

Increasing the efficacy of Decision Making and Perfecting the Information collection and Analysis System by Developing A Hospital Wide Revenue Dashboard

By

Soumya Jaiswal

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2018-2020



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Soumya Jaiswal**, student of MBA Hospital and Health Management/ Pharmaceutical / Rural Management from The IIHMR University, Jaipur has undergone internship training at **Regency Medical Center, Tanzania** from **14th February** to **29th May 2020**

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her success in all his future endeavors.

Dean, Academics and Student Affairs
The IIHMR University, Jaipur

Professor
The IIHMR University, Jaipur



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Website: www.regencymedicalcentre.com

Ref: RMC/HR/29052020-02

29th May 2020

TO WHOM IT MAY CONCERN

This is to certify that Ms. Soumya Jaiswal, a student of MBA (Healthcare & Hospital Management), IIHMR University, Jaipur, India, has successfully completed Dissertation Program from 14th February 2020 to 29th May 2020 at this Hospital. During the period of her Dissertation program with us she was found to be punctual and hardworking.

We wish her every success in life.


Dr. LALIT KANABAR
MD DEPARTMENT
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THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Increasing the efficacy of Decision Making and Perfecting the Information collection and Analysis System by Developing A Hospital Wide Revenue Dashboard** and submitted by **Soumya Jaiswal** Enrollment No **0843** under the supervision of **Professor Dhirendra Kumar** for award of MBA in Hospital and Health/ Pharmaceutical / Rural Management in Health and Hospitals of the University carried out during the period from 14th **February, 2020** to 29th **May, 2020** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Signature

ACKNOWLEDGEMENT

I am using this opportunity to express my deepest gratitude and special thanks to **Dr Amish Kanabar**, Director, Regency Medical Center for providing me an opportunity to do my dissertation and project work in Regency Medical Center, Dar Es Salaam, Tanzania.

I express my deepest thanks to **Dr Sushmit Jain**, Associate Professor, IIHMR University, Jaipur, for his generous guidance and patience throughout, and for making this international opportunity possible.

I owe my gratitude to my mentor **Professor Dhirendra Kumar**, Professor, IIHMR University, Jaipur, for his guidance and instructions.

Words fail to express my sense of gratefulness for the constant love, support, and encouragement of my mother **Mrs. Manu. R. Jaiswal** without whom nothing would have been possible.

I perceive this opportunity as a big milestone in my career initiation. I will strive to use the gained skills and knowledge in the best way possible and will continue to work on the improvement of my methods with every step to achieve excellence as I go forward.

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Abbreviations

RMC	Regency Medical Center
HIS	Hospital Information System
NHIF	National Health Insurance Fund
ICT	Information and Communications Technology
BI	Business Intelligence

Abstract

1) Research Problem –

How to Improve the decision-making process of the hospital by perfecting data analysis by creating Dashboards according to the hospital environment?

2) Methodology –

A software named *Charak* was already being used to collect data from various departments of the hospital. Dashboards were created in macro enabled excel for various departments. Cleaned data extracted from *Charak* was required to be fed to a completely automated dashboard which was created to facilitate better understanding of the revenue related data and ensure better decision making based on the analysis.

These dashboards were fully automated to produce accurate and real time data for comparisons and analysis these dashboards showcased data in form of various graphs and calculates figures.

3) Key Results –

Hospital-wide dashboards were created which would work because it did not put any extra burden on staff members for data collection as the data required by the dashboards to produce visual information was already being collected in *Charak*. These dashboards were fully automated to show any data put into it in the form of predefined graphs and filters.

4) Conclusion –

When Decisions are taken based on primary or secondary experience of intuition, without the use of any Business Intelligence Tool, it results in a lack of authentic and proven basis in internal and external data. There are usually not many ways of accessing, Monitoring, and evaluating the validity of such decisions creating a blind loop of poor decision making.

Introduction

Healthcare is a sector with exponential growth, making it one of the largest industries in the world with enormous impact on countries' economy. However, like all other institutions, healthcare organizations are at the mercy of the unstable environment of external factors such as technological advances. For these reasons and due to this impact on the healthcare system at the level of effectiveness it is necessary that hospitals constantly improve their performance. Therefore, to improve performance, it is necessary to measure and evaluate it, so that it is possible to allow healthcare organizations to define strategies to achieve hospitals' goals. The strategic objectives of healthcare organizations are difficult to achieve given their complexity. The data volume is increasing due to more than 20 years of electronic storage of patients' data, with the Hospital Information System (HIS) being able to store and subsequently provide useful information throughout the hospital's medical history. The impact of the introduction of information and communications technology (ICT) in the multifaceted health sector is well known and acknowledged by health stakeholders who have witnessed the role of ICTs in diverse levels in hospital organization.

Business Intelligence (BI) is a valuable asset in today's organizations, having a direct impact on the following aspects: providing data visualization tools, improving organizational decisions, supporting analysis of breaking organizational information barriers, influencing strategic business decisions, and helping to give meaning to organizational data.

When designed to measure performance and backed by a business-oriented BI infrastructure, dashboards enable health managers to be able to measure performance, monitor KPI by preventing deviations, understand undesirable behaviors and redefine the trajectory of the objectives.

The dashboard is a mechanism that effectively and efficiently aggregates relevant information to be explored through three tasks:

- (1) Monitor
- (2) Analyze and
- (3) Manage

Currently, the growing need for hospital organization to have valid and reliable tools that help in the process of analyzing and evaluating the services provided to patients plus the need to have adequate and available information to facilitate measurement of the productivity of hospital organization call for further investigation in this domain.

Company Profile



Regency Medical Center is a 100 bedded, multi-specialty hospital located on Aly Khan Road, Dar Es Salaam, Tanzania. It was established in 1999 by the founder and chairman Dr. Rajni Kanabar.

Their vision is to make specialized medical services available to all on an equitable basis. They believe health care should be affordable and comprehensive for everyone, and physically accessible where and when needed.

Regency Medical Center is an NHIF accredited hospital and provides all facilities under tis scheme.

National Health Insurance Fund (NHIF)

NHIF is a social health insurance scheme which ensures healthcare service availability to all Tanzanians. NHIF registered beneficiaries can easily avail health care facilities in any accredited hospital in Tanzania.

Research Methodology

Key Research Question –

How to Improve the decision-making process of the hospital and perfecting data analysis by creating Dashboards according to the hospital environment?

The research design – Qualitative and Descriptive

Data Collection Tools –

(1) Tool used to collect data – *Charak*, a specially customized software with various level of accessibility to different staff members.

(2) Tool used to make Dashboard – Microsoft Excel

Study Setting- Regency Medical Centre, Dar Es Salaam, Tanzania

Data Collection and Analysis

Data collection and analysis was done in the following steps: -

- (1) Data Inventory
- (2) Dashboard Content
- (3) Dashboard design
- (4) Improving Dashboard flexibility and connectivity

(1) Data Inventory

A software named *Charak* was already being used to collect data from various departments of the hospital. Dashboards were required to be made in such a way so that the information which was already being collected could be used and understood in a better way. Cleaned data was to be taken from *Charak* and fed to a completely automated dashboard which was created by me to facilitate better understanding of the revenue related data and ensure better decision making based on the analysis. The challenge here is not to increase the burden on the internal and external stakeholders in the process of collecting the quantitative data required for the dashboard.

(2) Dashboard Content

A better way of data analysis and real time availability of data was in urgent demand and various methods were sought to achieve a solution to get closest to the requirement. First KPIs were determined to understand the indicators having a direct effect on the revenue-based performance of various department and doctors of the hospital.

The
Following
KPIs were
listed

Utilization Statistics
Visiting Staff
Inpatient Surgeries
Outpatient Surgeries
Natural Births
Cesarean Sections
Micellaneous
Reffered O/P Visits
I/P Surgeries
O/P Surgeries
Home Medical Visits

Direct Expenses	Financial and Utilization Data by Payer Category
Salaries and Wages	Adjusted Patient Days
Employee Benefits	Patient Days
Lease/Rent	Discharges
Water	Avg Length of Stay
Electricity	Outpatients Visits
Daily Hospital Services	Gross Inpatient Revenue
Insurance	Gross Outpatient Revenue
Depreciation	Expenses
Miscellaneous	Referral Rate
Overall Referral Rate	Gross Inpatient Revenue P/D
Overall discharge Rate	Gross Inpatient Revenue P/Discharge
Proportion of NHIF patient in hospital	Net Inpatient Revenue P/D
Bed Occupancy Rate	Net Inpatient Revenue P/Discharge
IPD per thousand population	Net Outpatient Revenue P/Visit
OPD consultation per Thousand Population	Payment Shortfall
Bed Occupancy Rate	Abscounding Rate
No. of total admissions per thousand population	
Deductions from revenue	

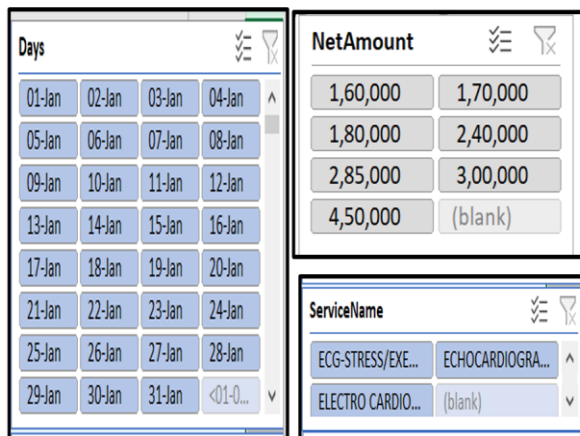
Out of these the following main were selected: -

- (1) Revenue generated per Doctor
- (2) Revenue generated per Type of Payor
- (3) Revenue generated per Day
- (4) Revenue generated per Clinical Procedure

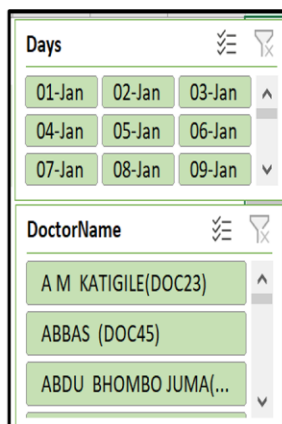
These main data figures were followed to analyze the revenue generated in the hospital with the help of the dashboards created.

(3) Dashboard Design

Dashboards were created on Microsoft Excel using pivot tables and existing hospital data.

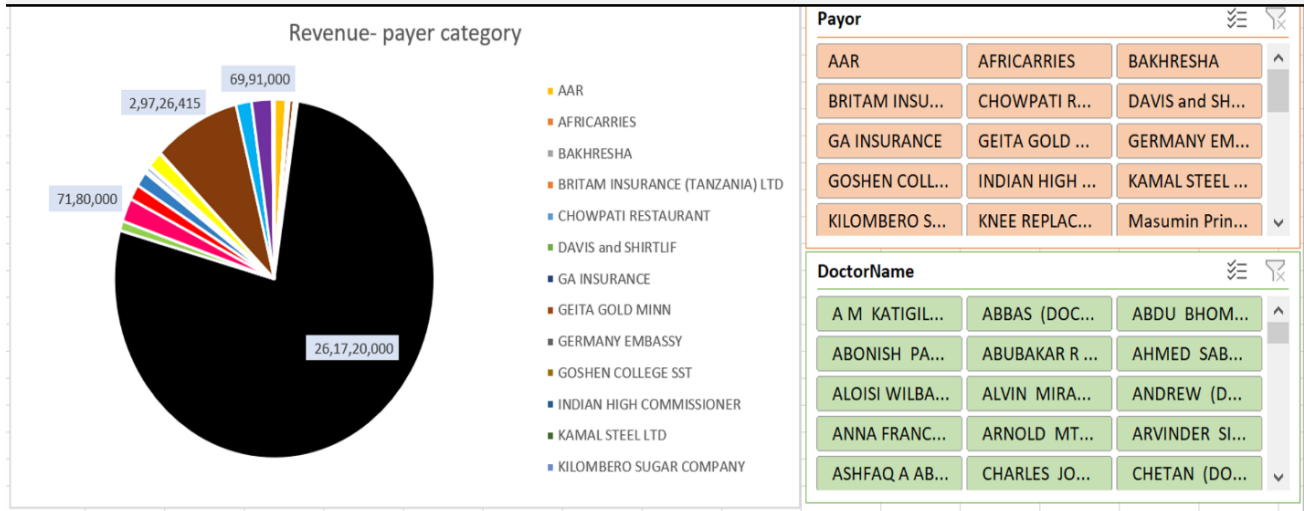


These Dashboards are operated with the help of filters. Different settings can be selected according to the requirement. The following are some revenue related filters that have been put to facilitate better comparison and analysis.

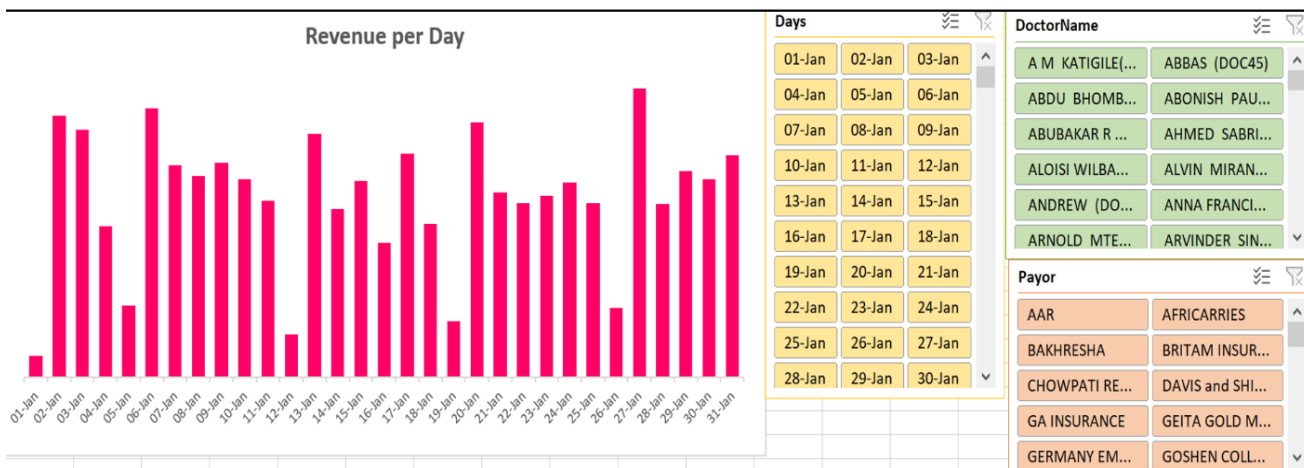


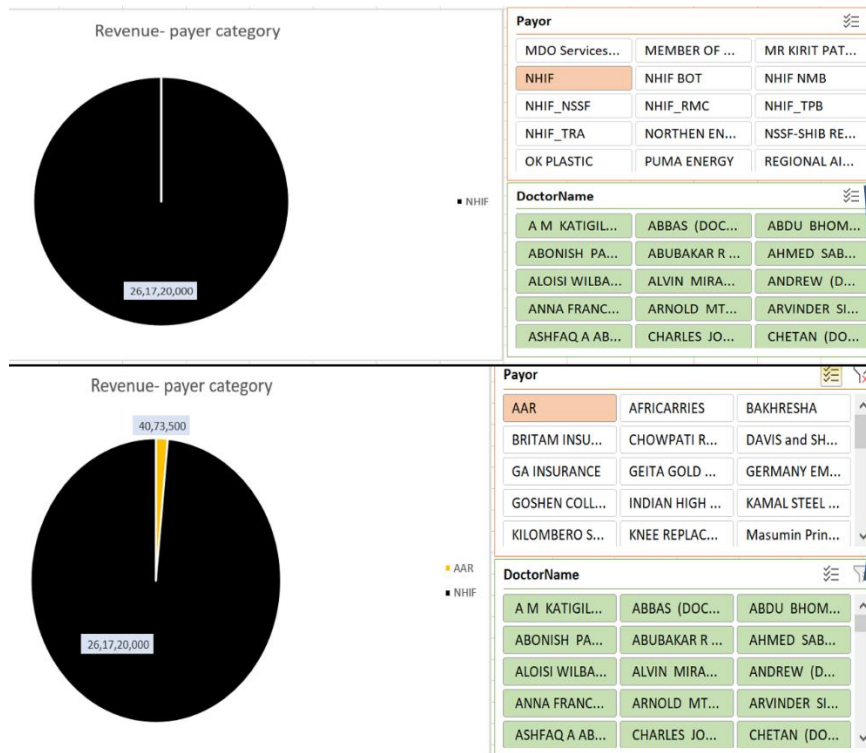
These excel worksheets are macro enabled, therefore will update with the changed data set every time. However, due to the current way of raw data collection, it is only suitable if data is properly extracted department wise first and then put into the worksheet for accurate analysis and further decision making.

Pie Charts have been used to understand the revenue generated in the payer category.

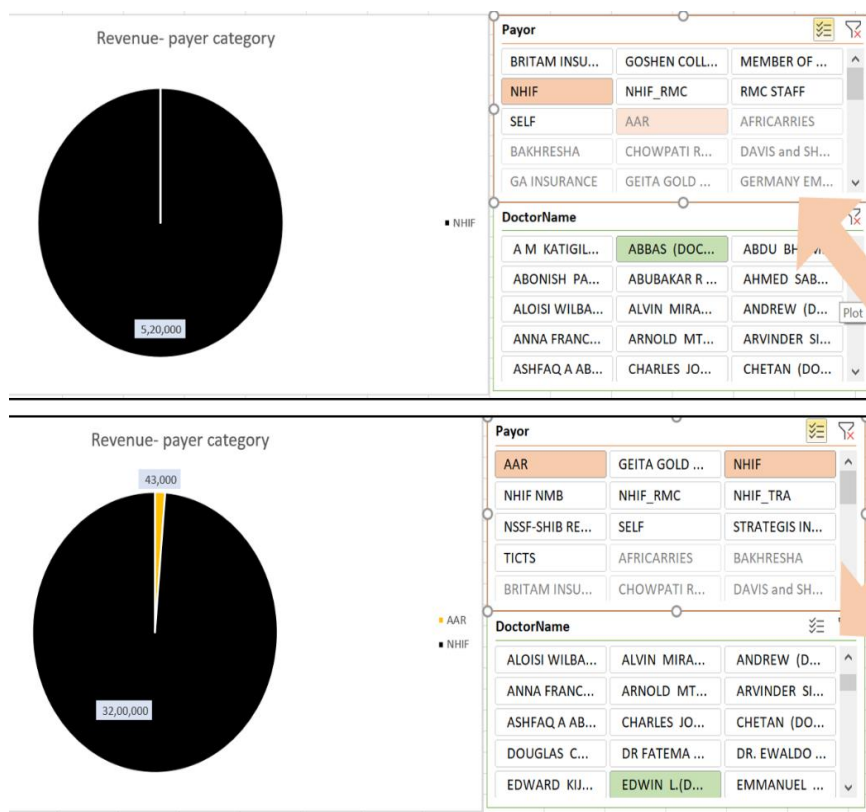


Column Charts have been used to understand the revenue generated per day.

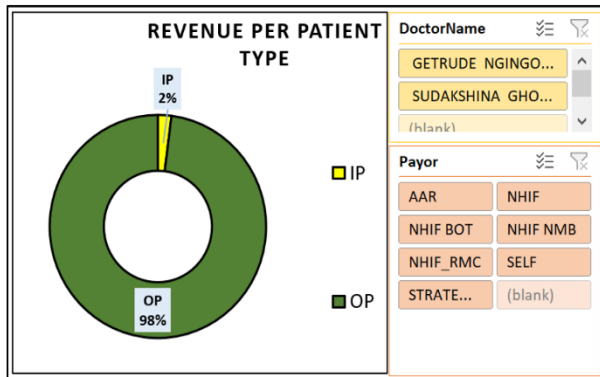




Comparison
of
NHIF
and AAR
patient
revenue
with
the help
of
filter
selection

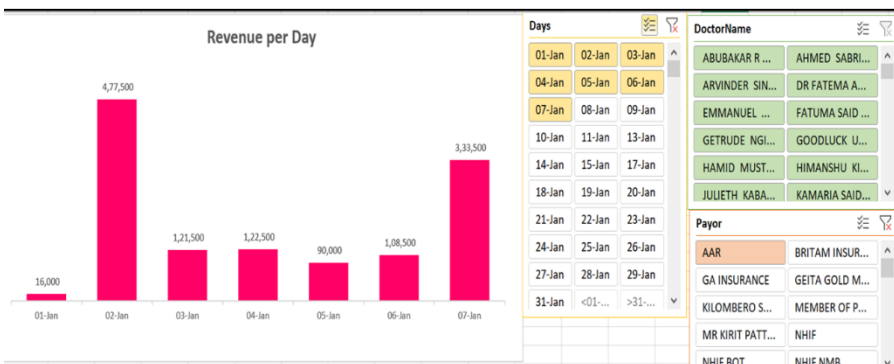
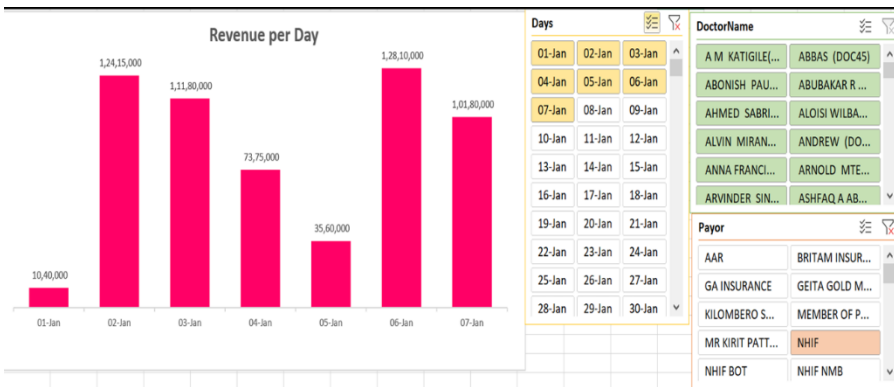
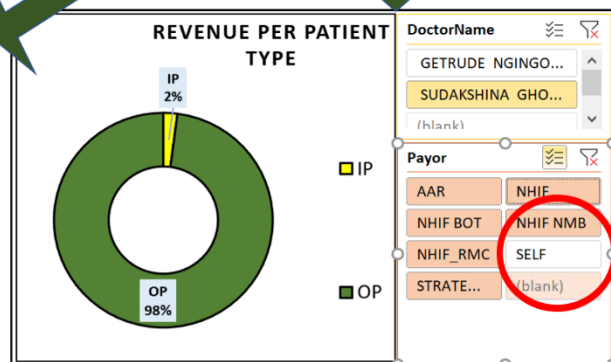
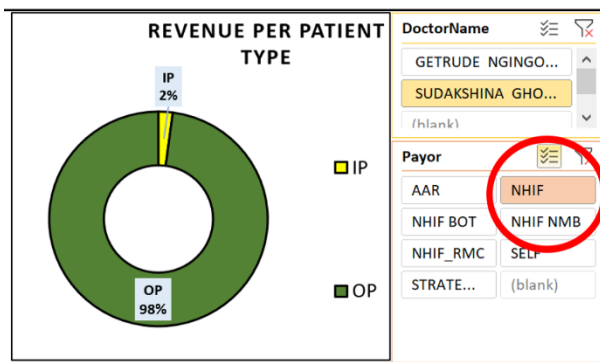


Comparison
of
NHIF
and AAR
patient
revenue
between
two
doctors

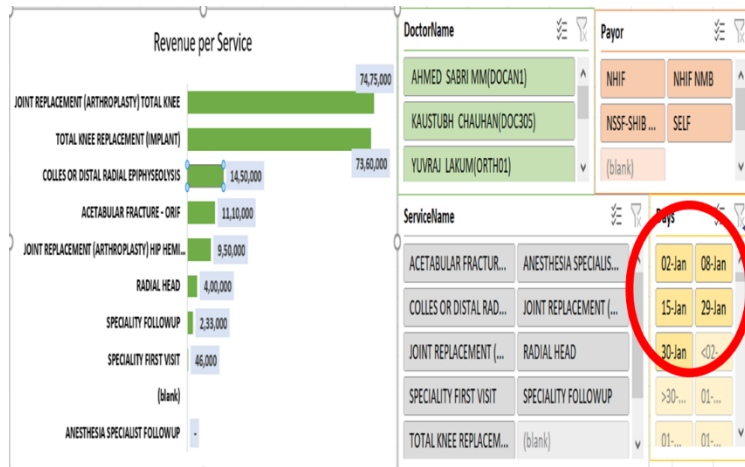


Doughnut Charts have been used to understand the revenue generated in the Patient type category.

Payer Categories can be selected to get related data for comparisons and analysis.

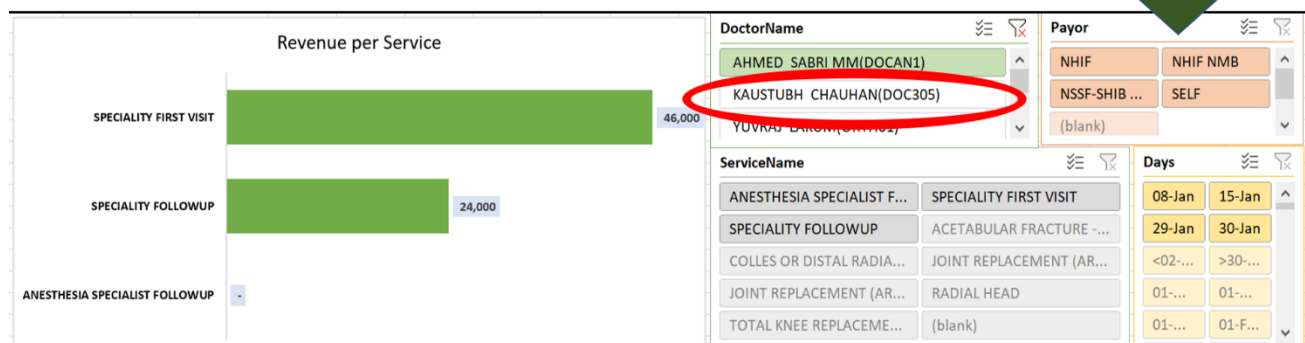


Weekly payer category analysis by various selections can be easily displayed.



Dates can be selected by turning on the multiple selection tool to get data for a specific date or any number of day for example: 1 week

Doctor's name can be selected from the filters to get all the data associated with that doctor as well as a comparison if needed for further analysis



(4) Improving Dashboard flexibility and connectivity

These dashboards were fully automatized to show any data put into it in the form of predefined graphs and filters. It was made macro enabled and other functions were added to facilitate better connectivity and user-friendly interface for internal and external stakeholders.

Various prototypes were made of dashboards on excel of various departments and presented to the management for further action.

Discussion

When Decisions are taken based on primary or secondary experience of intuition, without the use of any Business Intelligence Tool, it results in a lack of authentic and proven basis in internal and external data. There are usually not many ways of accessing, Monitoring, and evaluating the validity of such decisions creating a blind loop of poor decision making. These types of decisions tend to lack immediacy and accuracy. Relying on partially accurate 30 days old reports, without the ability to dive in deeper into KPI will not keep a hospital as financially strong and competitive as it as the potential to be.

hence it is extremely beneficial to use Business Intelligence Tools such as dashboards which maybe a onetime investment if made properly and provide accurate and understandable information based on the required information. Dashboards provide fact-based real-time data which is limited in quality and quantity only by the customization of the user.

Limitations

In these revenue-based dashboards, footfall, an essential KPI as not been included which might lead to a little inaccuracy of the overall view of the revenue when calculated in terms of profits.

A Dashboard is only as good as the user customizing and taking out information from it.

One must know how to operate, view, understand the data showcased. One must have time to identify the data needs and organize the data base. Data management is required for more real time and advanced information flow system to be established. Feeding the required data into the dashboard, monitoring and evaluating is essential to take full advantage of this business intelligence tool.

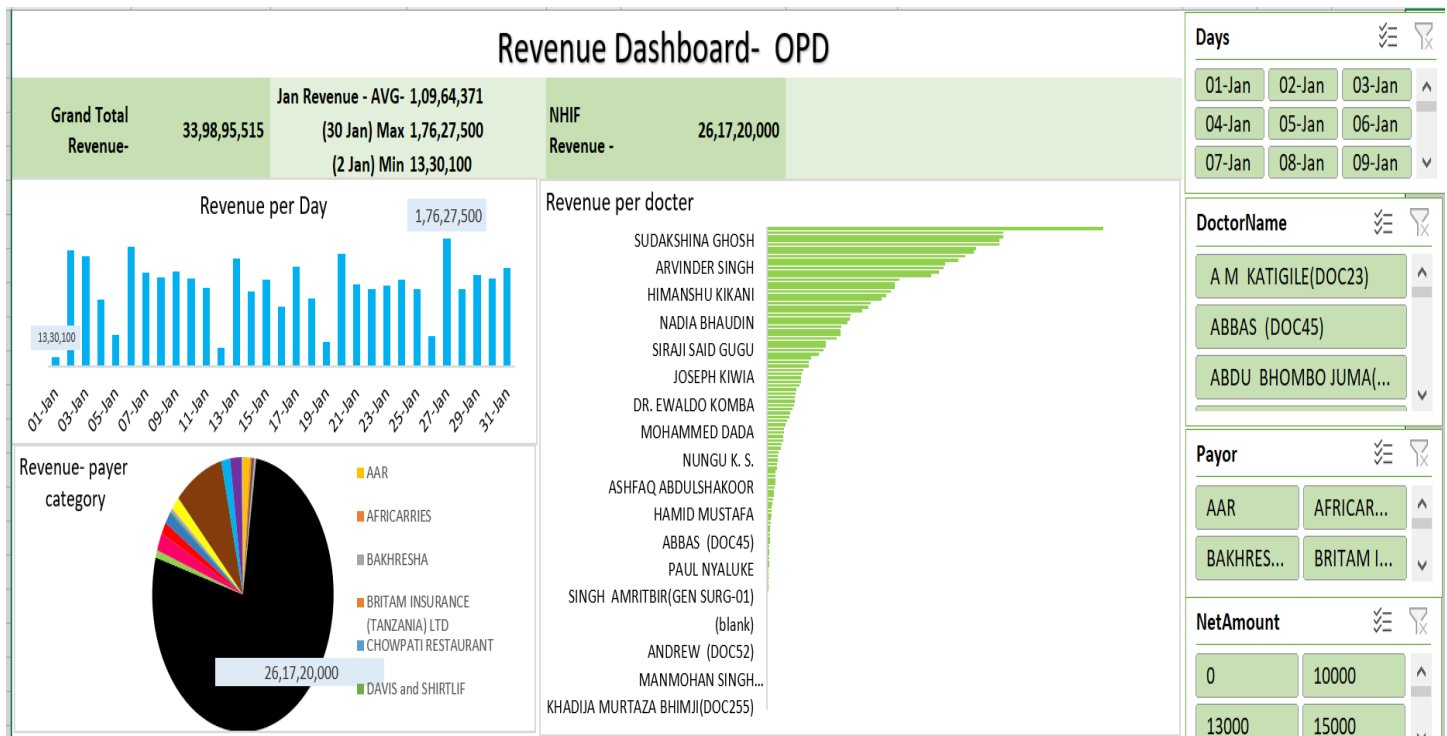
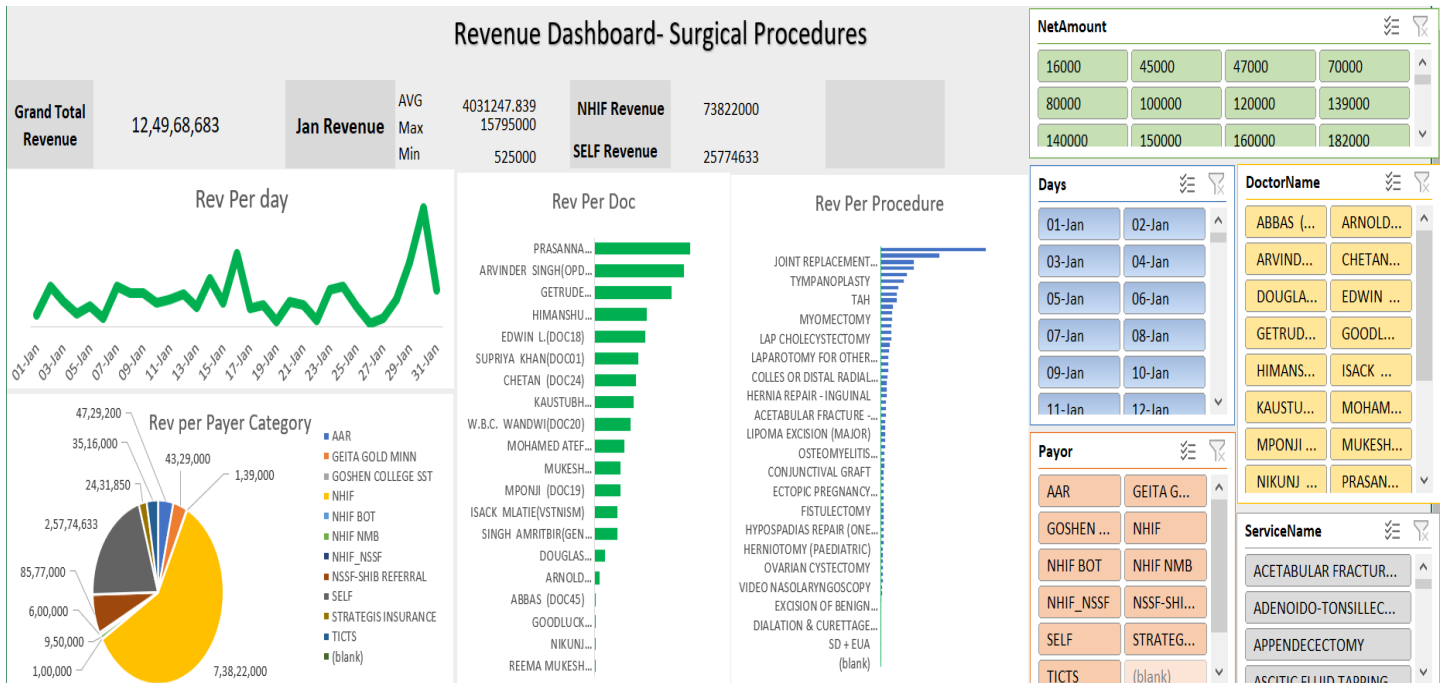
Conclusion

The implementation of dashboards on revenue generation is like an asset for the organization. The most important thing to notice is that the prototype of dashboard was loaded with real data from hospital which made it easier for stakeholders to understand. Dashboard implementation has all conditions to materialize as it puts no extra burden on the staff to collect the required data. Apart from all this dashboard also allow us to measure the revenue based performance and productivity of the organization.

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doi:10.1007/s12626-014-0044-x

Annexure



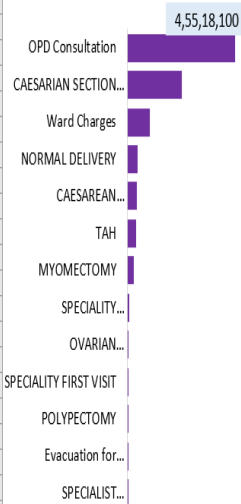
Revenue Dashboard- GYN

Grand Total Revenue- 93661544

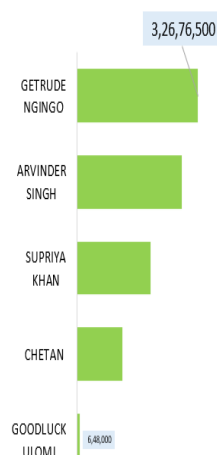
Jan Revenue - AVG- 61,58,870
(16 Jan) Max 67,57,064
(5 Jan) Min 5,27,954

NHIF Revenue - 15715000

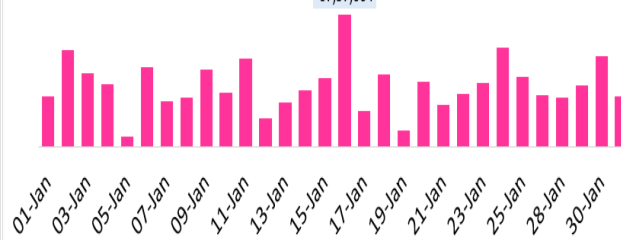
Revenue per Service



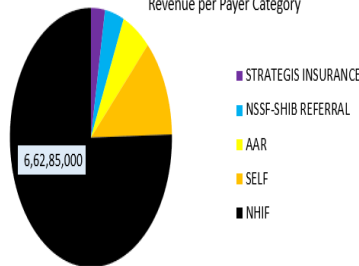
Revenue per Doctor



Revenue per Day



Revenue per Payer Category



Days

01-Jan	02-Jan	03-Jan
04-Jan	05-Jan	06-Jan
07-Jan	08-Jan	09-Jan
10-Jan	11-Jan	12-Jan
13-Jan	14-Jan	15-Jan
16-Jan	17-Jan	18-Jan

AttendingDoctorDBKey

ARVINDER SINGH(...)	CHETAN (DOC24)
GETRUDE NGINGO...	GOODLUCK ULOMI...
SUPRIYA KHAN(DO...	ARVINDER SINGH
CHETAN	GETRUDE NGINGO

Payor

AAR	BRITAM INS...	GEITA GOL...
MR KIRIT P...	NHIF	NHIF BOT
NHIF NMB	NHIF_NSSF	NHIF_RMC
NHIF_TPB	NHIF_TRA	NORTHERN ...

ServiceName

CAESAREA...	CAESARIAN...	Evacuation ...
MYOMECT...	NORMAL D...	OPD Consul...
OVARIAN C...	POLYPECT...	SPECIALIST ...

NetAmount

0	10000	15000	21148
22884	22998	23000	24000
25000	30000	32100	32500
33000	35000	48000	50000

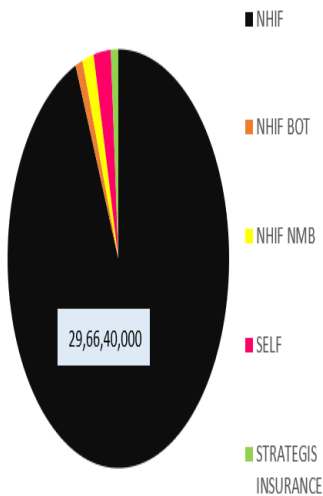
Revenue Dashboard- Dialysis

Grand Total Revenue- 13665000

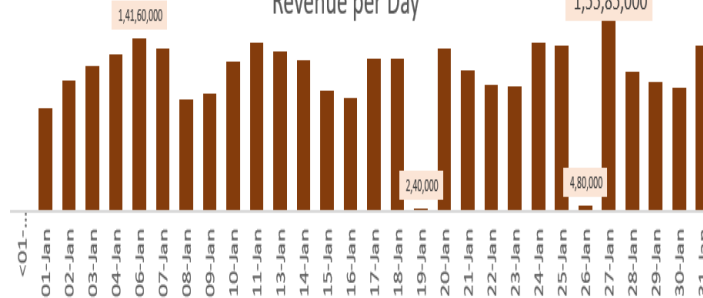
Jan Revenue - AVG- 1,36,65,000
(27 Jan) Max 1,55,85,000
(19 Jan) Min 2,40,000

NHIF Revenue - 3360000

Revenue per Payer Category



Revenue per Day



Revenue Per Patient Type

IP OP



Days

01-Jan	02-Jan	03-Jan	04-Jan
06-Jan	07-Jan	08-Jan	09-Jan
10-Jan	11-Jan	13-Jan	14-Jan
15-Jan	16-Jan	17-Jan	18-Jan
19-Jan	20-Jan	21-Jan	22-Jan

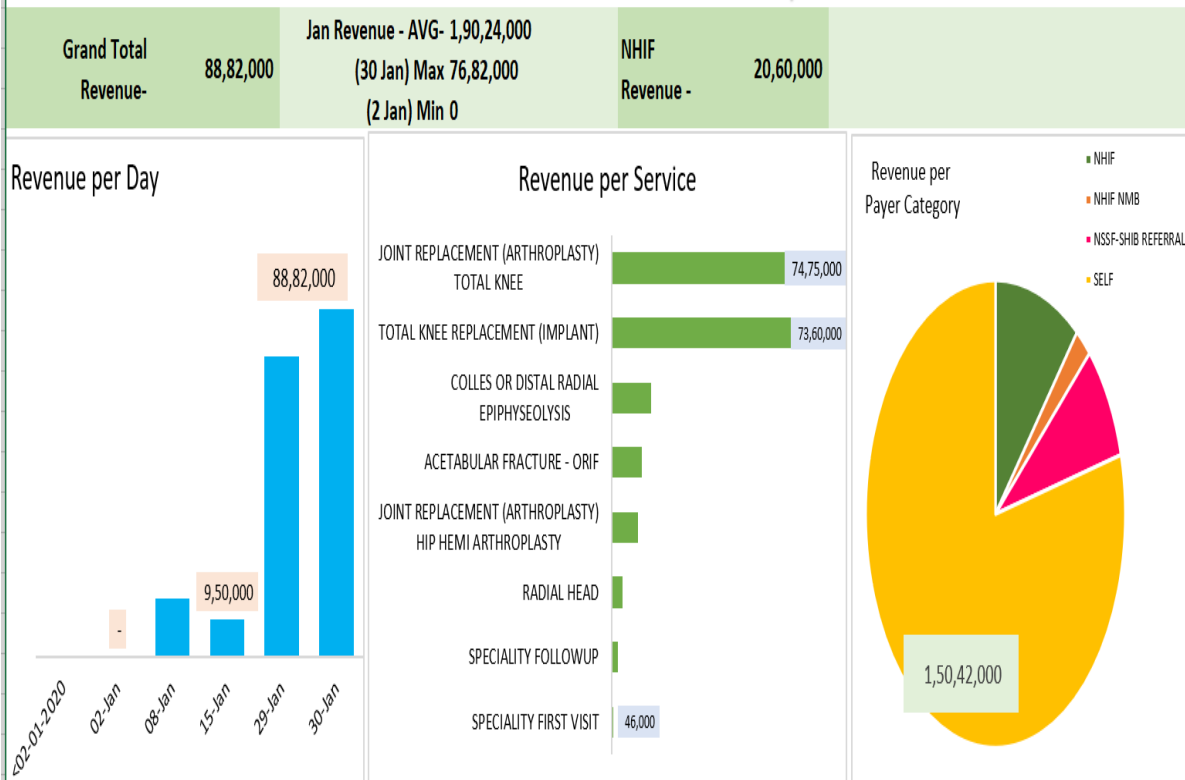
Payor

AAR	NHIF
NHIF BOT	NHIF NMB
NHIF_RMC	SELF
STRATEG...	(blank)

NetAmount

1,60,000	1,70,000
1,80,000	2,40,000
2,85,000	3,00,000
4,50,000	(blank)

Revenue Dashboard- Orthopaedics



Days

02-Jan 08-Jan
15-Jan 29-Jan
30-Jan <02-01-2...
>30-01-2... 01-Apr

ServiceName

ACETABULAR FRACTUR...
ANESTHESIA SPECIALIST...
COLLES OR DISTAL RADI...
JOINT REPLACEMENT (A...
JOINT REPLACEMENT (A...

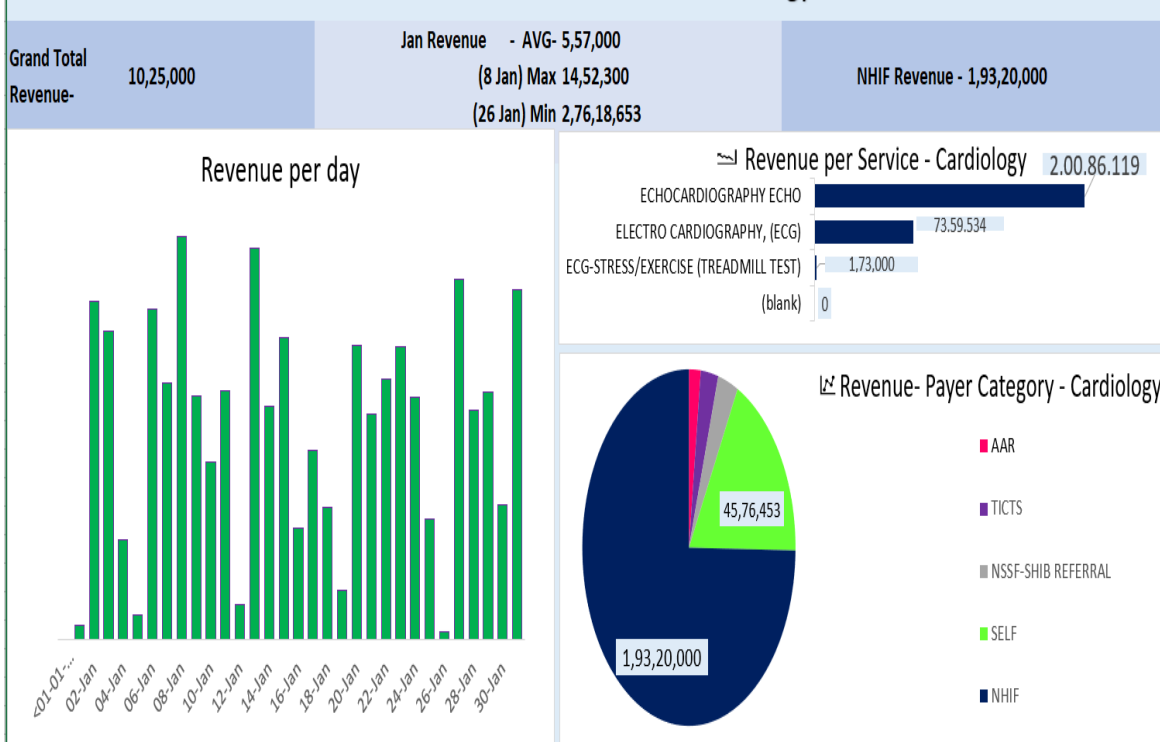
Payor

NHIF NHIF... NSSF...
SELF (blank)

NetAmount

- 23,000
24,000 4,00,000
9,50,000 11,10,000

Revenue Dashboard- Cardiology



Days

01-Jan 02-Jan 03-Jan 04-Jan
05-Jan 06-Jan 07-Jan 08-Jan
09-Jan 10-Jan 11-Jan 12-Jan
13-Jan 14-Jan 15-Jan 16-Jan
17-Jan 18-Jan 19-Jan 20-Jan
21-Jan 22-Jan 23-Jan 24-Jan
25-Jan 26-Jan 27-Jan 28-Jan
29-Jan 30-Jan 31-Jan <01-0...

ServiceName

ECG-STRESS/EXE... ECHOCARDIOGRA...
ELECTRO CARDIO... (blank)

Payor

AAR GEITA GO... KNEE REP...
MEMBER ... NHIF NHIF BOT...
NHIF NMB NHIF_NSSF NHIF_RMC
NHIF_TPB NORTHE... NSSF-SHI...

NetAmount

15000 30834 32000
32500 37400 39000
40000 58000 80000