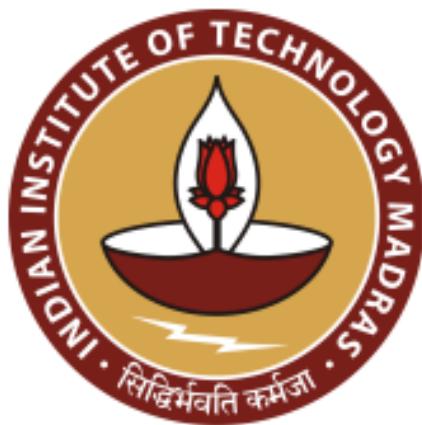


Business Data Management Mid-Term

Submission



Case study of Tulip Hospital: A Data-Driven Approach

Name:Shubh Bhaskar

Roll number:22f3000712

IITM Online BS Degree Program, Indian Institute of Technology, Madras,
Chennai Tamil Nadu, India, 60003

Contents

1. Executive Summary and Title	3-4
2. Proof of originality of the Data	4-6
3. Metadata	7-8
4. Descriptive Statistics	8-10
5. Detailed Explanation of Analysis Process/Method	11-12
6. Results and Findings	12

Enhancing Operational Efficiency and Financial Stability in Tulip Hospital: A Data-Driven Approach

1.) Executive Summary :

Healthcare services are fundamental in ensuring community well-being and managing public health. Tulip Hospital, located in Sonipat, Haryana, is a prominent healthcare facility dedicated to providing top-notch medical services at affordable rates.

As stated earlier in the proposal despite its commitment to excellence, Tulip Hospital faces significant challenges that hinder its operational efficiency and financial stability. The hospital struggles with inaccurate tracking of billable hours and procedure attribution, which leads to billing discrepancies and affects resource allocation and individual performance assessments. Additionally, the hospital experiences varying patient influx, complicating resource allocation and capacity planning, which in turn impacts financial forecasting and operational management. These fluctuations can strain resources during peak times and result in underutilization during off-peak periods, affecting both service delivery and patient satisfaction. Furthermore, cash flow issues due to insufficient cash reserves pose a threat to day-to-day operations, causing delays in bill payments and the procurement of essential supplies, thus jeopardizing financial stability and operational continuity.

This project aims to devise targeted interventions that enhance data management, optimize resource allocation, address cash flow constraints, and ultimately improve operational processes.

Goals for Mid-Term:

- To determine the impact of payment methods (self-paid, insurance, government benefit) on cash flow.**
- To analyze the distribution of procedures among doctors and departments for accurate attribution.**
- To examine patient influx patterns to improve capacity planning and resource allocation.**

2.) Proof of Originality of the Data:

Details:

- Hospital Name: Tulip Hospital**
- Owner: Dr. Sethi**
- Address: Sonipat, Haryana**

About:

Tulip Hospital, established in 2013, is a key healthcare provider in Sonipat, Haryana, with a 100-bed facility in Sonipat and a 65-bed unit in Kharkhoda. The hospital offers a range of medical services, emphasizing affordable and quality healthcare.

Images:

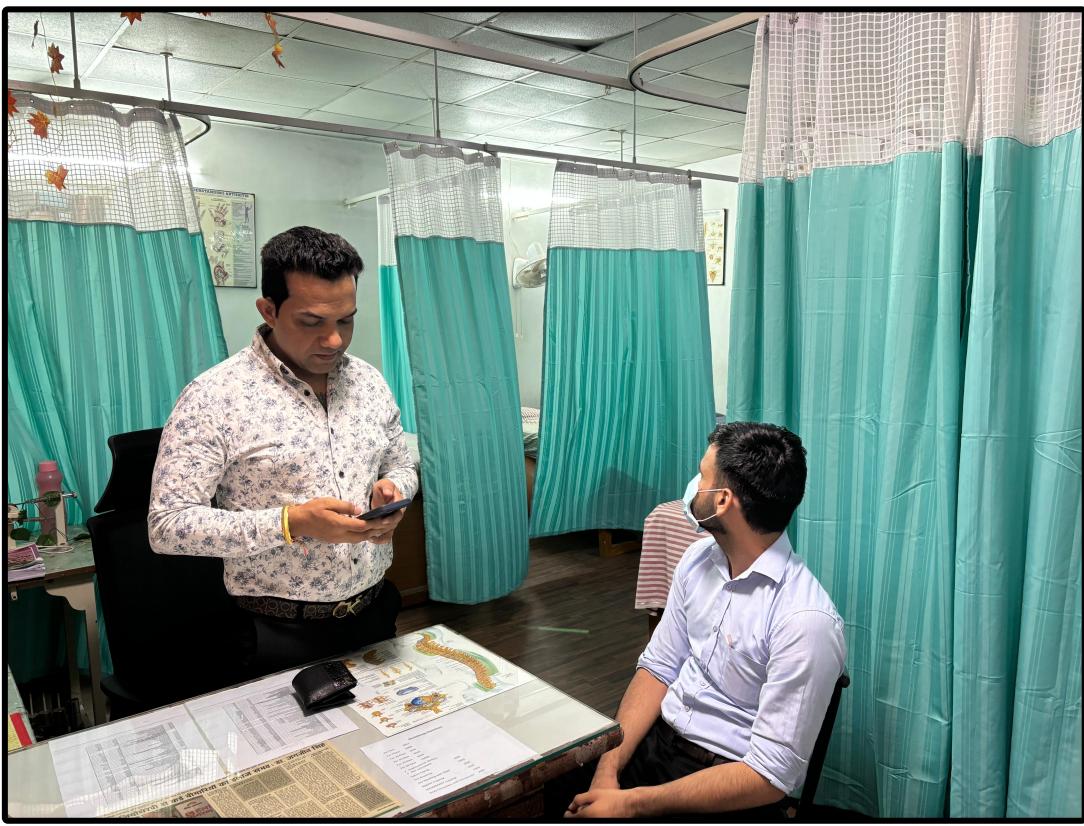
To substantiate my claims, I have included a visual documentation comprising images showcasing the establishment itself, along with the sample bills employed by the hospital to meticulously record each sale



General Ward of the Hospital



Diagnostic Centre



Doctor's Seating Area

<p>TULIP MULTISPECIALITY HOSPITAL PVT. LTD. TP SCHEME 15, NEAR VIVEKANAND CHOWK DELHI ROAD SONIPAT-131001 (HR) GSTIN :- 06AAECT5671P2Z0</p> <p style="text-align: center;"></p> <p>Final Bill</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <tr> <td>Uhid No. : 17591/22-23</td> <td>IPD No. : 2640/24</td> </tr> <tr> <td>Name : PREM WATI W/O BALRAM</td> <td>Bill No. : IBM/2774/24</td> </tr> <tr> <td>Age / Gender : 59 Y / FEMALE</td> <td>Bill Date : 15/06/2024</td> </tr> <tr> <td>Ward / Bed No : SEMI-PRIVATE ROOM / 1</td> <td>Admission Date : 10/06/2024 13:48</td> </tr> <tr> <td>Department : MEDICINE</td> <td>Discharge Date : 15/06/2024 11:45</td> </tr> <tr> <td>Address : VILL- PABSSERA SONIPAT</td> <td></td> </tr> <tr> <td>Doctor : DR. ANURAG & DR. DHRUB & DR. RAJA & DR. POOJANGI</td> <td></td> </tr> <tr> <td>Sponsor : MARUTI SUZUKI INDIA LTD. 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Bill generated by the hospital



TULIP HOSPITAL

Hope lives here!

Tulip Multispeciality Hospital Pvt. Ltd.
T.P. Scheme-15, Near Vivekanand Chowk,
Delhi Road, Sonipat-131001 (Haryana)
Tel: 0130-2218812, 2218813, 7056511111, 8199934919, 9817114531
Website: www.tuliphospital.com Email: hospitaltulip@gmail.com



Date – 15-03-2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. SHUBH BHASKAR**, a student pursuing IITM Online BS Degree Program offered by Indian Institute of Technology, Madras is working on a BDM capstone Project based on the resource data provided by us.

The Student details provided to us are:

Name: SHUBH BHASKAR

Roll No.: 22F3000712

e-mail: 22f3000712@ds.study.iitm.ac.in

He has collected our Primary Business Data individually through Offline and Online channels within the context of the academic project taken up towards his course fulfilment.

We wish him all success in his academics.

Regards,



Amit Gupta – Administrator
Tulip Hospital – Sonipat
Bd.tuliphospital@gmail.com

4 HRS. EMERGENCY & INTENSIVE CARE | ULTRA MODERN OT's | SPECIALITIES & SUPER SPECIALITIES | DIAGNOSTICS | PHARMACY | RADIOLOGY

Letter from organization

3.) Metadata and Descriptive Statistics :

I have meticulously gathered an extensive dataset spanning one year, from the 1st of April 2023 to the 31st of March 2024 with data pertaining to the following - Admission Date, Discharge Date, Patient Name, Sponsor, Doctor, Bill Amount, Discount, Net Amount, Deposit, Balance, Age, Gender, City Name, Department, Ward, etc., the data was collected in 3 excel sheets i.e in patient data , out patient data and the service register data .Throughout this period, my data collection approach involved systematic and continuous monitoring of hospital activities, ensuring that all relevant information was accurately recorded on a daily basis.

This method allowed me to compile a comprehensive set of cumulative data covering the entire year. The datasets include detailed records of payment methods, doctor attributions, departmental involvement, and ward occupancy, providing a robust foundation for analyzing the hospital's operational efficiency and financial stability.

A	B	C	D	E	F	G	H	I
Adm Date	PatientName	Age	Gender	CityName	Department	DoctorName	Sponsor	Ward
01-04-2023	Mrs. Renu Sethi	60 Y	Female	SONIPAT	Medicine	Dr Anil Agarwal	General	Private Room
01-04-2023	Mrs. Meenakshi	24 Y	Female	SONIPAT	GYNAECOLOGY	Dr Ananya Sinha & Dr Sheetal Kumari	CGHS CASH	General Ward
04-04-2023	Mr. SHAMSHER SINGH	58 Y	Male	SONIPAT	ORTHOPEDICS	Dr Gaurav Khanna	General	General Ward
02-05-2023	Mrs. LAXMI DEVI	69 Y	Female	SONIPAT	Medicine	Dr Anil Agarwal & Dr Rahul & Dr Devansh	ECHS CREDIT	Semi-private Room
02-05-2023	Mr. SALIL	19 Y	Male	SONIPAT	Medicine	Dr Anil Agarwal & Dr Devansh Rana	Care Health Insurance	Semi-private Room
01-02-2024	Mr. AHNAN	19 Y	Male	SONIPAT	GENERAL SURGEON	Dr Akash Seth	ICICI Lombard GIC	Private Room
01-02-2024	Mr. ALLEN	19 Y	Male	SONIPAT	GENERAL SURGEON	Dr Akash Seth	ICICI Lombard GIC	Private Room
01-02-2024	Mr. ANSHUK SAHU	21 Y	Male	SONIPAT	ORTHOPEDICS	Dr Prakash Sharma	ICICI Lombard GIC	Private Room
01-02-2024	Mr. VIJENDER	44 Y	Male	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	General	General Ward
01-02-2024	Miss. MAHIMA	24 Y	Female	SONIPAT	Ent	Dr. Anvesh Kumar	DELHI GOVT (DGEHS CASH)	Private Room
01-02-2024	Mr. DAYANAND	82 Y	Male	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	Haryana Govt.	Eicu
01-02-2024	Mrs. RAJ BALA	56 Y	Female	SONIPAT	Neurosurgeon	Dr Sameer Gupta & Dr Anil Agarwal	MEDI ASSIST TPA	Eicu
01-02-2024	Mrs. Savita	59 Y	Female	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	Star Health & Allied Insurance	Semi-private Room
01-02-2024	Mrs. Neelam Goswami	69 Y	Female	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	Raksha TPA Pvt. Ltd.	Semi-private Room
02-02-2024	Mrs. Kamla	61 Y	Female	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	Haryana Govt.	Private Room
02-02-2024	Mr. BADAR SINGH MALIK	70 Y	Male	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	ECHS CREDIT	Semi-private Room
02-02-2024	Mr. Gopi Chand	73 Y	Male	SONIPAT	Medicine	Dr Anil & Dr Rahul & Dr Devansh & Dr Poonam	Haryana Govt.	General Ward
02-02-2024	Mr. Devender Singh	59 Y	Male	SONIPAT	NEPHROLOGIST	Dr Yash Choudhary	Haryana Govt.	Dialysis (Day Care)
02-02-2024	Mrs. Sonika	28 Y	Female	SONIPAT	GENERAL SURGEON	Dr Akash Seth	Star Health & Allied Insurance	Surgical Icu2

(3.1)Snapshot of data

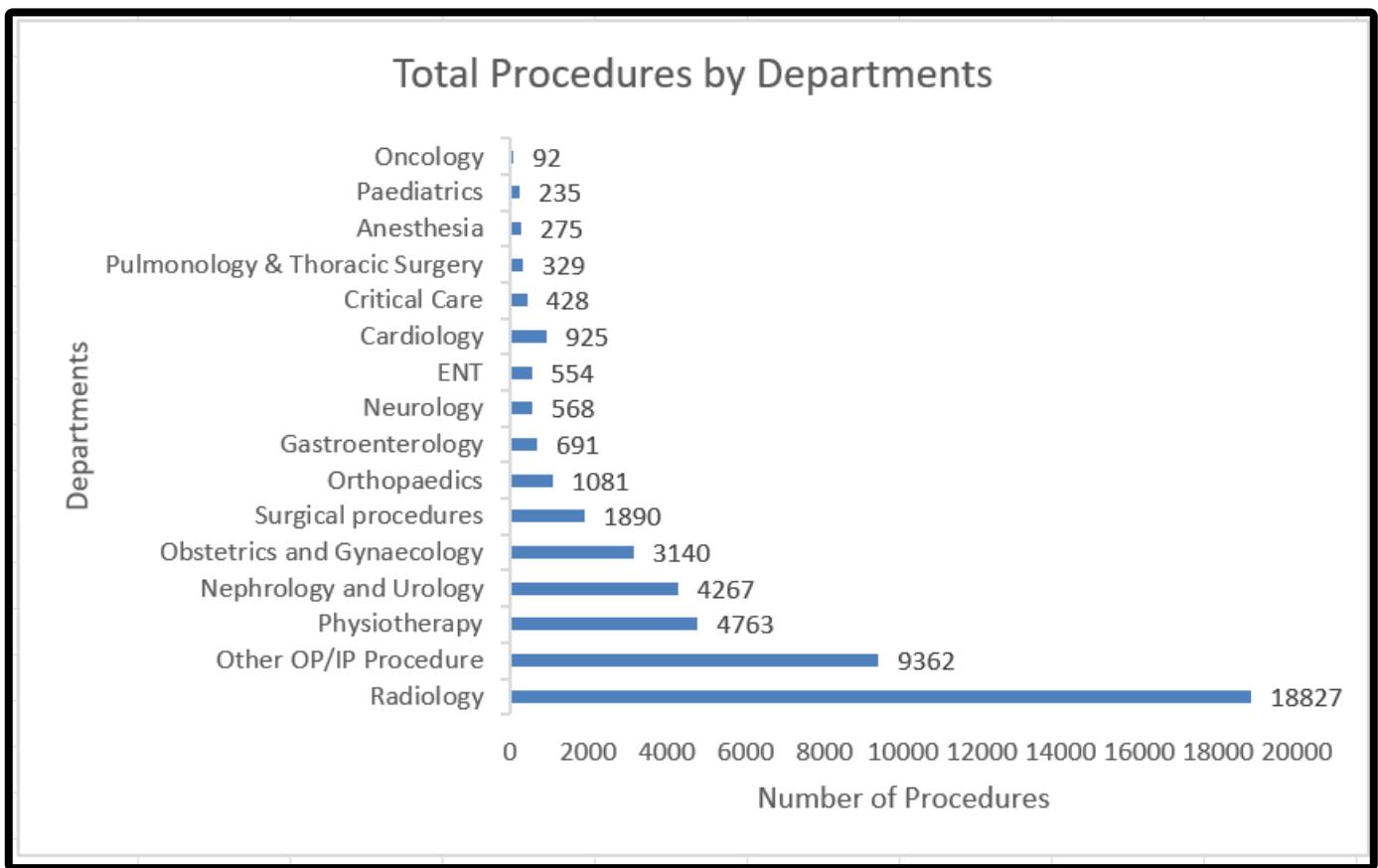
A	B	C	D	E	F	G	H	I	J	
1	TULIP MULTISPECIALITY HOSPITAL PVT. LTD.									
2	From Date :2023-04-01 To Date :2024-03-31									
3	IPD Discharge Register Report									
4	PatientName	Sponsor	Doctor	Adm Date	DisDate	BillAmount	discount	NetAmt	Deposit	Balance
5	DEVENDER	General	Dr Sameer Gupta	01/04/2023	01/04/2023	30050	2550	27500	27500	0
6	Meenakshi	CGHS CASH	Dr Ananya Sinha & Dr Sheetal Kumari	01/04/2023	01/04/2023	8625	863	7762	7762	0
7	Rajesh Devi	ECHS CREDIT	Dr Ananya Sinha & Dr Sheetal Kumari	01/04/2023	01/04/2023	7332	0	7332	0	7332
8	Kavita	General	Dr Ananya Sinha & Dr Sheetal Kumari	01/04/2023	01/04/2023	5000	0	5000	5000	0
9	Sushil Kumar	Haryana Govt.	Dr Yash Choudhary	01/04/2023	01/04/2023	1900	0	1900	1900	0
10	Ravinder Kumar Sehgal	East West TPA Pvt. Ltd.	Dr Yash Choudhary	01/04/2023	01/04/2023	3500	0	3500	0	3500
11	Devender Singh	Haryana Govt.	Dr Yash Choudhary	01/04/2023	01/04/2023	1900	0	1900	1900	0
12	Hawa Singh	Haryana Govt.	Dr Yash Choudhary	01/04/2023	01/04/2023	1900	0	1900	1900	0
13	Naresh Kumar	Haryana Govt.	Dr Anil Agarwal & Dr Devansh Rana	22/04/2023	01/05/2023	44970	0	44970	44970	0
14	Kabul Singh	Haryana Govt.	Dr Anil Agarwal & Dr Devansh Rana	24/04/2023	01/05/2023	16090	0	16090	16090	0
15	SHAMBHOO RAI	General	Dr. Ashish Sen	24/04/2023	01/05/2023	30400	3400	27000	27000	0
16	Savitri Devi .	ECHS CREDIT	Dr Anil Agarwal & Dr Devansh Rana	25/04/2023	01/05/2023	47625	0	47625	0	47625
17	Hari Ram Paul .	General	Dr Anil Agarwal & Dr Devansh Rana	25/04/2023	01/05/2023	266100	38600	227500	227500	0

(3.2)Snapshot of data

	A	B	C	D	E	F	G	H	I
1	Date	Type	PatientName	Sponsor Name	Service Name	Amount	NetAmt	Medical Group Name	OpDocName
2	09-04-2023	OPD	RAMBHAJ	General	Avulsion Suturing	4000	4000	Neuro Surgery	Dr Sameer Gupta
3	10-04-2023	OPD	Jagmender	General	Bladder Catheterization (Neonatal)	2000	2000	Paediatrics	Dr Anil Agarwal
4	15-04-2023	OPD	VIRBHAN	General	Bronchoscopy (Bedside)	8000	8000	Other OP/IP Procedure	Dr. Anvesh Kumar
5	01-05-2023	OPD	Kamakshi .	General	Cardiotocography (CTG)-2nd Visit	1250	1250	Obstetrics and Gynaecology	Dr Ananya Sinha
6	03-05-2023	OPD	Kamakshi .	General	Cardiotocography (CTG)-2nd Visit	1250	1250	Obstetrics and Gynaecology	Dr Parul Chauhan
7	30-05-2023	OPD	KALPANA SAINI	General	Ascitic Tap/Pleural Tap (Critical Care)	4500	4000	Critical Care	Dr Rahul Kapoor
8	31-05-2023	OPD	Surender Kumar .	General	Catheterization (Foley's)-Bedside	1500	1500	Other OP/IP Procedure	Dr Gautam Rajput
9	01-06-2023	OPD	SURESH PARKASH	General	Catheterization (Foley's)-Bedside	1500	1500	Other OP/IP Procedure	Dr Gautam Rajput
10	06-06-2023	OPD	PREETI	General	Complete Pulmonary Function Test (PFT)	1500	1500	Pulmonology & Thoracic Surgery	Dr. Anvesh Kumar
11	07-06-2023	OPD	RAJINDER PRASAD	General	Catheterization (Foley's)-Bedside	900	900	Other OP/IP Procedure	Dr Anil Agarwal
12	09-06-2023	OPD	SARTI DEVI	General	Complete Pulmonary Function Test (PFT)	1500	1500	Pulmonology & Thoracic Surgery	Dr Anil Agarwal
13	10-06-2023	OPD	SARVAN SINGH	General	Complete Pulmonary Function Test (PFT)	1500	1500	Pulmonology & Thoracic Surgery	Dr Rahul Kapoor
14	14-06-2023	OPD	RAM RATI	General	Complete Pulmonary Function Test (PFT)	1500	1500	Pulmonology & Thoracic Surgery	Dr Anil Agarwal
15	16-06-2023	OPD	NIRMALA	General	Colonoscopy With Biopsy	6500	6500	Gastroenterology	Dr Ankur Malhotra
16	19-06-2023	OPD	MAHAVIR	General	Biopsy (Laparoscopic)	1500	1500	Obstetrics and Gynaecology	Dr Ankur Malhotra
17	19-06-2023	OPD	MAHAVIR	General	Colonoscopy (full Length)	6000	6000	Gastroenterology	Dr Ankur Malhotra
18	23-06-2023	OPD	Rajender	General	Colonoscopy Virtual CT (Plain)	6500	6500	Radiology	Dr Ankur Malhotra
19	28-06-2023	OPD	SHAKUNTLA DEVI	General	Catheterization (Foley's)-Bedside	500	500	Other OP/IP Procedure	Dr Sameer Gupta

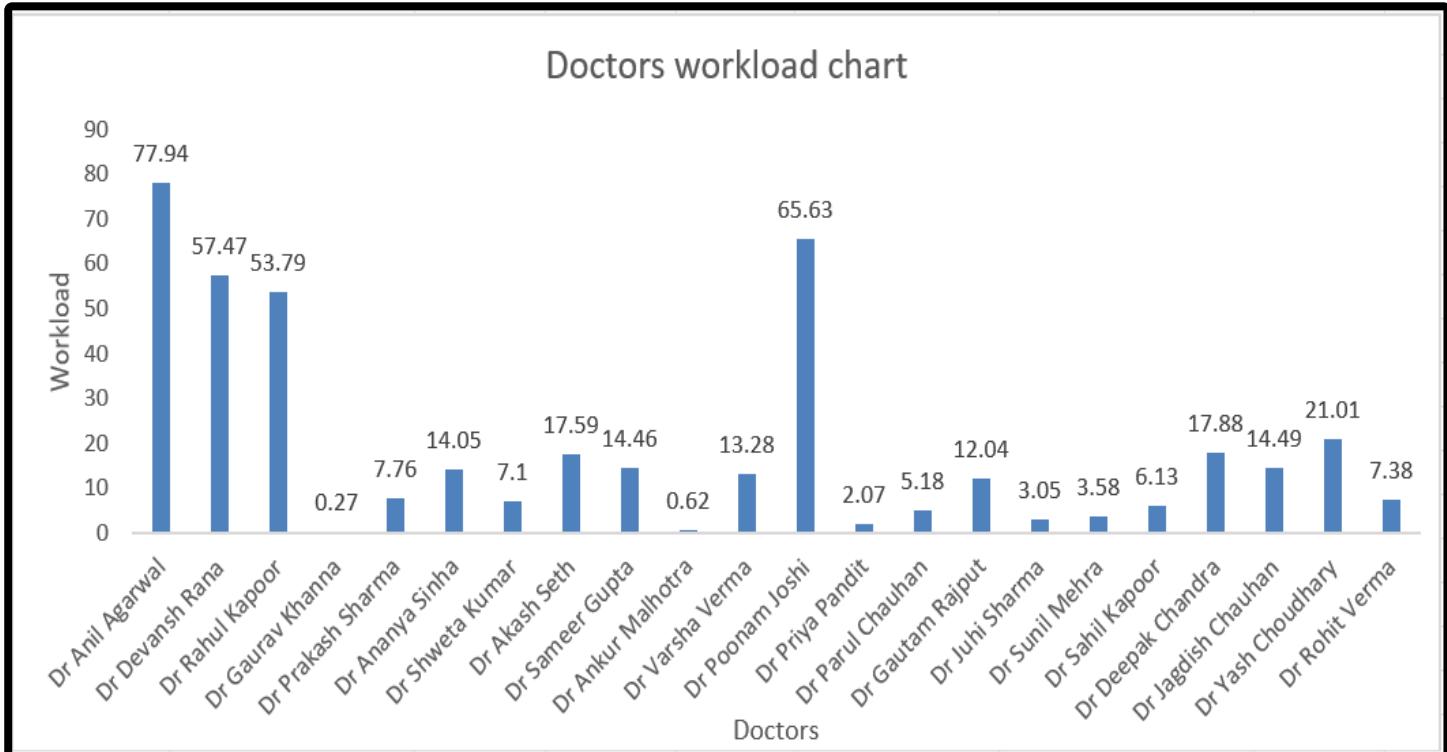
(3.3)Snapshot of data

Here is the descriptive statistics analysis performed on the collected data :

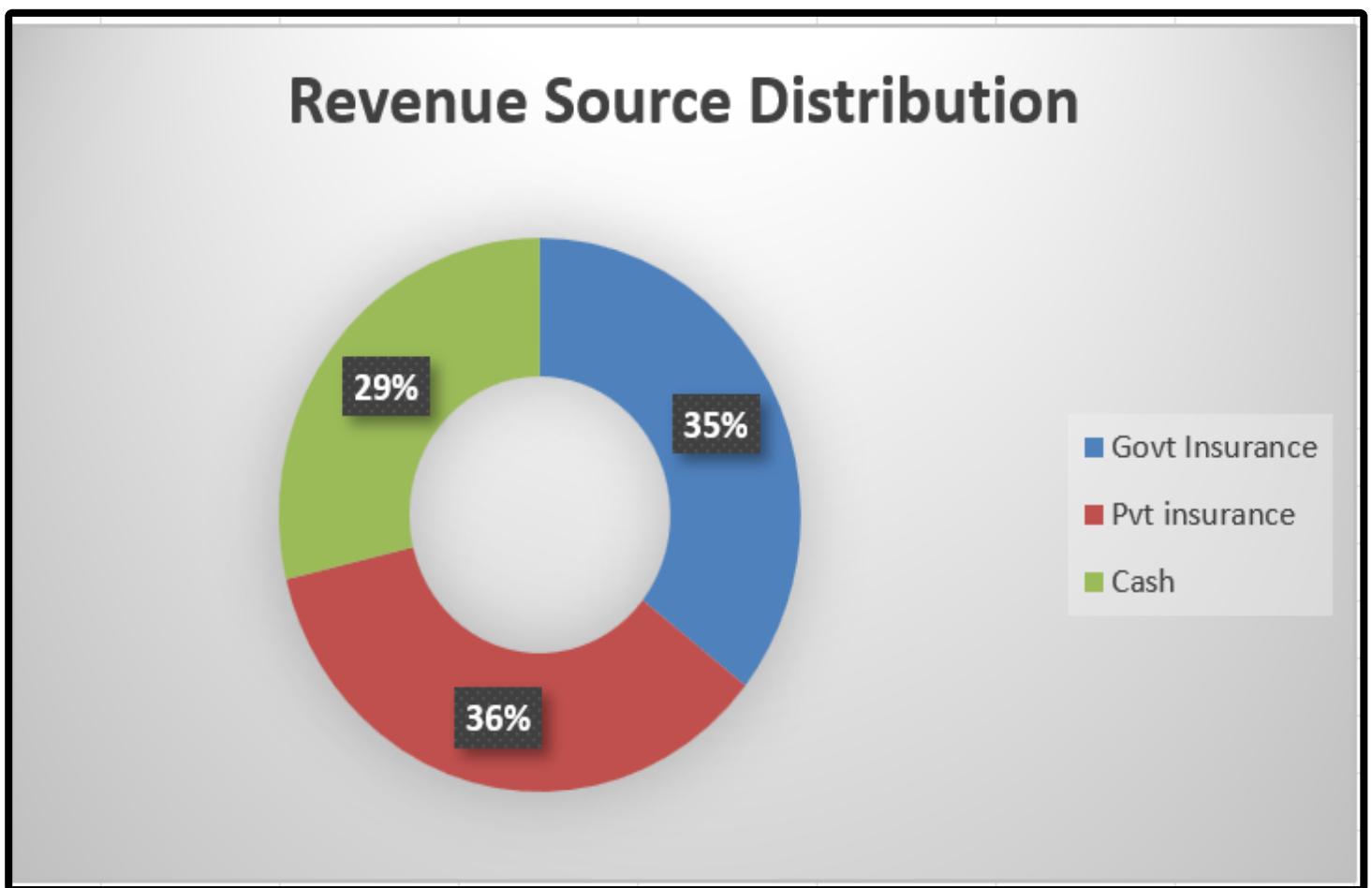


(3.4)Total Procedures done by all departments in a year

Other OP/IP Procedures includes an array of medical procedures performed by the hospital which can't be attributed to a particular department

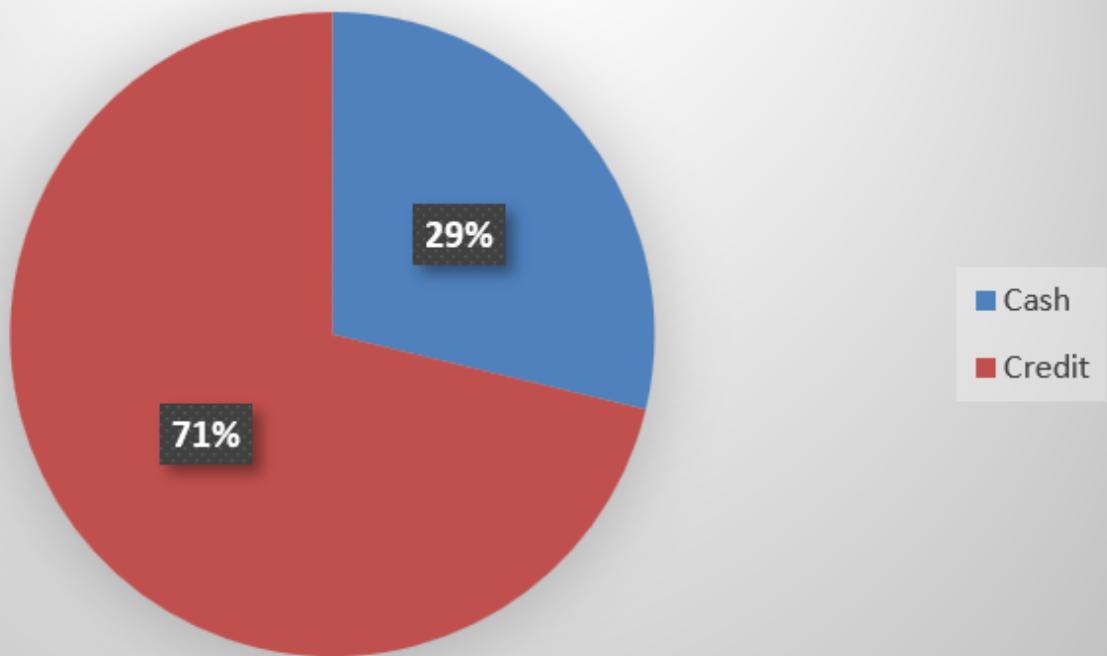


(3.5)Workload of doctors



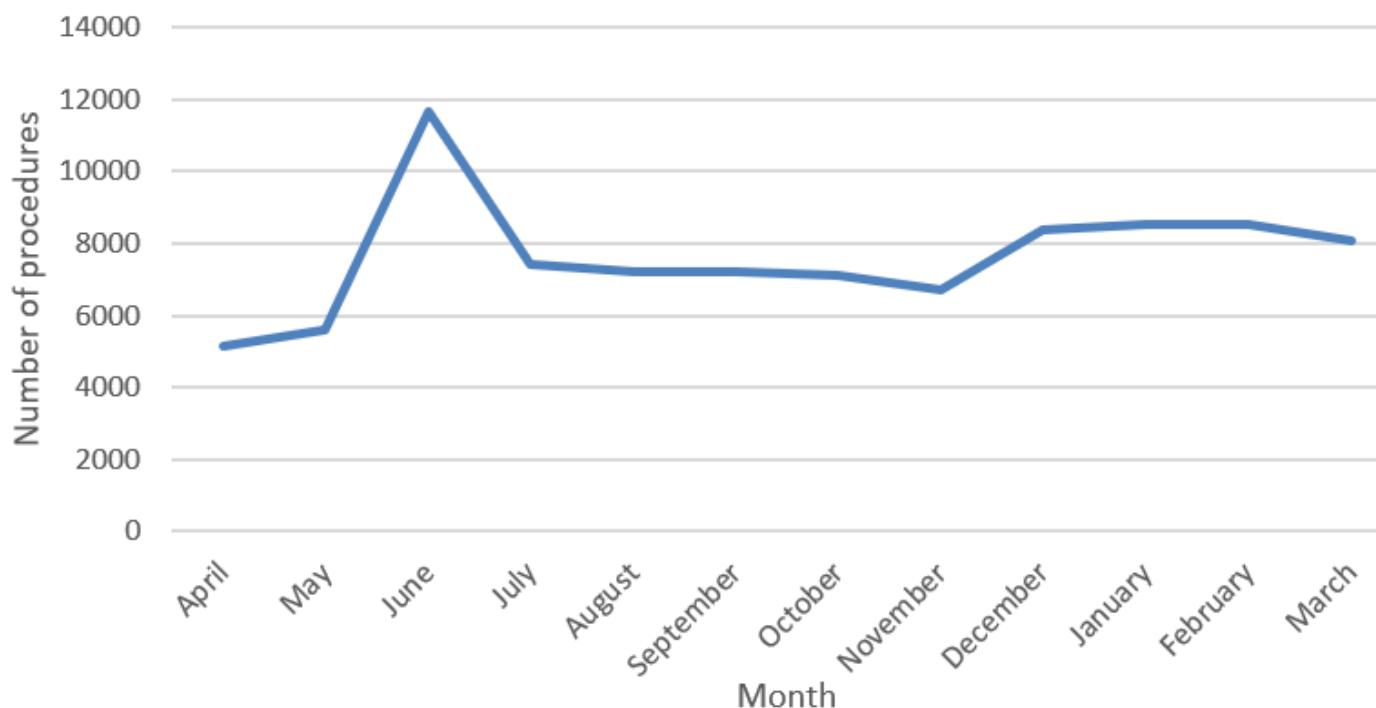
(3.6)Percentage of amount received by hospital through various sources

Cash Credit Ratio



(3.7) Percentage of payments received by hospital in the form of cash and credit

Monthly workload



(3.8) Total Procedures done by the hospital each month

Detailed Explanation of Analysis Process/Method :

I collected 1 year's worth of data in Excel, which was then cleaned, organized, and analyzed. The data was carefully examined to ensure its structure and format were clean and organized for effective analysis. This step involved checking for inconsistencies, missing values, and outliers that could impact the results. Next, a variety of descriptive statistical techniques were applied to summarize and explore the data. This included calculating measures such as the number of procedures, revenue sources, cash credit ratio and workload to gain insights into the overall dynamics of the hospital.

Column, bar, line, and pie charts were used to visually represent the number of procedures by department, revenue source distribution, and monthly workload. These charts provide a clear and concise way to understand the performance and distribution of various metrics within the hospital. They help identify trends, patterns, and areas of focus for decision-making. By utilizing these descriptive statistics and visualizations, we gain a comprehensive understanding of the data and its implications for the hospital. This analysis will enable us to make informed decisions and optimize hospital strategies for improved performance.

- To show the **total procedures by department**, a horizontal bar chart is utilized. This chart provides a clear and effective representation of the number of procedures performed by each department over the course of a year. It helps in identifying the most and least active departments, providing insights into resource allocation and departmental efficiency.
- To display the **proportions of revenue sources**, a doughnut chart is utilized. A doughnut chart effectively represents the relative contribution of each revenue source. Each slice corresponds to a specific revenue source (cash, private insurance, or government insurance), and its size is proportional to the revenue generated by that source.
- Similarly, a line chart is used to display trends in the **number of procedures performed each month over the year**. A line chart provides a visual representation of how the number of procedures changes with respect to time. This helps in understanding seasonal variations and workload trends, aiding in resource planning and management.
- To display the **ratio of cash payments to credit payments** received by the hospital, a pie chart is utilized. This chart provides a clear view of the payment preferences of patients, which can influence financial planning and billing strategies.
- Lastly, to evaluate the **distribution of workload among doctors**, a vertical bar chart is used. This chart is made after calculating the workload by dividing the total procedures done by the doctor in a year by the number of weeks in a year, and then further dividing it by the total

working days of the doctor in a week. This visualization assists in identifying any imbalances in the workload among doctors.

Results and Findings :

1. **Workload Fluctuations:** The monthly workload exhibits a peak in June, influenced by seasonal factors. The subsequent decline in July suggests a return to normalcy or a dip in patient demand.
2. **Departmental Performance:** Radiology stands out as the highest performing department, due to a high volume of diagnostic procedures and a strong Radiology team. "Other OP/IP Procedures" signifies a wide range of services offered.
3. **Payment Preferences:** A significant reliance on credit payments (71%) indicates that the hospital's income stream is heavily dependent on insurance reimbursements and delayed payments, which create a cash flow challenge.
4. **Diverse Revenue Sources:** Revenue is distributed fairly evenly among government insurance, private insurance, and cash payments indicating a diverse patient base and financial stability.
5. **Workload Disparity:** A significant disparity exists in doctor workloads, with some doctors, like Dr. Anil Agarwal and Dr. Devansh Rana, having significantly higher workloads, indicating high patient demand and capacity for handling patients.

In summary, the analysis reveals a healthcare facility with a fluctuating workload influenced by seasonal factors. The facility provides a wide range of services, primarily reliant on insurance-based payments. The diverse revenue streams and the presence of high-performing departments, such as Radiology, indicate a strong financial position. However, the notable disparity in doctor workloads suggests potential imbalances in patient distribution or practice areas.