inpatient services during past three years in public hospitals of Addis Ababa city, April 2013

Inpatient Case Mix	**Inpatients**	
	Frequency (n)	**Percentage (%)**
Gynecology- Obstetrics wards	5	20
Medical wards	4	16
Surgical wards	4	16
Neonatology wards	3	12
Emergency units	3	12
Pediatric wards	2	8
Orthopedic ward	1	4
Ophthalmic ward	1	4
Burn unit	1	4
Intensive care unit	1	4
Total	**25**	**100**

5.2. Inpatient admissions and discharges

During past three years recorded admissions described as summarized in table 2 below; it was 34,787 patients in 2002FY 35,031 patients in 2003FY and 36,669 patients in 2004FY and in average 35,496 patients recorded per year. Admission records had a consistent and increasing trend during past three years so it was a reliable data.

Admission among all wards; the maximum 5, 548 patients recorded in obstetrics ward of Gandhi hospital and the minimum 65 patients recorded in burn unit of Yekatit 12 hospital. Almost at equal proportion 13 (52%) of wards had a consistent trend whereas 12 (48%) of wards had inconsistent admission trend during past three years.

Similarly admission among all public hospitals the highest 11,607 patients recorded in Gandhi hospital and lowest 3,209 patients recorded in Ras Desta hospital. The majority three hospitals such as Dagmawi Minilik, Gandhi and Yekatit 12 had a consistent admission trend whereas Ras Desta and Zewditu hospitals had inconsistent admission trend recoded during past three years.

Discharge records during past three years described as summarized in table 2 below and it was 31,396 patients in 2002FY 32,586 patients in 2003FY, 33,326 patients in 2004FY and in average 32,436 patients recorded per year. Discharge records had a consistent and increasing trend during past three years so it was a reliable data.

Discharge among all wards the maximum 5, 548 patients recorded in obstetrics ward of Gandhi hospital and the minimum 68 patients recorded in burn unit of Yekatit 12 hospital and almost at equal proportion 13 (52%) of wards had a consistent and increasing discharge trend whereas 12 (48%) of wards had inconsistent discharge trend hence unreliable data recorded during past three years. Among all hospitals the highest 10,660 discharges recorded in Gandhi hospital and lowest 3,137 discharges recorded in Ras Desta hospital and in all hospitals except Gandhi had inconsistent discharge trend and unreliable data recorded during past three years.

Table 2: Admission and discharge recorded data during past three years in public hospitals of Addis Ababa City, April 2013

Wards and Hospitals	**Admission in EFY**				**Discharge in EFY**			
	2002	**2003**	**2004**	**Average**	**2002**	**2003**	**2004**	**Average**
Medical ward	1989	1107	1231	1442	945	1159	1159	1088
Surgical ward	980	1135	1173	1096	920	1105	1159	1061
Orthopedics ward	322	424	403	383	225	347	393	322
Ophthalmic ward	2048	1961	1009	1673	1667	1762	931	1453
Minilik Hospital	**5339**	**4627**	**3816**	**4594**	**3757**	**4373**	**3642**	**3924**
Gynecology ward	4637	5375	5290	5101	4356	4958	4356	4557
Obstetric ward	5095	5230	6318	5548	4886	5048	5681	5205
Neonatology ward	416	935	1524	958	350	920	1425	898
Gandhi Hospital	**10148**	**11540**	**13132**	**11607**	**9592**	**10926**	**11462**	**10660**
Medical ward	2229	1928	2163	2107	2327	2022	2007	2119
Surgical ward	848	989	1466	1101	810	959	1285	1018

Ras Desta Hospital	**3077**	**2917**	**3629**	**3208**	**3137**	**2981**	**3292**	**3137**
Medical ward	1234	1213	1196	1214	1249	1299	1256	1268
Surgical ward	692	682	673	682	570	549	643	587
Gynecology ward	542	323	317	394	561	300	322	394
Obstetric ward	2889	2861	2823	2858	2928	2610	2821	2786
Neonatology ward	937	942	853	911	765	799	806	790
Pediatric ward	799	729	717	748	732	714	613	686
Burn unit	70	63	63	65	79	64	60	68
Intensive care unit	364	182	179	242	329	164	164	219
Adult Emergency unit	265	329	257	284	241	230	226	232
Pediatric emergency unit	697	1046	1030	924	580	908	868	785
Yekatit 12 Hospital	**8489**	**8370**	**8108**	**8322**	**8034**	**7637**	**7779**	**7817**
Medical ward	936	1010	985	977	998	1090	1030	1039
Surgical ward	1572	1504	1633	1570	1409	1344	1461	1405
Gynecology-Obstetric ward	1889	2015	1758	1887	1539	1566	1503	1536
Neonatology ward	607	615	594	605	612	663	549	608
Pediatric ward	1329	1425	1226	1327	1198	1238	1146	1194
Emergency unit	1401	1008	1788	1399	1120	768	1462	1117
Zewditu Hospital	**7734**	**7577**	**7984**	**7765**	**6876**	**6669**	**7151**	**6899**
All Wards	**34787**	**35031**	**36669**	**35496**	**31396**	**32586**	**33326**	**32436**

5.3. Inpatient service indicators

The required inpatient indicators was derived by calculating with correct numerator and denominator value which already collected from inpatient recorded registers and reports during past three years that estimated the appropriate value for inpatient indicators. Therefore estimated inpatient indicators such as bed occupancy rate (BOR) and bed turnover rate (BTR) described as summarized in table 3 below.

Bed occupancy rate during past three years estimated as 51.3% in 2002FY 53.9% in 2003FY, 54.5% in 2004FY and in average 53.2% estimated per year. BOR had a consistent and increasing trend during past three years hence it was reliable rate. Among all wards the maximum 124.0% BOR scored in pediatric emergency and the minimum 17.4% BOR scored in adult emergency both wards was in Yekatit 12 hospital. The majority 15 (60%) of wards their BOR had inconsistent trend and unreliable rate but 10 (40%) of wards had consistent and reliable rate estimated during past three years.

BOR among all hospitals the highest 73% scored in Ras Desta Damtew hospital and lowest 37% scored in Dagmawi Minilik hospital and three hospitals such as Ras Desta, Yekatit 12 and

Zewditu had inconsistent and unreliable rate whereas Dagmawi Minilik and Gandhi hospitals had consistent and reliable rate estimated during past three years.

Bed turnover rate during past three years estimated as 39 patients per bed in 2002FY, 40 patients per bed in 2003FY, 42 patients per bed in 2004FY and in average 40 patients per bed estimated per year. BTR had a consistent and reliable rate estimated during past three years. Among all wards the maximum 211 patients per bed scored in obstetric ward of Gandhi hospital and the minimum 4 patients per bed scored in burn unit of Yekatit 12 hospital. Almost same proportion 13 (52%) of wards had consistent and a reliable BTR whereas 12 (48%) of wards had inconsistent and unreliable BTR estimated during past three years.

BTR among all hospitals the highest 104 patients per bed scored in Gandhi hospital and the lowest 20 patients per bed scored in Dagmawi Minilik hospital. It had a consistent trend and reliable rate in Dagmawi Minilik, Gandhi and Zewditu hospitals whereas it had inconsistent trend and unreliable rate in Ras Desta and Yekatit 12 hospitals during past three years.

Table 3: Estimated bed occupancy and turnover rates during past three in public hospitals of Addis Ababa City, April 2013

Wards and Hospitals	**Estimated BOR in EFY**				**Estimated BTR in EFY**			
	2002	**2003**	**2004**	**Average**	**2002**	**2003**	**2004**	**Average**
Medical ward	46.4	42.2	35.5	41.1	19	18	19	19
Surgical ward	33.0	29.0	29.4	30.3	19	19	18	19
Orthopedics ward	27.3	38.7	32.0	32.7	6	9	12	9
Ophthalmic ward	49.6	37.2	39.1	42.4	29	31	28	30
Dagmawi Minilik Hospital	**40**	**37**	**33**	**37**	**20**	**20**	**19**	**20**
Gynecology ward	48.2	60.4	61.5	56.7	63	72	66	67
Obstetric ward	62.9	63.6	71.4	66.1	204	210	219	211
Neonatology ward	25.4	85.2	105.0	71.9	35	92	143	90
Gandhi Hospital	**49**	**64**	**68**	**60**	**93**	**106**	**112**	**104**
Medical ward	70.3	60.0	79.9	70.1	39	38	38	39
Surgical ward	76.9	83.3	79.1	79.8	32	38	51	41
Ras Desta Hospital	**72**	**67**	**80**	**73**	**37**	**38**	**42**	**39**
Medical ward	63.5	70.6	75.5	69.8	28	30	29	29
Surgical ward	45.9	54.4	58.2	52.8	18	18	21	19
Gynecology ward	74.9	44.4	47.6	55.7	56	30	32	39
Obstetric ward	66.2	81.2	86.8	77.8	113	109	118	113
Neonatology ward	36.0	41.3	44.1	40.4	26	28	28	27
Pediatric ward	32.7	37.6	40.2	36.8	13	13	11	12
Burn unit	64.1	60.0	67.7	63.9	4	3	3	4
Intensive care unit	22.0	28.8	30.8	26.8	37	23	23	29

Adult Emergency unit	26.0	17.4	18.7	20.2	34	33	32	33
Pediatric emergency unit	119.5	119.1	131.8	124.0	145	227	217	196
Yekatit 12 Hospital	**62**	**54**	**58**	**58**	**34**	**33**	**34**	**34**
Medical ward	54.3	57.3	55.2	55.6	26	28	27	27
Surgical ward	69.8	72.4	67.1	69.7	37	35	38	37
Gynecology-Obstetric ward	54.5	59.6	50.7	54.9	41	41	41	41
Neonatology ward	52.5	79.2	39.1	53.3	29	44	21	29
Pediatric ward	58.8	63.5	54.0	58.8	30	31	29	30
Emergency unit	41.2	39.8	44.7	42.2	86	77	97	88
Zewditu Hospital	**57**	**63**	**53**	**58**	**36**	**37**	**37**	**37**
All Wards	**51.3**	**53.9**	**54.5**	**53.2**	**39**	**40**	**42**	**40**

5.4. Inpatient service comparison

The above data computing procedure already generated the necessary inpatient indicators that reflected individual ward and hospital actual score as well as overall wards average score. All wards average indicators value was 53.2% of bed occupancy rate and 40 patients per bed turnover rate and it referred as average level of inpatient service utilization. Overall average indicator value used as a cutoff point for satisfactory (average) utilization of inpatient service during past three years and therefore the relative rank and category of wards and hospitals compared against average indicators value.

Relative ranking was determined based on the comparison of the indicators against the average value for all wards and hospitals therefore the ranking sign which defined as (+) for higher than average indicators value represented as 'above average utilization', (+/-) at average indicators value represented as 'average utilization' and (-) for lower than average indicators value represented as 'below average utilization'. Therefore the relative rank of all wards and hospitals described as summarized in table 4 and 5 below.

Relative rank for bed occupancy rate among all wards the majority 15 (60%) of wards utilized above average level whereas 10 (40%) of wards utilized below average level during past three years.

All wards of Gandhi and Ras Desta hospitals as well as medical, gynecology, obstetric, burn and pediatric emergency wards of Yekatit 12 hospital and all except emergency unit of Zewditu hospital where utilized above average level in the contrary all wards of Dagmawi Minilik hospital as well as surgical, neonatology, pediatrics, intensive care and adult emergency wards of Yekatit

12 hospital where utilized below average level. Likewise among hospitals except Dagmawi Minilik hospital all hospitals were utilized above average level during past three years.

Relative rank for bed turnover rate among all wards the majority 17 (68%) of wards utilized below average level whereas few 8 (32%) of wards utilized above average during past three years.

All wards of Gandhi hospital; surgical ward of Ras Desta hospital; obstetric and pediatric emergency wards of Yekatit 12 hospital as well as gynecology-obstetric and emergency wards of Zewditu hospital utilized above average level whereas all wards of Dagmawi Minilik hospital; medical ward of Ras Desta hospital; medical, surgical, gynecology, neonatology, pediatrics, burn, intensive care and adult emergency wards of Yekatit 12 hospital as well as medical, surgical, neonatology and pediatric wards of Zewditu hospital utilized below average level during past three years. Among all hospitals except Gandhi hospital all hospitals where utilized below average during past three years.

Relative category of wards and hospitals determined based on the average indicators where all wards and hospitals categorized into four quadrants by applying PABON LASSO compartmentalize technique so the symbols such as (Q-I), (Q-II), (Q-III) and (Q-IV) represents for quadrant one, two, three and four where indicted inefficient utilization, mixed utilization, efficient utilization and mixed utilization respectively. Therefore the relative category of all wards and hospitals described as summarized in table 4 and 6 below.

The relative category comparison technique located all wards and hospitals into four quadrants so among all wards the majority 9 (36%) of wards located on quadrant one where it represented as inefficient utilized wards whereas 7 (28%) of wards located on quadrant three where it represented as efficient utilized wards. The rest wards were mixed utilization quadrants includes a few 2 (8%) located on quadrant two where it represented as wards that predominately served for short term care or/and it identified as unnecessary admission that takes place in contrary the majority 7 (28%) located on quadrant four where it represented as wards that predominately served for long term care or/and it identified as unnecessary stay that takes place during past three years.

All the same all wards of Dagmawi Minilik hospital as well as surgical, neonatology, pediatric, intensive care and adult emergency wards of Yekatit 12 hospital located on quadrant one where it

represented as inefficient utilized wards whereas all wards of Gandhi hospital, surgical ward of Ras Desta hospital, obstetric and pediatric emergency wards of Yekatit 12 hospital and only gynecology-obstetric ward of Zewditu hospital located on quadrant three where it represented as efficient utilized wards during past three years. The rest medical ward of Ras Desta hospital and emergency unit of Zewditu hospital located on quadrant two where it represented as predominantly short term care or/and it identified as unnecessary admission wards but medical, gynecology, burn wards of Yekatit 12 hospital as well as medical, surgical, neonatology and pediatric wards of Zewditu hospital located on quadrant four where it represented as predominantly long term care or/and it identified as unnecessary stay wards during past three years.

The relative category among all hospitals the majority Ras Desta, Yekatit and Zewditu hospitals located on quadrant four where it represented as hospitals predominately served for long term care or/and it also identified as unnecessary stay. The rest Gandhi hospitals located on quadrant three where it represented as efficient utilized hospital but Dagmawi Minilik hospital located on quadrant one where it represented as inefficient utilized hospital during past three years.

Table 4: Inpatient relative rank and category during past three years in public hospitals of Addis Ababa City, April 2013

Wards and Hospitals	**Relative Rank**		**Relative Category**
	BOR	BTR	
Medical ward	(-)	(-)	Q-I
Surgical ward	(-)	(-)	Q-I
Orthopedics ward	(-)	(-)	Q-I
Ophthalmic ward	(-)	(-)	Q-I
Dagmawi Minilik Hospital	**(-)**	**(-)**	**Q-I**
Gynecology ward	(+)	(+)	Q-III
Obstetric ward	(+)	(+)	Q-III
Neonatology ward	(+)	(+)	Q-III
Gandhi Hospital	**(+)**	**(+)**	**Q-III**
Medical ward	(+)	(-)	Q-II
Surgical ward	(+)	(+)	Q-III
Ras Desta Hospital	**(+)**	**(-)**	**Q-IV**
Medical ward	(+)	(-)	Q-IV
Surgical ward	(-)	(-)	Q-I
Gynecology ward	(+)	(-)	Q-IV
Obstetric ward	(+)	(+)	Q-III
Neonatology ward	(-)	(-)	Q-I
Pediatric ward	(-)	(-)	Q-I

Burn unit	(+)	(-)	Q-IV
Intensive care unit	(-)	(-)	Q-I
Adult Emergency unit	(-)	(-)	Q-I
Pediatric emergency unit	(+)	(+)	Q-III
Yekatit 12 Hospital	**(+)**	**(-)**	**Q-IV**
Medical ward	(+)	(-)	Q-IV
Surgical ward	(+)	(-)	Q-IV
Gynecology-Obstetric ward	(+)	(+)	Q-III
Neonatology ward	(+)	(-)	Q-IV
Pediatric ward	(+)	(-)	Q-IV
Emergency unit	(-)	(+)	Q-II
Zewditu Hospital	**(+)**	**(-)**	**Q-IV**
Overall Wards	**(+/-)**	**(+/-)**	**Q-A**

NB: Relative Ranking sign defined as: (+) higher than average; (+/-) at average and (-) lower than average. Relative category symbol Q-I, Q-II, Q-III and Q-IV for quadrant one, two, three and four respectively.

Table 5: Inpatient relative rank summary during past three years in public hospitals of Addis Ababa City, April 2013

All Wards	**BOR Rank**		**BTR Rank**	
	Frequency	Percent	Frequency	Percent
Higher than Average	15	60	8	32
Lower than Average	10	40	17	68
Total	25	100	25	100
All Hospitals				
Higher than Average	4	80	1	20
Lower than Average	1	20	4	80
Total	5	100	5	100

Table 6: Inpatient relative category summary during past three years in public hospitals of Addis Ababa City, April 2013

All Wards	Relative Category	
	Frequency	Percent
Quadrant-I	9	36
Quadrant-II	2	8
Quadrant-III	7	28
Quadrant-IV	7	28
Total	25	100
All Hospitals		
Quadrant-I	1	20
Quadrant-II	0	00
Quadrant-III	1	20
Quadrant-IV	3	60
Total	5	100

6. Discussion

Usually hospital beds once available, no matter how many there are provide, it should be utilized efficiently (12,) however the study average bed occupancy value was almost fifty percent in other word only half percent of bed occupied, which means one out of two beds was lay idle during past three years. So the study average BOR value was more likely to National (15) and Malawi studies (13) but it was less likely to studies in Romania (10), Iran (11), South Africa (12), Uganda (14) and Palestine (17).

In comparing hospitals across different countries their typology is matters because it makes sense only if the hospitals have similar characteristic. However hospitals mostly varies not only in allocated budget, staff mix, technology used and case mix but also relative efficient use of inputs (12,13,14). Although inpatient care whenever applied advanced technology, it highly contributed to reduction of number beds that need to be available than those not applied (16,17).

Large proportion of occupied beds is not always assured to full utilization of inpatient services unless higher patients turnover at all time (6,12). The study average BTR value was more likely to studies done in South Africa (12) and Uganda (14) but it was less likely to National study as well as studies conducted in Romania (10), Iran (11) and Malawi (13).

Hospitals equipped with higher assets perform a better quality of care subsequently it reduced hospital stay and increased patient turnover than those less equipped (6,12,16). High staff to bed ratio is associated with reeducation of hospital stay and production of more discharges and it leads to higher patient turnover (15,17,18).

The position of wards/hospitals where located among four quadrants determined the level of utilization (20,21,22). The study wards/hospitals where located at quadrant one characterized as inefficient utilization and the proportion was more likely to National (15) study but less likely to those studies conducted in Iran (11), South Africa (12), Malawi (13) and Uganda (14).

Underuse of inputs in terms of available beds and turnover was associated with production of less outputs in terms of discharges and inpatient days subsequently it leads to inefficient utilization of inpatient services (23,24). In this situation there was an excess of unused beds because large number of beds that remains ideal and few patients served and at all times (6,11,12,13,14). It might be associated with excess bed supply or/and less need/demand for hospitalization or/and

surplus of ward beds relative to the current demand (11,12,13,14). Although, it might be also related with if wards/hospitals highly specialized with highly equipped for high complexity of cases it might not working at all time (10,12).

Relatively short hospitals stay which increased bed turnover but reduce bed occupancy due to unoccupied periods between patients, it was the characteristic of quadrant two (14) and the proportion was less likely to all studies in National (15), Iran (11) and South Africa (12). In this quadrant there was an excess of unused beds and it might be misused due to unnecessary admission (6,12).

An excess of unoccupied with increased bed turnover might be associated with when multiple patients requiring short-term hospitalization or/and predominantly normal delivery or/and applying the hospital beds for simply observing patients or/and surplus bed capacity or/and an oversupply of beds or/and unspecialized hospitals that admitted less sever patients that likely faster recovery (6,11,12,13,14). Meanwhile unnecessary admission might also related to in public hospitals private wing if there a payment mechanism per admission and then more patient might be admitted with exclusion of certain medical conditions unnecessary (7,8,12).

Longer hospitalized days increase bed occupancy but reduce bed turnover due to relatively few patient discharged where it observed in quadrant four (20,21) . The proportion of this quadrant was more likely to South Africa (12), likely to National (15) and less likely to Iran (11) studies.

Long-term hospitalization might be associated with admitting predominantly chronic patients or/and large proportion of severe cases or/and there might unnecessary patients stay longer than the required. Reduced bed turnover might also associated with a shortage of beds due to undersupplied against the current demand (6,10,12,13,14). As far unnecessary stay might be observed in private wing because if there a payment mechanism with number of hospitalized days they might be kept the patients longer than required (7,8,12).

Efficient utilization that observed in those wards/hospitals located at quadrant three and the study result was more likely to Malawi (13), less likely to National (15), Uganda (14), South Africa (12) and very less likely to Iran (11) studies. Although a relatively few vacant beds at any time observed it might there where patients discharged unnecessarily in too short length of stay before their full recover (6, 10,11,12,13,14). This situation might be associated with a shortage of beds

due to undersupplied against the current demand patients (11,12,13,14) or/and monetary incentive for private wing more patient discharged as same time more to be admitted (7,8,12).

Inpatient recorded data is reliable if it provides the same value when it is repeated under identical conditions. It should be similar from year to year either an increasing or decreasing trend to give a consistent data at all period of time. But if it fluctuates from year to year it was almost always a sign of unreliability and then over or under recorded data should give unreliable indicators because it affected the denominator of their indicators (12,19).

Fortunately, all study average results was reliable rather unreliability data observed among few individual wards and hospitals. This unreliability of data might be raised from different conditions but mostly it happened from inpatient recording format (12,19).

The study identified some inpatient recording formats that might be a source of unreliable data such like, individual admission card (25) had a provided space that required to fill a bed number information but the admission register (25) it lacks a similar provided space to obtain this information so number of available beds might be subjectively reported with variation of people counted the same number of bed across period of time hence it might be affected the denominator of both bed occupancy and turnover.

Admission and discharge registration book had instruction about how to record inpatient information with definition of terms (25) but the term “inpatient” hadn’t defined any of supplied inpatient format, unfortunately it might be caused for unnecessary over counting of admissions because as a definition whether the patient stays passes over the night or not, who is considered as an inpatient or day patient didn’t stated clearly.

The time of admission and discharge recorded in day, month and year (25) but the time in hours hadn’t considered in the registration book so the inpatient days during the interval between admission and discharge should not be always full days hence the probability of number of fraction of day might had a chance to rounded off into full day therefore it might be caused for over recording of inpatient days subsequently it affected the denominator of bed occupancy.

On average, the sum of the patients coming into the hospitals must balance the patients leaving the hospitals. The patients’ coming in are the sum of admissions + transfers-in and the patients leaving are the sum of discharges + deaths + transfers-out (19). However inpatients register had a

list of conditions at discharge but at the same time conditions at admission hadn't considered hence it might be caused double counting of patients during transferring or return from default.

Inpatient indicators calculation can still produce unreliable result if the raw data that used as a nominator and denominator are unreliable (12,19). Besides those three inpatient indicators themselves are mathematically related so that the knowledge of any two of enables the third to be calculated (10). Therefore it helps to check the possibility of unreliable estimated rates, for instance; usually bed occupancy rate couldn't be estimated greater than 100%, turnover interval is a time in day for unoccupied beds between successive discharges and the estimated days couldn't be zero or negative as well as the value for ALS should be constant value at a given BOR and BTR values (19, 12).

7. Strength and limitation of the study

7.1. The strength

- The study reviewed past three years inpatient service records at ward level and it helps to observe level of utilization at individual ward as well as the data reliability checked whether it is consistent or inconsistent during reviewed years.

7.2. The limitation

- PABON LASSO model constructing table only with inpatient indicators but it might be influenced by some inevitable and non measurable factors.
- Inpatient record that documented during past three years might not be kept appropriately so it might be affected the result.

8. Conclusion

The study findings clearly identified that 54% of inpatient services was underutilized due to an excess of unused beds and longer hospitalized days during past three years. These situations might be related to the following scenario:-

- Underuse of available beds caused inefficient utilization of inpatient services due to both BOR and BTR scored lower than average. Most of wards and hospitals were below average utilization because large number of beds that remains ideal and few patients served during past three years. All this might be associated with less need/demand for hospitalization or/and poor appreciation of service delivery or/and excess bed supply relative to the current demand.
- Misuse of available beds caused unnecessary admission due to increased bed turnover but lower bed occupancy than average. Some of wards and hospitals were below average utilization in bed occupancy during past three years. This might be associated with multiple patients requiring short-term hospitalization or/and surplus bed capacity or/and an oversupply of beds.
- Longer hospitalized days caused unnecessary long stay relatively few patient discharged and it reduce bed turnover. Most of wards and hospitals were below average utilization in bed turnover during past three years. Reduced bed turnover might also associated with a shortage of beds due to undersupplied against the current demand as well as patients stayed a lengthy days might poor technology used or/and admitting predominantly chronic patients or/and large proportion of severe cases.

9. Recommendations

Based on the major study findings, the following recommendations are proposed with a view to improve utilization of inpatient services:-

- Inpatient beds once available, no matters how there are provided, it should be utilized efficiently therefore wards/hospitals should be maintained usable (active) beds at all times.
    - Hospitals need to reallocate beds from oversupplied to undersupply wards.
    - Hospitals need to reorganize wards of underutilized adjust to over-utilized.

- ❖ Wards need to replace currently unusable beds into ready for uses at all time.
- ❖ Wards need to promote provided services so as to improve low demand for care.

- ☛ Inpatient services should be managed so as to avoid late admission and delayed discharge through reduction of hospitalize days.
  - ❖ Wards need to be supported with appropriate technology to become efficient.
  - ❖ Wads need to apply PABON LASSO model to measure the progress so far.

Further research

- ☛ Assessing hospital performance applying BABON LASSO medal using the three interrelated indicators together with other indicators like economic, quality of care and satisfaction.
- ☛ Inpatient service utilization assessment with multiple data sources including reviewing records, focus group discussion, exit interview of patients and inpatient management in-depth interview.
- ☛ Hospital performance assessment based on typology study is needed to see the variation of hospitals among similar typology.

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11. Annex

11.1. Checklist

Addis Ababa University College of Health Sciences School of Public Health

Instruction: inform to the inpatient units head nurses/case team leader that you are going to ask about record review and participant interview. Next request them to begin the review and interview in order to respond the question appropriately. Please collect the data clearly if any ambiguity inform to the supervisor.

Hello. My name is …….... I am here on behalf of Addis Ababa University College of Health Sciences School of Public Health to carry out a study in public hospitals inpatient units (wards) to determine service utilization. The hospital inpatient unit's internal medicine, general surgery, gynecology and obstetrics, pediatric, otorhinolaryngology, ophthalmology, psychiatry and other units past three years (2002-2004 EFY) recorded medical data based on key performance indicators will review as well as ward head's will also interview.

Part One: Public Hospitals Inpatient Units General Information

101 Hospital: Name: ……

102 Hospital Code: ……

103 Hospital Data Unit Focal Person……..

104 Ward Name: ……..…….

105 Ward Code: ……..…….

106 Ward Head Nurse: ……..……...

107. Data Collection date and time

	Record Review and Respondent Interview Days		
	Day One	Day Two	Day Three
DD/MM/YY (E. C.)			
Starting Time: min/hrs.			
Ending Time: min/hrs.			

108 Data Collector Name: ……. Qualification: ……..….. Signature: ……

109 Supervisor Name: …… Qualification: …….. Signature: …….

110 Principal Investigator Name: ……. Qualification: …….. Signature: ……

Part Two: Public Hospitals Inpatient Units Medical Data Record Review

This part consist seven questions which suppose to review inpatient medical records in Ethiopia Fiscal Year (EFY) from Hamle/July to Sene/June in the respective past three years to obtain the intended data elements.

201 How many number of usable (active) inpatient beds are available in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF INPATIENT BEDS DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE
1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					
11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

202 How many working hours in each day and days in each week routinely opened in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF INPATIENT WORKING TIME DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE
1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					
11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

203 How many patients admitted (including transfer in within and between the hospitals) in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF ADMITTED PATIENTS DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE

1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					
11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

204 How many patients discharged (including transfer out within and between the hospitals) in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF DISCHARGED PATIENTS DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE
1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					
11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

205 How many patients died in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF DEATHS DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE
1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					

11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

206 How many hours and days patients stay in the hospital until discharge alive (including transfer out within and between the hospitals) or death in the past three years to the respective inpatient unit?

NO.	MONTHS (Local/English)	NUMBER OF HOURS AND DAYS PATIENT STAY DURING PAST YEARS				
		2002 EFY	2003 EFY	2004 EFY	TOTAL	AVERAGE
1	HAMLE/JULY					
2	NEHASE/AUGUST					
3	MESKEREM/SEPTEMBER					
4	TIKMIT/OCTOBER					
5	HIDAR/NOVEMBER					
6	TAHSSAS/DECEMBER					
7	TIR/JANUARY					
8	YEKATIT/FEBRUARY					
9	MEGABIT/MARCH					
10	MIAZIA/APRIL					
11	GINBOT/MAY					
12	SENE/JUNE					
TOTAL						

11.2. Declaration

I, the undersigned, Public Health student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Public Health.

Name: Melaku Yilma

Signature: _____

Place of submission: School of public Health, College of Health Sciences, Addis Ababa University.

Date of Submission: June, 2013

This thesis work has been submitted for examination with my/ our approval as university advisor(s).

Advisors:-

Name Signature

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