Addis Ababa University

College of Health Sciences

School of Public Health

Master of Hospital and Health Care Administration

Assess and improve the low bed occupancy rate *in ABI-ADI Hospital, Tigray, Ethiopia*

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A capstone project report submitted to Addis Ababa University, College of Health Sciences School of Public Health in partial fulfillment of the requirement for the degree of Masters of Hospital and Health Care Administration

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By

G/slassie G/meskel

Name and Signature of Members of the Examining Board

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Acknowledgement

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Abbreviations

AIDS: Acquired Immunodeficiency Syndrome

BOR: Bed Occupancy Rate

CEO: Chief Executive Officer

HIV: Human Immunodeficiency Virus

KM: Kilometer

KPI: Key Performance Indicator

EHRIG: Ethiopian Hospital Reform Implementation Guide line

MHA: Easter of Hospital and Health Care Administration

GYN OBS: Gynecology and Obstetrics

OPD: Outpatient Department

RHB: Regional Health Bureau

SMT: Senior Management Team

Abstract

Back ground

Bed occupancy rate is the average percentage of occupied beds during the reporting period. Hospital bed-occupancy rates have been proposed as a measure that reflects the ability of a hospital to properly care for patients. Whether this measure can be considered useful in guiding the planning and operational management of hospital beds in a way that improves how well patients fare while in hospital.

Objective

The objective of the project is to improve data quality management system and low bed occupancy rate from 42.2% to 80% by the end of July 2013

Methodology

A pre-post intervention study design is used to improve the low bed occupancy rate in Abi adi Hospital, Data is collected from the admission and discharge registration log books including all patients admitted pre and post intervention by using the check list from each ward by data collectors.

Result

In this pre-post intervention study bed occupancy rate is increased from 42.2% to 66.3% and number of patients not registered their date of discharge and length of stay was decrease from 43 [5%] to 5 [0.04%] which is significant.

Discussion and recommendation

The study indicates that poor data quality management is one of the major causes of low bed occupancy rate in ABI adi hospital.

Bed occupancy rate was increased from 42.2% to 66.3% in this intervention period the hospital management committee should give attention and do daily follow up by the liaison officer for its sustainability.

1. Introduction

1.1 Back ground

Organizational Description

Abi-Adi hospital is one of the general hospitals of Tigray region established in 1983E-C and is located 95 kms away from the capital city Mekele. It gives service to more than 30000 people residing in Abi-Adi town, surrounding Weredas (district) including in neibouring Amhara Regional State.

The mission of the hospital is to reduce morbidity, mortality, disability and improve the health status of the community through providing comprehensive, preventive, curative and rehabilitative service in collaboration with all stake holders and community participation.

The hospital has 105 technical and 88 supportive staffs the technical staffs are 1 emergency surgery and Gynecology and Obstetrics master,1 infectious master,1 pediatric master, 1 General practitioner, 1 field surgeons, 56 nurses, 11 midwifes, 4 laboratory technologists, 3 pharmacy technologists and others.

The hospital serves for 48,600 out patients and 4,654 in patients annually. There are 81 functional beds in 4 wards (medical ward 28, surgical ward 18 Gynecology and Obstetrics ward 23 and pediatric ward 12). The annual EHRIG performance of the Hospital was 67.1%, average length of stay and bed occupancy rate was 4.2 and 40% respectively.

2. Statement of the problem

Beds in hospitals are expected to be utilized up to 80% and should not exceed 90%. This range is considered to be optimum for hospital inpatient activities [1]. Occupancy rate below 80 % is supposed to be underutilization of hospital resources (production factors). The resources recruited to each bed must be appropriately utilized to achieve optimum efficiency. Possibly low cost should be incurred to serve maximum possible number of patients with good clinical effectiveness

In the previous year, the bed occupancy rate of Abi adi Hospital had been very low throughout the year [1]. It was 40 % which is below the standard. Even though the problem was big, no improvement measure had been taken. The standard bed occupancy rate in the hospital KPI guide line is 80% to 90%, Hospital bed-occupancy rates have been proposed as a measure that reflects the ability of a hospital to properly care for patients. When I observed the gapes this is due to poor quality of admission and discharge process, poor follow up because all admitted patients are not registered their date of discharge and length of stay in days in the admission and discharge registration book despite the comments given repeatedly by regional health bureau and stake holders to improve this problem so I have started to think

that if I do my capstone project on this I may solve the problem and I share this idea to management committee and the committee agreed that this is one of the main problems of the hospital and if I do my project on this the hospital management committee has agreed and committed to support me financially and technically. The expected out come after this project completed was 80%.

Table 1: The collected important data for bed occupancy rate in Pre intervention period, across months by wards in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

Months	wards	Total no of pts admitted in the period	Total no of pts discharged in the period	Total Length of stay in days	No of pts not registered their date of discharge $ length of stay	BOR
February	medical	100	94	408	5	
	surgical	63	55	280	6	
	gyn	70	60	221	4	
	pediatric	51	48	205	3	
Total		284	257	1114	18	44.2%
March	medical	91	90	402	4	
	surgical	68	56	281	3	
	gyn	71	61	272	5	
	pediatric	36	28	115	2	
Total		266	235	1070	14	42.4%
April	medical	101	77	373	3	
	surgical	55	48	206	2	
	gyn	70	68	304	4	
	pediatric	34	31	137	2	
Total		260	224	1020	11	40%
Ground total		806		3204		42.2%

BOR = $\frac{\text{Total number of patient days for a given period x 100}}{\text{Available beds (bed complement) x the number of days in the period}}$

3. Objectives

3.1 General Objective

To improve the low Bed occupancy rate of Abi adi hospital by the end of July 2013

3.2 Specific Objective

To improve data quality management system of admitted and discharged patients in all wards

To assess and improve the low bed occupancy rate from 42.2% to 80% by the end of July 2013

4. Root cause analysis

After the problem was identified and prioritized by the senior management committee to do the capstone project on this information is collect by interviewing *what do you think is the major cause for low bed occupancy in our hospital?* To the hospital medical director, the respected OPD health workers (OPD director, OPD case team, Emergency case team,) in pt case teams (medical ward, surgical ward and Gynecology and Obstetrics ward case teams), HMIs personals and they list the causes they expect these are

Absence of job description and centralized office with necessary materials for liaison officer to control occupied and free beds daily and check registration of discharged patient whether their date of discharge and length of stay is registered appropriately or not

Poor data quality management system /All discharged patients are not registered their date of discharge and length of stay in days in the admission and discharge registration book. So it is difficult to get the actual sum total length of stay in days during reporting period which is the numerator of bed occupancy rate

Average length of stay is low due to early discharge of patients.

Poor knowledge of nurses towards the registration system

Shortage of man power [Nurses in wards]

No registration book

The above mentioned root causes were put in fish bone diagram and describe by flow chart because there is flow of patients starting from card room and emergency room to admission sites [wards] which is important to follow whether all admitted and discharged patients are registered their date of discharge an length of stay in the registration loge book appropriately or not.

Flow chart

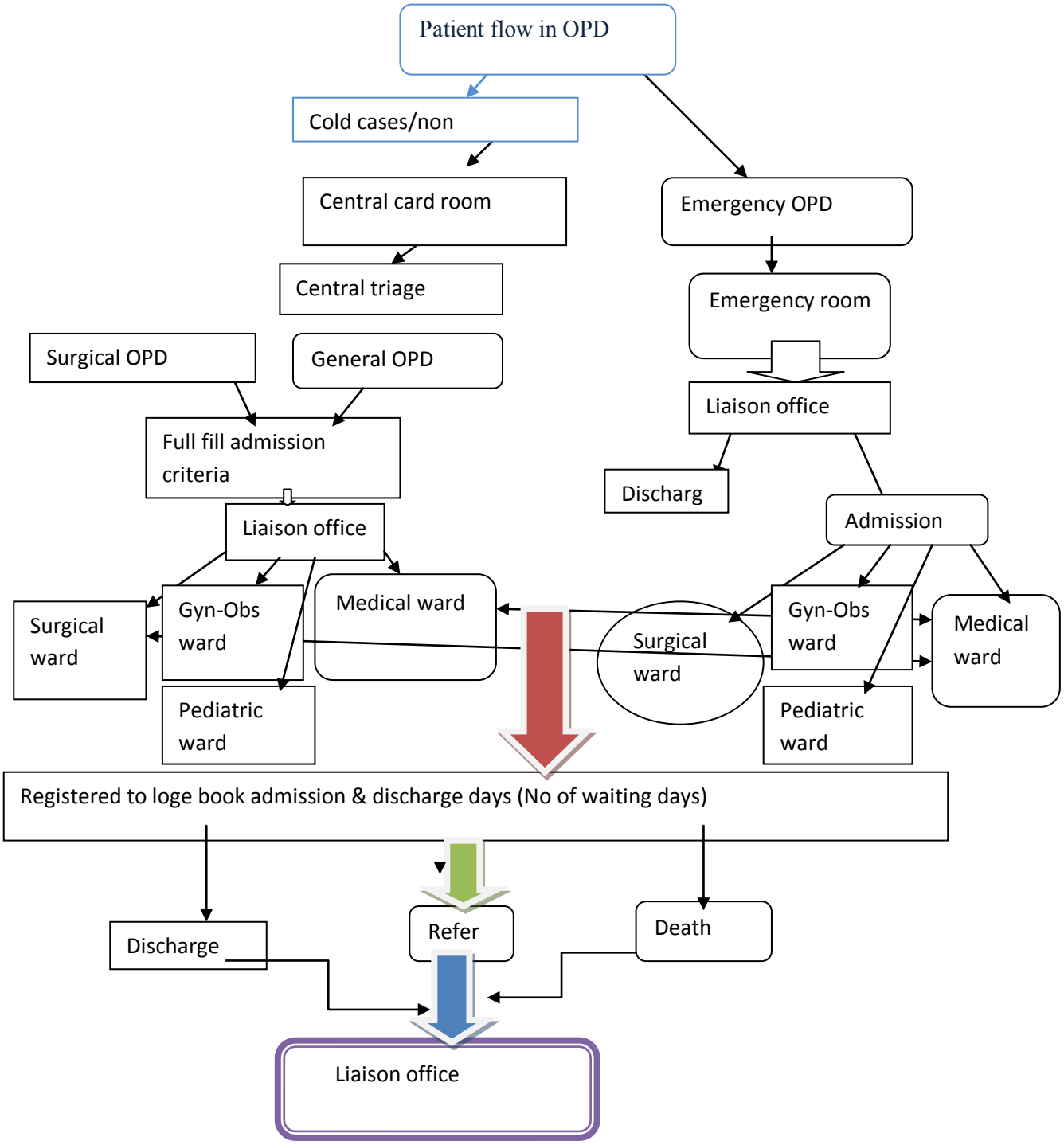


Figure1. Flow chart diagram shows flow of patients from outpatient department in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

Fish bone diagram

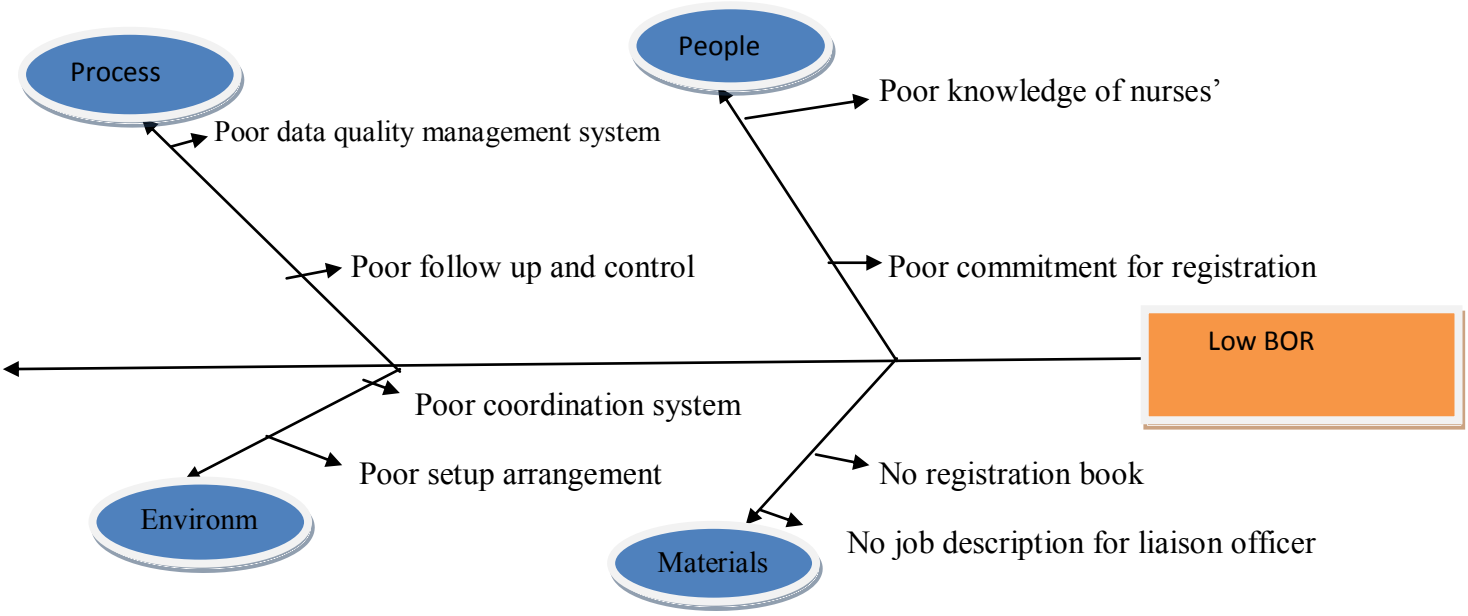


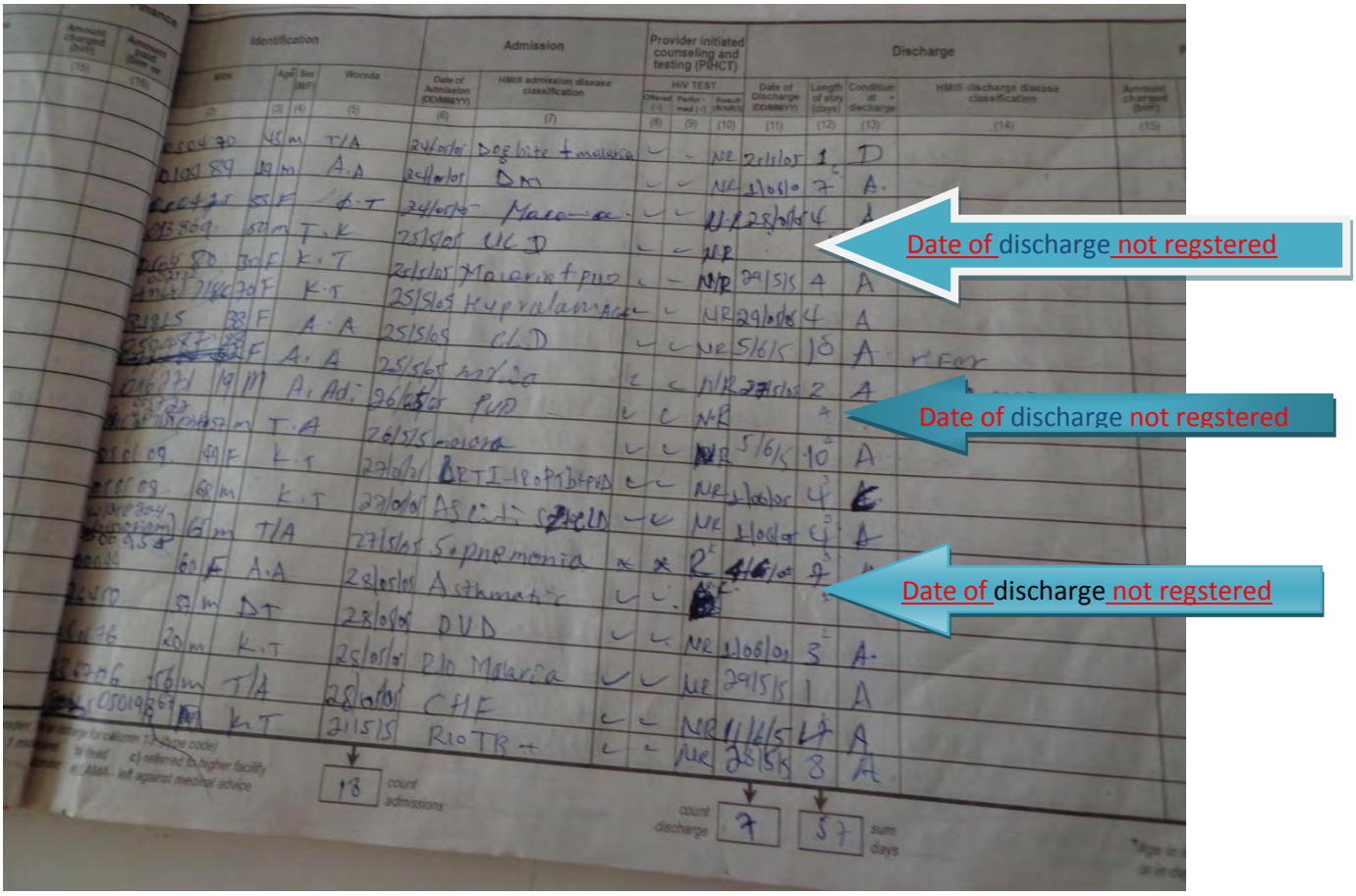
Figure: 2 Fish bone diagram summarize generated idea that cause low bed occupancy rate in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

Each root cause was proved and disproved by interviewing respected persons and department heads such as the medical director, the matron, outpatient director, outpatient head, outpatient health workers, in patient heads and other respected staffs orally whether the listed root causes are true causes or not and observed from documents and performance reports of the Hospital , so even though there is liaison officer the office is not central to outpatient department and wards, the officer has no specific job description and did not do the liaison duties such as control number of bed occupied and free daily, number of pts admitted and discharge daily and has not materials to follow and register all the activities correctly.

There are 81 functional beds which are enough according to the hospital service demand needed.

The annual average length of stay of the Hospital is 4.2 days which are near standard which is 4-5days. So it is not real problem.

Registration log book had been checked in each wards whether admitted pts are registered their date of admission , date of discharge and length of stay in days in the admission and discharge loge book and reported correctly so discharged patients were not registered correctly in the log book.



Fgure3. Example of in complete registration system observed in medical in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

Finally it was proved that real cause's **low bed occupancy rate** in Abi adi hospital were:

Poor data quality management system /all patients discharged from four wards were not appropriately registered their date of discharge and length of stay in days.

There was no job description and centralized office with necessary materials for liaison officer.

5. Literature review

The bed occupancy rate (BOR) is a measure of the efficiency of inpatient services. Hospitals are most efficient at a BOR of 80 – 90%. If the BOR is lower, resources may be wasted. If the BOR is higher than 90% there is a danger of staff burnout and of over-crowding during sudden increases in demand for services. [1]

Knowledge of the BOR helps hospitals to identify inefficiencies in service delivery in order to investigate and take action to address this, and also to plan for future staff or other resource requirements. [3]

For a RHB, knowledge of the BOR from each hospital helps to assess health service coverage and population access to services as a foundation for health service plan. (2)

Hospital bed-occupancy rates have been proposed as a measure that reflects the ability of a hospital to properly care for patients. Whether this measure can be considered useful in guiding the planning and operational management of hospital beds in a way that improves how well patients fare while in hospital depends on the answers to two questions. Firstly, does the bed-occupancy rate influence patient outcomes? And secondly, what would be an appropriate level of occupancy to aspire to? [4, 5, 6]

Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centres. In most cases, beds for both acute and chronic care are included. Inpatient bed density serves as proxy for availability of health service delivery. [6, 7, 8]

A greater number of hospital beds suggest greater availability of inpatient health services. Conversely, some countries (e.g., Organisation for Economic Cooperation and Development) have witnessed a downward trend in hospital beds per 10,000 populations as outpatient surgery increases. (8, 9, 10, 11)

Percentage of occupancy of inpatient beds

The percentage of inpatient beds occupied over a given period

6. Methodology

6.1 Project design and Project area:-

Per –post intervention study was conducted in Abi-Adi hospital (February - April and May-July 2013).It is one of the general hospitals of tigray region established in 1983 in Abi-Adi town and has four wards. It gives service to more than 30000 people residing in Abi-Adi town, surrounding weredas (district) including regions in neighboring Amhara region people .It's climatic condition is hot.

6.2 Study design

Pre-post intervention study design is used

6.3 Source population

The source population of the study was all patients coming to the hospital for service seeking in the study period.

6.4 Study population

All patients admitted in the hospital in all wards with in pre and post intervention periods /February - April and May-July/ 2013

6.5 Sampling

There was no sample size and sampling technique used because all patients discharged in pre intervention [716] and all patients discharged patients in the intervention period [997] were included so it is censes type.

6. 6 Data collection procedure

Data is collected from the admission and discharge registration books using check list designed to collect important data by data collectors /HMIS personnel/ after they trained for half how to collect important data for BOR. The check list includes all measures for BOR such as number of patients admitted, number of patients discharged, length of stay inwards for each patient in days and number of patients not registered their date of discharge and length of stay in days in the study period.

6.7 Data quality assurance

Two HMIS personnel trained how to collect data for BOR in half day, during the actual data collection process the data quality was cross checked with the registration log book.

Quality of registration system was cross checked daily by liaison officer.

Cross check the registration loge book every two weeks by HMIS personals and BOR was calculated every month in the intervention period

6.7 Data processing and analysis

Data is measured and calculated using the stated formulas by Tigray hospital performance monitoring and improvement manual-august 2011.

Definition: The average percentage of occupied beds during the reporting period

BOR = the sum total length of stay in days during reporting period (Q19) ÷ [Average number of operational beds during reporting period (Q20) x number of days in reporting period (Q21)] x 100

Numerator The sum total length of stay in days during the reporting period (Q19)

Denominator Average number of operational beds during reporting period (Q20) x number of days in reporting period (Q21)

Formula $\frac{\text{Total number of patient days for a given period(length of stay) x 100}}{\text{Available beds (bed complement) x the number of days in the period}}$

Example

A hospital with 210 available beds (excluding newborn bassinets) rendered 4,780 patient days in June. June has 30 days. The percentage of occupancy for the hospital in June was:

$\frac{4780 \times 100}{210 \times 30} = \frac{78000}{6300} =$ 75.87 or 75.9% (12, 13)

Analysis is done manually and by using scientific hand motion calculator, excel sheet and interpretation is by comparing pre and post intervention analysis.

Data quality is managed by following the HMIS personals how to collect the data from the admission and discharge logbook. And it is analyzed using t-test analysis

T-test analysis $$t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} \times \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$t = \frac{(1.2 - 10.8)}{\sqrt{\frac{(3-1)1.2 + (3-1)10.8}{3+3-2} \times \left(\frac{1}{1.2} + \frac{1}{10.8}\right)}} \quad t = 4.2 \;\; DF = 4$$

So…now I have calculated the *t* statistic, when we look it up on the *t* table

With p=0.05, confidence interval 95% and DF= 4, the "critical value" is 2.776

Thus, since our calculated *t* value **exceeds** the critical value, we **reject the null hypothesis** and conclude that the 2 means **are significantly different** from one another

So the intervention result is scientifically significant.

6.7 Ethical clearance

Before intervention started Ethical clearance was obtained from Addis Ababa University School of public health ethical committee. Consent was given by the senior management committee of Abi adi hospital all ward heads liaison and HMIS personals.

6.8 Plan of dissemination

After the project is finished the result will be presented for defense comments and suggestions will be incorporated and finally it will be disseminated to all respected bodies such as Abi-Adi hospital, Tigray regional health bureau, Addis Ababa University and other respected institutions.

Intervention

Intervention strategy

After identifying the root causes I have set alternative and best strategies as follows:

Alternative strategies

Setting job description and centralized office to the outpatient and wards with necessary materials for liaison and controlled the bed occupancy rate by the officer. Hiring enough and highly qualified staff specially nurses who give quality of care in wards.

Improve quality admission and discharge registration system in wards by discussing and giving orientation about the importance of quality of registration and increased BOR to standard to do their contribution for all ward heads, liaison officer, matron, HMIS personals and SMT how to register admitted and discharged pts and their length of stay in days in the logbook and how to calculate the bed occupancy rate.

Registering and collecting admitted and discharged pts by HMIS personals to improve BOR.

I have compared the alternative strategies using decision matrix to select best strategy using evaluation criteria like how much the strategy has an impact to solve the problem, can we cover the expense in relation to our budget, the time period needed to finish this project and how it is feasible politically with the management committee of the hospital.

After identifying the real root causes best strategies were selected from the alternative strategies using decision matrix as follows:

Table2. Decision matrix used to compare evaluation criteria for seted alternative strategies in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

Strategic alternatives	Evaluation criteria				
	Impact on problem	Expense	Time	Political feasibility	Total score
Setting job description and centralized office with necessary materials for liaison officer.	3	3	3	4	13
Improve quality of registration in wards by informing respected bodies and follow up	4	4	4	3	15
Hiring highly qualified nurses	5	1	1	2	9
Registering and collecting admitted and discharged pts by HMIS personals to improve BOR.	3	3	2	2	10

Best strategy

The above strategies are ranked according the evaluation criteria set in the decision matrix:

Improve data quality registration system of admitted and discharged patients by discussing and giving sensitization type training for one day for all in patient ward heads, liaison officer, matron and HMIS personals about the importance of quality of registration and how to register admitted and discharged pts and their length of stay in days in the logbook and how to calculate the bed occupancy rate.

Setting job description and centralized office to the outpatient and wards with necessary materials for liaison officer controlled the occupied and free beds daily and to control the registration system of admitted patients.

Implementation Accomplishments

Intervention 1

After best strategy was selected focus group was formed to implement the strategies with their responsibilities from each discipline of the hospital who has contribution and an impact on improving quality of registration to increase BOR of the hospital which are listed below

Focused group

Group member **responsibility**

G/slassie G/meskel…….CEO
Ayalew Asgdom…….……Matron
S/r Mulu Asgedom……..Medical ward head nuers
S/r Alemnesh Birhane……..Surgical ward head nurse
S/r Legisa G/slassie……Gyn ward head
S/r Atsede Z/bruk……..Liaisone officer
A/alem Weldu ……..….HMIS
G/mikal ……..…….HMIS
S/r L/jewergs……pediatric ward head

Responsibility of the members

The ward heads responsibility is to check and register all admitted and discharged patients and length of stay daily of admitted pts in their ward share experience each other

The liaison officer's responsibility is to control occupied and free beds daily, check if all admitted and discharged patients registered their date of admission, discharge and length of stay in daily.

HMIS personals responsibility is checking the registration system every 2weeks and tallying the total length of stay of all pts admitted and discharged within a month and submit the report to principal investigator.

My responsibility (CEO investigator) is to follow (check) the activity, develop tally sheet and calculate BOR ever month by tallying the total length of stay of all pts admitted and discharged within a month and seeing the result and discussing the progress with the group members and filling intervention gaps accordingly.

Intervention 2

Job description of liaison officer is developed, central office is given and registration materials are accomplished.

Plan to achieve

To register all admitted patients their date of discharge and length of stay in the loge book in all wards from the beginning of the intervention period [May, 2013]

To improve BOR ever month and finally to achieve the objective of the project by the end of the intervention period [July, 2013]

7. Result

In this pre-post study bed occupancy rate is increased from 42.3% to 66.3% when we see the progress of BOR in each month with in the intervention period

In May 317 patients admitted their total length of stay was 1411 days and BOR was **58.06%.**
In Jun 386 patients admitted their total length of stay was 1627 was days and BOR was **66.95%**
In July 393 patients admitted their total length of stay was 1795days and BOR was **73.39** %
In the intervention period [May-July] 1096 patients admitted their total length of stay was 4833days and BOR was *66.3%*

Number of patients not registered their date of discharge and length of stay in pre intervention was 43 [5%] where as in the intervention period is decreased to 5 [0.04%]

Table 3: The data for bed occupancy rate in post intervention period across wards by months in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

months	wards	Total no of pts admitted in the period	Total no of pts discharged in the period	Total Length of stay in days	No of pts not registered their date of discharge $ length of stay	BOR
May	medical	98	85	508	1	
	surgical	66	55	274	1	
	gyn	95	93	457	0	
	pediatric	58	44	172	1	
total		317	277	1411	3	58.06%
June	medical	107	99	514	1	
	surgical	75	65	342	1	
	gyn	145	136	597	0	
	pediatric	59	55	174	0	
total		386	355	1627	2	66.95%
July	medical	108	103	566	0	
	surgical	74	65	398	0	
	gyn	154	144	614	0	
	pediatric	57	53	217	0	
total		393	365	1795	0	73.39%
Ground total		1096	997	4833	5	66.3%

Table 4: The data for bed occupancy rate in post intervention period across months by wards in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

ward	Time or period	Total no of pts admitted in the period	Total no of pts discharged in the period	Total Length of stay in days	No of pts not registered their date of discharge $ length of stay
medical	May	98	85	508	1
	June	107	99	514	1
	July	108	103	566	0
total		313	287	1588	2
surgical	May	66	55	274	1
	June	75	65	342	1
	July	74	65	398	O
total		215	185	1014	2
Gyn	May	95	93	457	0
	June	145	136	597	0
	July	154	144	614	0
total		394	373	1668	0
pediatric	May	58	44	172	1
	June	59	55	174	0
	July	57	53	217	0
total		174	152	563	1
Ground total		1096	997	4833	5

Table 5: Pre-post intervention comparison of data across months, in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

Pre intervention data			Post intervention data		
months	Total length of stay in days	No of pts not registered their date of discharge and length of stay	months	Total length of stay in days	No of pts not registered their date of discharge and length of stay
February	1114	18	May	1411	3
march	1070	14	June	1627	2
April	1020	11	July	1795	0
total	3204	43		4833	5
BOR	42.3%	5%		66.3%	0.04%

Improvement after intervention

Total length of stay in days:

1st month pre-post = 1411-1114/2525*100=29700/2525=11.76%

2nd month pre-post = 1627-1070/2697*100=55700/2697=20.65%

3rd month pre-post =1795-1020/2815*100= 77500/2815=27.53%

No of pts not registered their date of discharge $ length of stay:

1st month pre-post = 18-3/21*100=1500/21= 71.4%

2nd month pre-post = 14-2/16*100= 1200/16= 75%

3rd month pre-post 11-0/11*100=1100/11= 100%

The overall improvement of BOR is ***24%***

Table 6: Pre-post bed occupancy rate comparison across months in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

	Pre intervention		Post intervention	
	Months	BOR	Months	BOR
	February	44.2	May	58.6
	march	42.4	June	66.95
	April	40	July	73.39
mean	42.2		66.3	
Standard deviation	1.2		10.8 p=0.05	

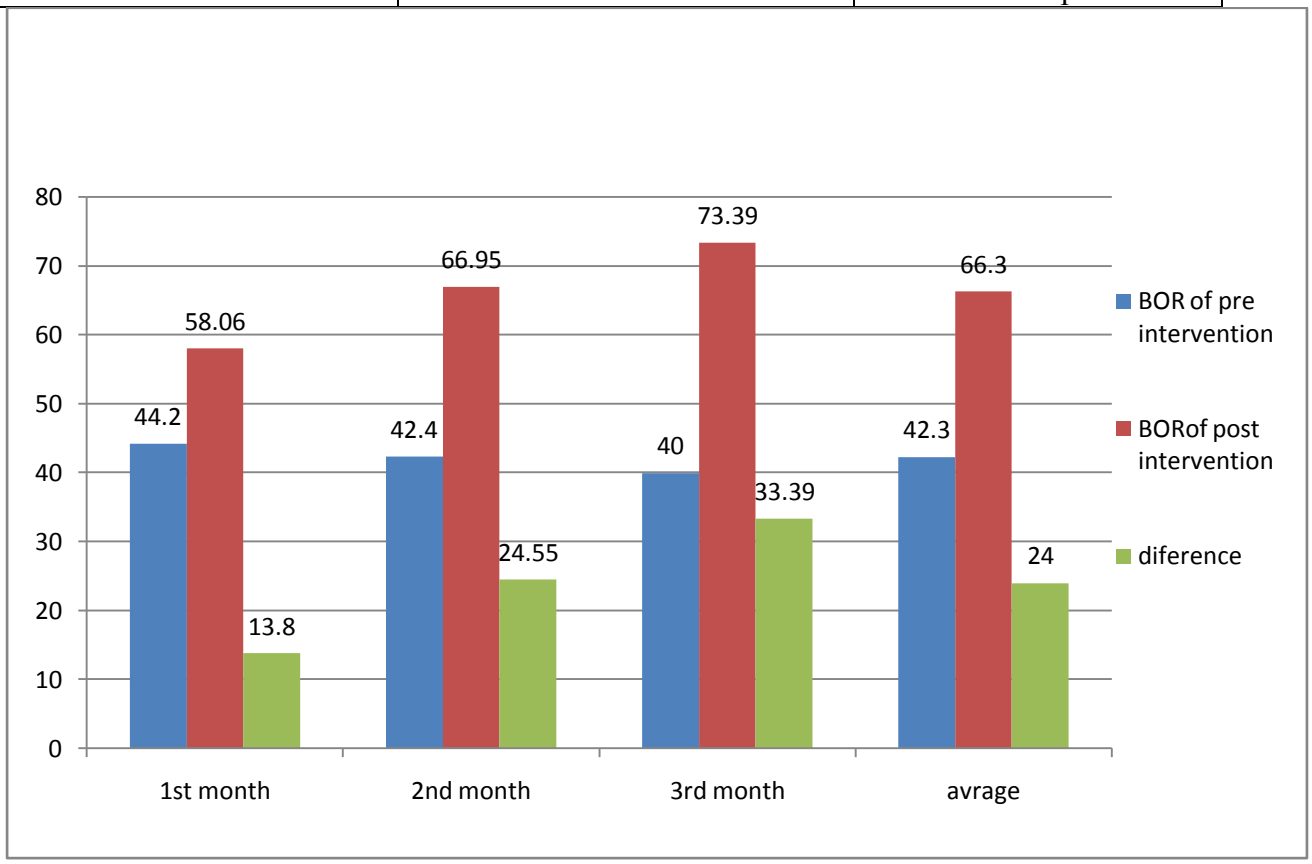


Figure 4: Per- post intervention comparison of bed occupancy rate across months in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

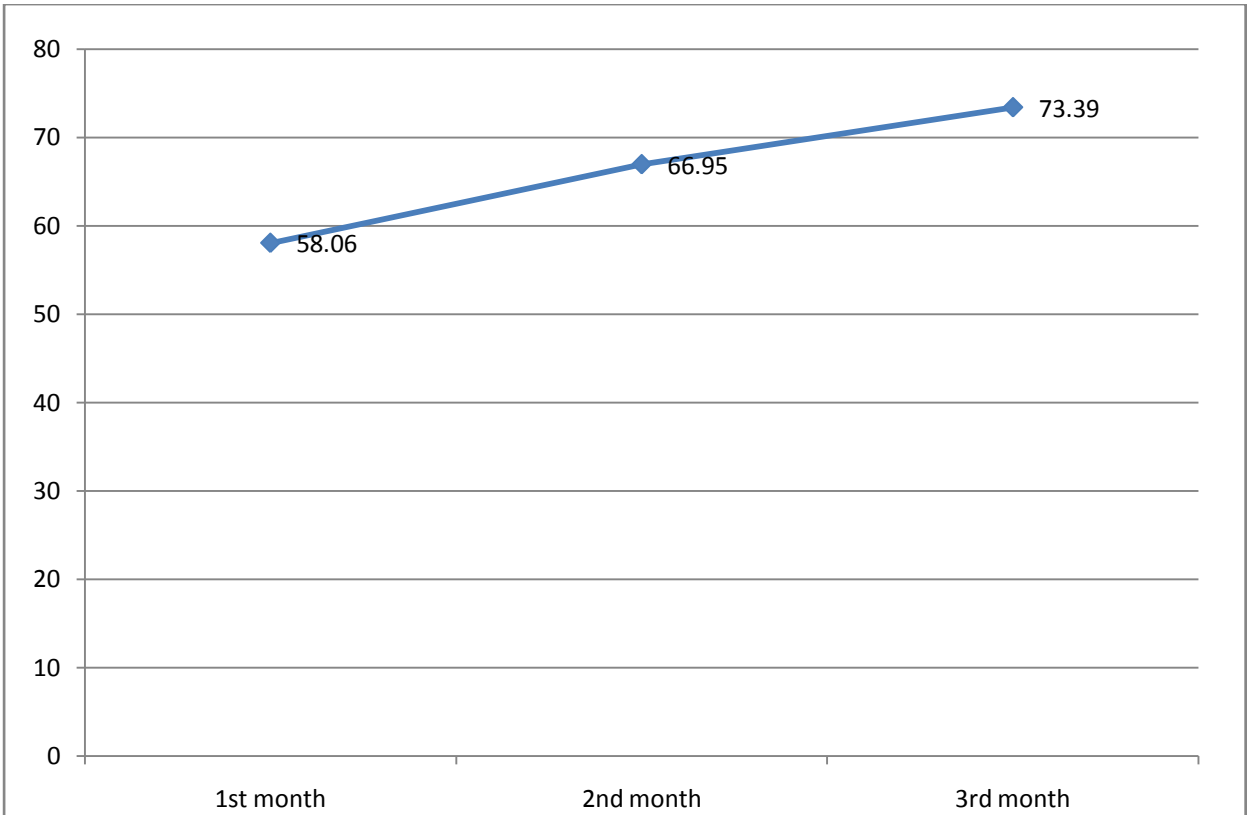
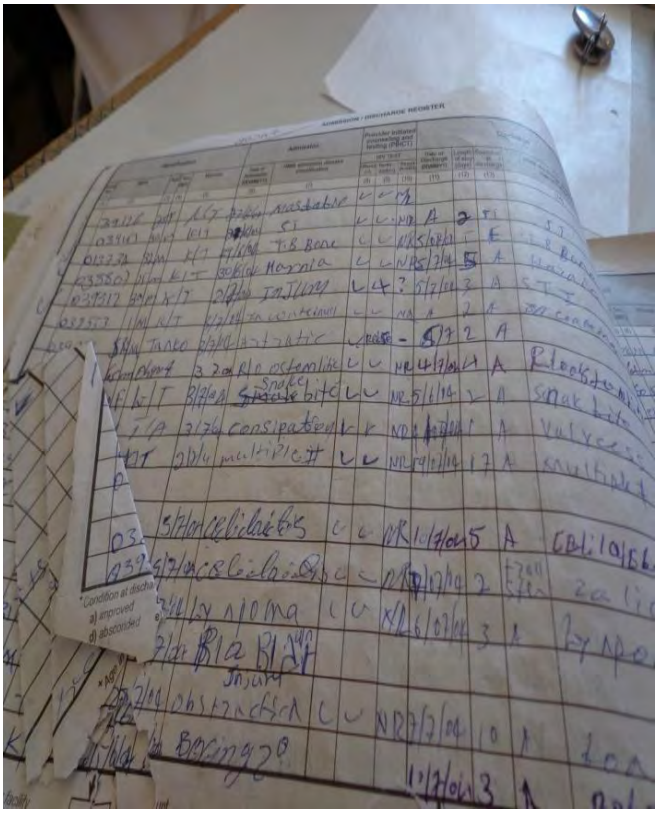


Figure 5. Bed occupancy rate improvement in the intervention period by month in Abi adi Hospital, Tigray central zone, Ethiopia, 2013.

Pre intervention registration system Post intervention registration system



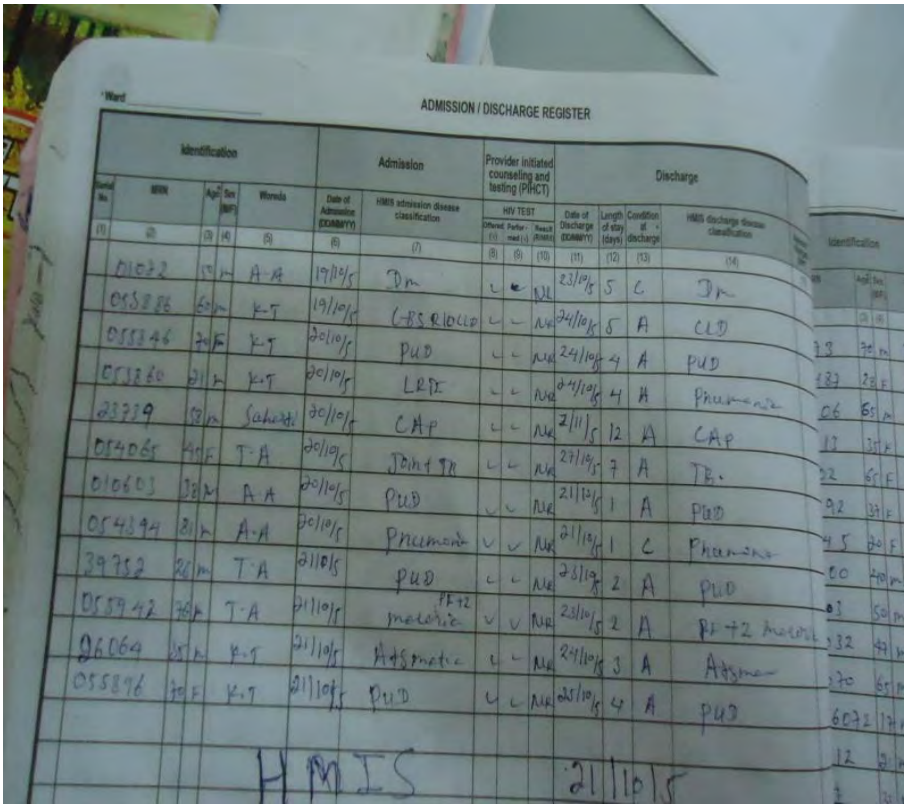


Figure 6: Comparison of registration loge books in pre- post intervention in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

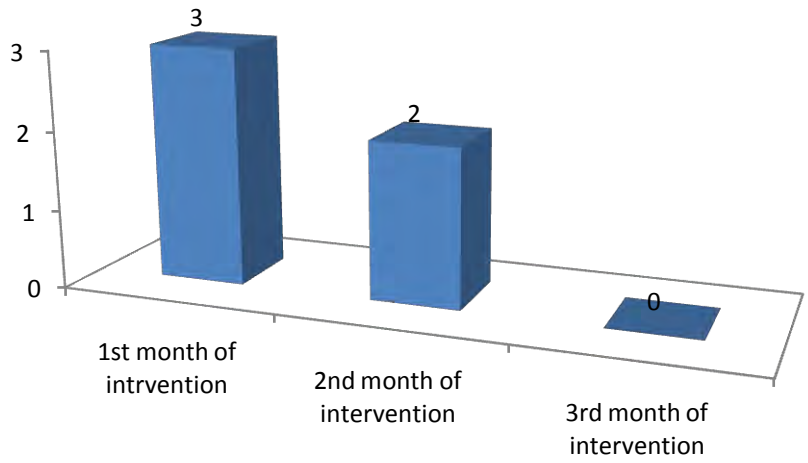


Figure 7. No of patients not regtered their dat of discharge and length of stay in dys in the intervention period in Abi adi Hospital,Tigraycentral zone, Ethiopia,2013

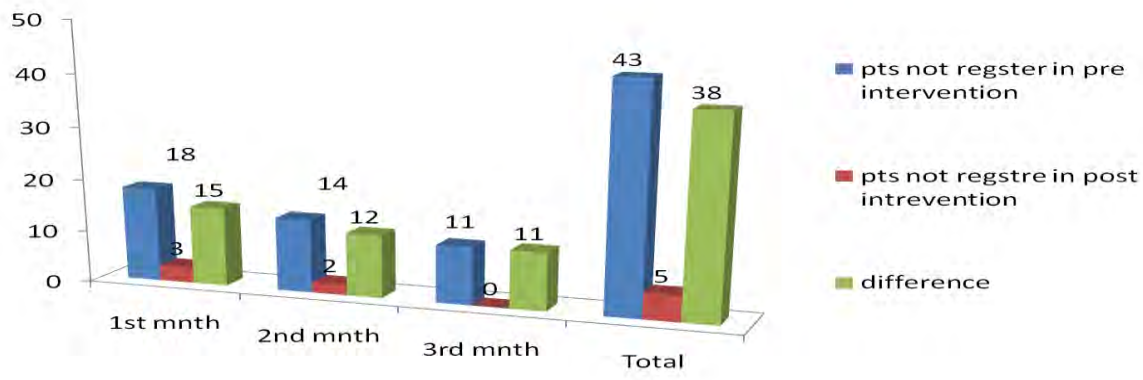


Figure 8: Per-post intervention comparison in number of patients not registered their date of discharge and length of stay in days in Abi adi Hospital, Tigray central zone, Ethiopia, 2013

Discussion

This is the first study of its kind in Abi- adi hospital addressing bed occupancy rate issues and compares the pre and post intervention result. It is known that the bed occupancy rate (BOR) is a measure of the efficiency of inpatient services. Hospitals are most efficient at a BOR of 80 – 90%. If the BOR is lower, resources may be wasted. If the BOR is higher than 90% there is a danger of staff burnout and of over-crowding during sudden increases in demand for services.

Knowledge of the BOR helps hospitals to identify inefficiencies in service delivery in order to investigate and take action to address this, and also to plan for future staff or other resource requirements (, 2, 6, and 7). The result of the study shows that the average pre and post intervention bed occupancy rate is 42.3% and 66.3% respectively even though there is improvement with intervention we have still resource wastage since the standard is no mate.

In the national key performance indicator manual bed occupancy formula the numerator is sum total length of stay in days during the reporting period according to the pre–post intervention study done in Abi adi hospital 43[5%] patients from the total discharged patients [726] was not registered their length of stay in days, this shows that increasing number of patients who is not registered their date of discharge and length of stay [poor data quality management system] has an impact in decreasing the percentage of bed occupancy rate.

Hospital bed-occupancy rates have been proposed as a measure that reflects the ability of a hospital to properly care for patients. Whether this measure can be considered useful in

guiding the planning and operational management of hospital beds in a way that improves how well patients fare while in hospital? (6, 8, 9,11, 12) similarly this study indicates that knowing actual occupied and free beds daily is very important to manage resources correctly and ready to give efficient service for newly admitted patients.

Strength

Primary data is used

Close follow up in the intervention period

Acceptance and commitment of management committee to support the project work

Limitation

Short duration of time for study

8. Conclusion and Recommendation

The study indicates that poor data quality management is one of the major causes of low bed occupancy rate in Abi adi hospital.

Almost all 1096[99.96%] patients who admitted to the hospital were registered their date of admission, date of discharge and total length of stay in the intervention period this indicates that good follow up and crosschecking how data owners register and support to fill the gap is very important to improve data quality.

Finally this study indicates that using problem solving strategy by doing root cause analysis and setting best strategy is effective to solve problem with minimal resources.

Recommendation

Hospital bed-occupancy rates have been proposed as a measure that reflects the ability of a hospital to properly care for patients.So efforts need to be strengthened to increase knowledge and attitude of health workers especially head nurses towards bed occupancy rate how and when to register admitted and discharged patients.

Bed occupancy rate was increased from 42.2% to 66.3% in this intervention period the hospital management committee should give attention and do daily follow up for its sustainability.

Since data was collected by the end of the month by the ward hade while he/she is over loaded to evaluate all activities of the ward the data was not collected correctly so it is better to collect the data in daily based.

Data was tally and collected in a piece of paper and not formal for all wards in order to be formal and easy the developed tally sheet /check list/ should be reviewed and used as data collecting tool.

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Annexes

Annex 1:

Table 5: Developed Tally sheet for data collection in pre-post intervention study on BOR in Abi adi hospital [February-July, 2013]

ward	Time period (months)	Total no of pts admitted in the period	Total no of pts discharged in the period	Total Length of stay of each patient in days	No of pts not registered their date of discharge and length of stay
medical					
total					
surgical					
total					
Gyn					
pediatric					
total					
Ground total					

BOR = $\frac{\text{Total number of patient days for a given period x 100}}{\text{Available beds (bed complement) x the number of days in the period}}$

Annex 2

Liaison job description in related to BOR

The Liaison officer of Abi-Adi General Hospital is responsible to

Facilitate Bed Management system by registering and report daily occupied and free in all wards

Cross check appropriated registration system of admitted patients daily in all wards and give support to ward heads.

Facilitate Emergency and Elective Admission

Provide Social Service Support to the emergency, Inpatient and outpatient case team

1.1 Inpatient Service

Pediatrics including Therapeutic feeding unit and Neonatal unit

Surgical patients

Gynecologic patients

Obstetric Management

Provision of delivery Services

Provision of emergency operations

Assurance of principal investigator

The under signed agrees to accept responsibility for the scientific ethical and technical conduct of the project and for provision of required progress reports as per terms and conditions of the research publications office (affect at the time of grant is for warded as the result of this application

Name of the student G/slassie G/meskel

Date _____ sign _____

Approval of primary advisor

Name of primary advisor mesfin Adisse (Dr)

Date _____ sign _____