

**OPERATIONAL ANALYTICS AND MIS-BASED DECISION MAKING FOR
IMPROVING DIAGNOSTIC SERVICE EFFICIENCY: A CASE STUDY OF
CRYSTAL DIAGNOSTIC CENTRE, THANE**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Healthcare Analytics

by

Yanagandul Badrinath Murli

Under the Supervision and Guidance of

Dr. Ritu Vashistha

2026



Sonography • Colour Doppler • X-Ray • Intervention Procedures • Pathology • 2D Echo

Date: 01/06/2026

EXPERIENCE CERTIFICATE

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. Yanagandul Badrinath Murli has successfully completed an internship in Operational Management at Crystal Diagnostic Centre from 02/03/2026 to 31/05/2026.

During the Internship period, the candidate was actively involved in the day-to-day operational activities of the diagnostic centre and demonstrated a sincere approach towards learning and professional responsibilities. The Intern gained practical exposure in the following areas:

- Patient flow and operational coordination
- Front desk and appointment management
- Diagnostic centre workflow monitoring
- Coordination with technicians, doctors, and support staff
- Record maintenance and documentation
- Reporting and operational support activities
- Understanding healthcare service standards and patient management
- Assisting in improving operational efficiency and process management

Throughout the internship tenure, Yanagandul Badrinath displayed good communication skills, professionalism, punctuality, and the ability to work effectively in a team environment. The candidate was hardworking, disciplined, and showed a positive attitude towards assigned responsibilities.

We found the performance of Yanagandul Badrinath to be satisfactory and appreciate the dedication and commitment shown during the internship period.

We wish him all the very best for future academic and professional endeavours.

For Crystal Diagnostic Centre

Authorized Signatory

Name: Dr. Devendra patil

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Seal & Signature

Dr. DEVENDRA PATIL

MD (Radiologist)

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CERTIFICATE

This is to certify that dissertation titled **Operational Analytics and MIS-Based Decision Making for Improving Diagnostic Service Efficiency: A Case Study of Crystal Diagnostic Centre, Thane** is a record of the research work undertaken by **Yanagandul Badrinath Murli** in partial fulfillment of the requirements for the award of the degree of MBA (Healthcare Analytics) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

A blue ink signature of Dr. Ritu Vashistha, written in a cursive style.

Dr. Ritu Vashistha

Assistant Professor

IIHMR University, Jaipur

Date: 20.06.2026

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Operational Analytics and MIS-Based Decision Making for Improving Diagnostic Service Efficiency: A Case Study of Crystal Diagnostic Centre, Thane** is the Bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



(Signature)

Name of Student :Yanagandul Badrinath Murli

Date : 23-06-2026

ABSTRACT

Title: Operational Analytics and MIS-Based Decision Making for Improving Diagnostic Service Efficiency: A Case Study of Crystal Diagnostic Centre, Thane

Author Name: Yanagandul Badrinath Murli

Advisor Name: Dr Ritu Vashistha

Keywords:

Operational Analytics, Management Information System (MIS), Healthcare Analytics, Diagnostic Service Efficiency, KPI Dashboard, Revenue Analysis, Decision Support, Operational Performance

Background:

Operational analytics and Management Information Systems (MIS) are increasingly crucial in healthcare. They enhance service delivery, track progress, and guide informed decisions. Diagnostic centers' transactional and operational data can boost efficiency, optimize resources, and strengthen management.

However, translating data into actionable intelligence often proves challenging in healthcare environments. This research seeks to enhance the operational efficiency of diagnostic services at Crystal Diagnostic Centre in Thane by integrating operational analytics with MIS.

Objective:

Objective is to assess the extent to which operational analytics and MIS-based decision making can improve diagnostic service efficiency by analyzing operational measures, service usage patterns, revenue performance, payment behavior, and key performance indicators (KPIs).

Methodology:

Study adopted a descriptive and analytical research design. Data from Crystal Diagnostic Centre's operational MIS, including patient activities, revenue, payment status, service use, and operational performance metrics, were utilized. Preprocessing and validation were followed by analysis, and descriptive techniques, coupled with KPIs, were employed to derive insights.

Ethical and academic standards were upheld.

Results/Findings:

Structured MIS reports and operational analytics provided deeper visibility into operations and better managerial control. Operational insights were drawn from revenue patterns, patient flow, payment trends, service utilization data, and collections.

KPI analysis highlighted areas where monitoring, reporting, and data-driven choices could be improved. The results confirmed that consistent operational data utilization informs managerial decision making and supports monitoring in diagnostic services.

Conclusion:

Bringing operational analytics together with MIS builds a solid foundation for boosting efficiency in diagnostic services and gives managers the tools they need to make better decisions. With dashboards and performance metrics, healthcare organizations can really keep an eye on how well they're delivering services and quickly spot where things need to get better.

The evidence here backs up what many have started to realize: healthcare analytics drives true operational excellence and supports smart choices in diagnostics. Right now, healthcare is changing fast thanks to digital tools like EHRs, HIS, MIS, and all sorts of analytics platforms.

Hospitals and clinics collect huge amounts of data every day everything from patient care to finances and daily operations. Being able to dig into and make sense of that data isn't just helpful; it's essential. It means leaders can manage more effectively, make sharper decisions, use resources wisely, and ultimately get better results across every corner of healthcare operations.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Health Organizations collect huge amount of operational and financial data during day-to-day operations like patient registration, Billing, Diagnostic test request form, Service request, Employee Data, Monthly and Annual remunerations to employees, Marketing cost and other related financial data to deliver care. This collected information is used to make strategic decisions in delivering quality service and growth of business.

Diagnostic centres are one of the important parts of the healthcare system to evidence-based treatment to patients. During provisional diagnosis based on symptoms, doctors advise diagnostics tests and with diagnostic details, doctors advise treatment to cure illness. Due to the rise in patient flow across the globe, it is very important to maintain the data to track performance, manage resources and continuously deliver quality service delivery for patient safety.

During my internship at Crystal Diagnostic Centre in Thane, I got a close-up look at how things work on the ground: from the way patients are registered and billed to how data is compiled and used in day-to-day reports. One thing stood out—the daily flood of operational data is a goldmine of insights into service usage, revenue, and efficiency.

And also learned how my academic Healthcare analytics learnings can be applied to understand the operational flow and understanding the data, monitor trends of patient flow and revenue collection, how MIS sheets can be prepared since the centre used to maintain manual record collection and MIS reports can be used to improve performance of diagnostic center and how data-driven decisions can be taken to improve efficiency.

1.2 Organization Profile

Crystal Diagnostic centre, in Thane provides various diagnostic and imaging services: Sonography, X-ray, Doppler Studies etc. Crystal Diagnostic centre in Thane is a well-known centre in the nearby area with strong doctors and hospital network which enable the centre with good patient flow. The centre tracks information manually which was later entered in the MIS system through a data entry operator for record management.

During my internship, I learned the ins and outs of sonography, the flow of patient services, how billing process works, and how the MIS system works and helps the director to understand monthly performance. That hands-on experience is what shaped this study.

1.3 Problem Statement

With internship work, what I understand is every part of the health care system and diagnostics centre like Crystal Diagnostic centre generate large amount of operational and financial data. I also got to know that healthcare data is more complex to understand and analyze without having a base

operational understanding.

To analyze the data one should know basic workflow of that one particular centre before proceeding analysis and concluding the work. And also one should know detail break-up of data was collected, how revenue information and patient registration information is stored to analyze the pattern.

After above detailed understanding one can perform analysis to pull information of performance, patterns and actionable insights to improve business and efficiency of service.

1.4 Objectives of the Study

The main objective of this study is to understand four things:

1. How a diagnostic healthcare organization actually works day-to-day.
2. How operational and financial data stored in Management Information System.
3. Understand real numbers like patient visits count, revenue, collections, and how much people use the services.
4. And last, how healthcare analytics can be applied in real life at a diagnostic center.

1.5 Research Questions

1. How can data from a management information system (MIS) help measure how well a diagnostic center is performing?
2. What can we actually learn about operations by looking at patient numbers, revenue, and service usage data?
3. In what ways do healthcare analytics make it easier for managers to make decisions in diagnostic centers?

1.6 Scope and Significance of the Study

Report analyses the Operational as well as Financial information system processed through Management Information System of Crystal Diagnostic Centre based out of Thane. This captured parameters include Number of patient visit, utilization of services, Revenue generated, Collection efficiency and few other parameters.

Objective is to demonstrate with practical example and real data captured from a diagnostic center, Healthcare analytics put into action which aids in monitoring their performance and assists them to take well informed decisions. Outcome of this report will benefits health care managers, entrepreneurs who own diagnostic centers or even students who seek insight on practical usage of healthcare analytics.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

Diagnostic centers are at the core of this system. They offer rapid and precise tests which assist doctors in determining what is happening to their patients. These centres can also be a hotspot of operational information ranging from patient registration to appointments, tests, billing to payment tracking. With the use of healthcare analytics and management information systems, managers can leverage this sea of numbers and convert them to useful insights for their daily decision making.

Study examines how Crystal Diagnostic Centre, Thane has implemented the operational analytics and MIS to direct their decision making path. To set the context, the chapter covers the latest research about healthcare analytics, information systems, business intelligence, operational analytics, dashboards and everything data-driven in healthcare. This background sets the stage for the study and identifies the research gaps that the study will address.

2.2 Literature Review Matrix

Table 2.1 Literature Review Matrix

Author & Year	Study Area	Methodology	Key Findings	Research Gap	Relevance to Present Study	Study Access Link
Raghu pathi & Raghu pathi (2014)	Healthcare Analytics	Literature Review	Analytics improves healthcare efficiency and decision-making	Limited operational case studies	Supports healthcare analytics framework	https://hissjournal.biomedcentral.com/articles/10.1186/2047-2501-2-3
Islam et al. (2018)	Healthcare Data Mining	Systematic Review	Analytics supports evidence-based healthcare	Limited diagnostic centre focus	Supports analytical methodology	https://www.mdpi.com/2227-9032/6/2/54

Author & Year	Study Area	Methodology	Key Findings	Research Gap	Relevance to Present Study	Study Access Link
			are decision s			
Mehta & Pandit (2018)	Big Data Analytics	Systematic Review	Healthcare analytics improve operational performance	Lack of diagnostic service studies	Supports operational analytics discussion	https://www.sciencedirect.com/science/article/pii/S1386505618302466
Menachemi & Collum (2011)	Electronic Health Records	Literature Review	Information systems improve healthcare management	Limited financial analytics discussion	Supports MIS concepts	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3270933
Bates et al. (2014)	Healthcare Big Data	Policy Review	Data-driven healthcare improves outcomes and efficiency	Limited operational analytics focus	Supports decision-support systems	https://www.healthaffairs.org/doi/10.1377/hlthaff.2014.0041
Brossard et	Hospital	Scoping	Analytics	Diagnostic centres	Supports analytics	https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-021-07332-

Author & Year	Study Area	Methodology	Key Findings	Research Gap	Relevance to Present Study	Study Access Link
al. (2022)	Analytics Capability	Review	capabilities create organizational value	not examined	maturity discussion	0
Wang et al. (2018)	Big Data Capabilities	Conceptual Study	Analytics enhances organizational performance	Healthcare-specific evidence limited	Supports analytical framework	https://doi.org/10.1016/j.techfore.2015.12.019
Kruse et al. (2016)	Big Data in Healthcare	Systematic Review	Analytics improves operational efficiency	Operational implementation challenges remain	Supports healthcare analytics adoption	https://medinform.jmir.org/2016/4/e38
Dash et al. (2019)	Big Data Management	Review Study	Data analytics improves healthcare planning	Limited focus on diagnostic operations	Supports future recommendations	https://journalofbigdata.springeropen.com/articles/10.1186/s40537-019-0217-0
Khalifa	Health Analytics	Literature	Healthcare	Limited practical	Supports MIS	https://pubmed.ncbi.nlm.nih.gov/299686

Author & Year	Study Area	Methodology	Key Findings	Research Gap	Relevance to Present Study	Study Access Link
(2018)	cs	Review	analytics support multiple management levels	implementation studies	reporting	21
Adler-Milstein & Huckman (2013)	EHR Productivity	Empirical Analysis	Digital systems improve organizational productivity	Limited financial analysis	Supports healthcare digitalization	https://www.ajmc.com/view/impact-of-electronic-health-records-on-physician-productivity
Davenport & Harris (2007)	Business Analytics	Strategic Analysis	Analytics improve decision quality	Healthcare-specific application limited	Supports managerial decision-making	https://hbr.org/2007/01/competing-on-analytics
Shickel et al. (2018)	EHR Analytics	Survey Study	Advanced analytics improve information utilization	Operational performance less explored	Supports healthcare informatics	https://ieeexplore.ieee.org/document/8065961
Taipalus et	Healthcare	Tertiary	Data analytic	Diagnostic centre	Supports research	https://link.springer.com/article/10.1007/

Author & Year	Study Area	Methodology	Key Findings	Research Gap	Relevance to Present Study	Study Access Link
al. (2023)	Data Analytics	Review	adoption increasing globally	evidence limited	rationale	s42979-022-01507-0
Gomes et al. (2022)	Health Service Analytics	Literature Review	Analytics improve organizational performance	Need for operational case studies	Supports present study	https://doi.org/10.5585/exactaep.2021.17297

Source: Compiled by the Researcher from peer-reviewed literature (2011–2023).

2.3 Conceptual Discussion

Present study is based on the premise that it is possible to convert operational data into meaningful managerial information through the systematic application of MIS and healthcare analytics.

Operational Data → MIS Processing → Analytics → KPI Generation → Dashboard Reporting → Managerial Decision-Making → Operational Improvement

Within diagnostic centres, this process allows management to:

- Monitor patient volumes
 - Track revenue performance
 - Evaluate collection efficiency
 - Analyze service utilization
 - Identify operational bottlenecks
 - Improve resource allocation
-

2.4 Research Gap

The review of literature identified several important gaps.

Gap 1: Inadequate research on Diagnostic Centres

Majority of healthcare analytics studies are conducted in hospital or healthcare systems or in a clinical environments. There are not many studies that focus specifically on diagnostic centres

Gap 2: Lack of Operational Analytics Studies

Most of the literature available is focused on clinical analytics and patient outcomes. There is limited work done regarding the operational aspects of the efficiency of diagnostic services.

Gap 3: Limited Indian Context Evidence

Very few studies in India analyse the operational decision making system used in the diagnostic centres based on MIS.

Gap 4: Limited use of dashboard based performance evaluation

While there is much written on dashboards, there is limited real-life examples of how dashboards can be used in diagnostic centres.

Gap 5: Need for Real-World Case Studies

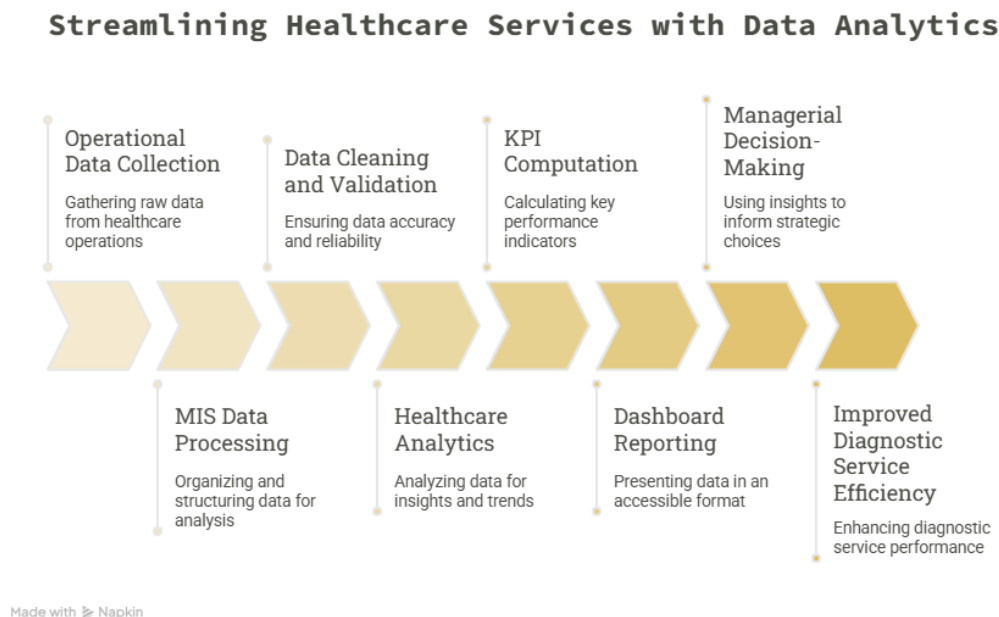
Practical studies with internships, that show how operational data are used to provide actionable managerial insights are lacking.

2.5 Relevance of Literature to the Present Study

Relevance of literature to the present study is highlighted. It is evident, from past research, that healthcare analytics, MIS, business intelligence and dashboards reporting have a significant effect on the performance of organizations. But when it comes to diagnostic centre's, the evidence is pretty thin. This is where this study comes in as it is a study on the operational analytics and MIS Reporting capabilities in relation to how these actually help individuals make better decisions within the diagnostic centre context. Results aren't abstract, but they bring together the dots between what "should" work in healthcare analytics and what "does" work in the diagnostic healthcare service.

2.6 Proposed Conceptual Framework

Figure 2.1 Conceptual Framework of the Study



Framework Components

- Operational Data Collection
- MIS Data Processing
- Data Cleaning and Validation
- Healthcare Analytics

- KPI Computation
- Dashboard Reporting
- Managerial Decision-Making
- Improved Diagnostic Service Efficiency

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is not something that can be checked off, but is rather the foundation of how a study progresses from conception to actual results. Research is focused on the role of operational analytics and MIS based decision making in an actual diagnostic, healthcare environment. That's because I looked at Crystal Diagnostic Centre in Thane. I examined how they size their operations, how they're used by patients and what their revenue figures show. Most important of all, I wanted to show how all these numbers and all these patterns assist the manager in his decision making. That's the thinking behind the methods used in this study.

3.2 Research Design

Method of this study was descriptive and analytical methods. It then analysed the data to identify trends, patterns and insights from the information in the MIS system. It was all a project for the internship during the MBA (Healthcare Analytics) program and was quite a reflection of how things work in a diagnostic service.

3.3 Study Setting

During my internship period, I worked in Crystal Diagnostic Centre, Thane, where I catered to all imaging and diagnostic needs of the patients in the vicinity. Most of my focus was on the work of sonography operations, however. I explored the patient flow, service provision and patient reporting process. Everything I saw gave me a real world understanding of how the operational data is generated, collected and utilized by managers when making decisions. Internship responsibilities and scope of work will be determined by the sponsoring organization's needs and the student's qualifications.

3.4 Internship Responsibilities and Scope of Work

During the internship, I got to dive right in with daily activities of the organization, as well as being involved with analysis. To begin with, I needed to understand the inner workings of the diagnostic center, how it operated actually, what they did day-to-day. I also got a chance to observe how they do their sonography services. Assisted in the preparation and review of MIS reports, cleaned and double checked the operational data; performed analysis in excel and python. Building dashboards and creating KPI summaries were part of my routine, along with digging into revenue and collection numbers. I also monitored the performance and consolidated data to aid in making decisions. All of these practical projects to which I have contributed have been the foundation of my current study.

3.5 Data Sources

The study mainly focused on the operational information obtained from the organization's MIS.

Data elements analyzed were **Operational Variables**:

- Patient visit information
- Service utilization records
- Appointment-related information
- Diagnostic procedure records

Financial Variables

- Billing amounts
- Collection amounts
- Payment status
- Revenue-related indicators

Administrative Variables

- Service categories
- Visit classifications
- Payment methods
- Reporting period information

3.6 Data Confidentiality and Ethical Considerations

As a part of my MBA course in Healthcare Analytics from IIHMR University, Jaipur, I interned from 2nd March to 31st May 2026 at the Crystal Diagnostic Centre, Thane.

However, the confidentiality rules of the company mean that I have not had access to actual patient information, financial data or internal business information for academic purposes. There isn't anything in this dissertation that's supposed to be kept confidential.

For purposes of demonstrating my analysis, I created a data set that adheres to all the privacy guidelines. It was based on my internship experience: what sort of reports people make, how the data is handled, and what sort of analytics work people do. All values were anonymous and tweaked so the data would be representative of what is seen in the real world, but would not disclose patient identities, proprietary numbers or protected business information.

proprietary numbers or protected business information. The academic aspect of this study is what it's all about; actually, how healthcare analytics, MIS, and data-driven decision making works. It's not an evaluation of the effectiveness of the organization itself.

During the project I followed the five main principles of ethics:

- Maintaining confidentiality of patient data.
 - Never giving out personally identifiable information.
 - Following the company's rules on data protection and confidentiality.
 - Using analytics responsibly and ethically.
 - Reporting my findings with full academic integrity, transparency, and accuracy.
-

3.7 Data Preparation and Cleaning

The third step is to prepare and clean the data. In the third step, data is prepared and cleaned. Preparing data for healthcare analytics is a critical process because incorrect or inconsistent data can impact the quality and reliability of the analytics results.

Following activities were performed:

Data Validation

Following points were reviewed for:

- Missing values
- Duplicate records
- Incorrect entries
- Data inconsistencies

Data Standardization

Variables were standardized to ensure consistency in:

- Service names
- Payment categories
- Date formats
- Revenue-related fields

Data Transformation

Analytical formats were created for dashboard development and computation of relevant variables needed for KPIs. Data after cleaning were then analysed.

3.8 Variables Used in the Study

Table 3.1 Variables Included in Analysis

Variable Category	Variables
Patient Variables	Visit Count, Patient Records
Financial Variables	Revenue, Collection Amount, Outstanding Amount
Service Variables	Procedure Type, Service Utilization
Payment Variables	Payment Mode, Payment Status
Operational Variables	Daily and Monthly Performance Metrics

Variables used were chosen because of their relevance to operational performance monitoring and managerial decision making.

3.9 Key Performance Indicators (KPIs)

To assess the performance of the organization, a number of Key Performance Indicators (KPIs) have been computed.

Table 3.2 Key Performance Indicators

KPI	Purpose
Total Patient Visits	Measures service demand
Total Revenue	Measures financial performance
Total Collections	Measures realized income
Outstanding Balance	Measures pending collections
Collection Rate (%)	Evaluates collection efficiency
Revenue per Visit	Measures revenue productivity
Service Utilization Rate	Measures service demand patterns
Payment Mode Distribution	Evaluates payment behavior

These KPIs were used to monitor both operational and financial performance.

3.10 Analytical Framework

Study followed a structured analytical workflow.

Step 1: Data Collection

Information was derived from operational records created in MIS.

Step 2: Data Cleaning

Data quality issues identified and addressed.

Step 3: KPI Computation

Performance indicators were computed.

Step 4: Descriptive Analysis

Patient volume, revenue, and service utilization were summarized.

Step 5: Dashboard Development

Visual dashboards were prepared to support managerial interpretation.

Step 6: Insight Generation

Results of the analyses were interpreted from an operational management perspective.

3.11 Software and Analytical Tools

Study utilized the following tools:

Table 3.3 Software Used

Software	Purpose
Microsoft Excel	Data validation and preliminary analysis
Python	Data processing and analytics
Pandas	Data cleaning and manipulation
NumPy	Numerical analysis
Matplotlib	Data visualization
Seaborn	Statistical visualization

Analytical outputs, summary of KPIs and dashboards were generated using Python.

3.12 Data Analysis Techniques

Descriptive analytical techniques were used in assessing operational performance of the study. Following analyses were performed:

Descriptive Statistics

Used to summarize operational and financial indicators.

Revenue Analysis

Used to evaluate revenue generation and collection patterns.

Service Utilization Analysis

Used to identify utilization trends across diagnostic services.

Payment Analysis

Used to understand payment mode preferences and collection behavior.

Dashboard Analytics

Trained in the visualization of performance indicators for management purposes. Techniques have been chosen based on their ability to meet the study aim of showcasing operational analytics applications in a diagnostic centre.

3.13 Limitations of the Methodology

Methodology has certain limitations. Methodology possesses some limitations. A few limitations of methodology. Other areas are not considered, as most of the work during the internship was related to sonography operations. Study did not delve into the more advanced predictive or prescriptive analytics, as that was not in the original scope. Also, I could not share actual organisational data because of confidentiality policies. Instead, a database anonymized for academic use is used for the analytical results. Nonetheless, these restrictions do not detract from the central theme to which these limitations contribute the methodology aligns with the goals of the study and demonstrates the application of healthcare analytics and MIS techniques in a healthcare diagnostic context.

CHAPTER 4

RESULTS AND FINDINGS

4.1 Introduction

Data from the MIS at Crystal Diagnostic Centre, Thane were analysed to draw results. All information on the study period, including patient visits, billing, payments, and diagnostic procedures performed are included. Findings demonstrate the effective functioning of the center and reveal the effectiveness of healthcare analytics and MIS tools in making decisions in real diagnostic center..

Note on Data Presentation

Crystal Diagnostic Centre's patient privacy, financial security and data protection are of paramount concern. However, due to the centres policy, I was not permitted to include actual patient information, financial information or any operational information which could be considered sensitive in my report.

Therefore, Numbers you will see in this report are not the actual figures. They are analyzed numbers I've developed from a data set which should be anonymized and used for academic research. All other aspects of the workflow - the structure, the KPIs, the way I analysed the data, the dashboards and my interpretation of the results are exactly the same as at Crystal Diagnostic Centre, Thane, I merely anonymized and edited some of the numbers for privacy.

Nothing proprietary, confidential business information, or patient information is revealed in this dissertation. Main purpose of the study is to demonstrate the use of healthcare analytics, MIS, dashboards and data driven decision making in a diagnostic centre. It is not intended to publish the actual performance figures of the Centre.

Hence, use the results of this chapter as examples for research and learning purposes and not as a direct reflection of organizational performance but as an authentic reflection of my internship experience.

4.2 Dataset Overview

Records of operations for the study period were available from MIS database.

Table 4.1 Dataset Summary

Parameter	Value
Total Records	622
Unique Patients	622

Parameter	Value
Study Types	31
Date Range	01 April 2026 – 30 May 2026
Missing Values	0
Number of Variables	11

Data obtained from MIS Analysis Report, 2026 (prepared from Confidentiality-Compliant Academic dataset)

Interpretation

No missing values and no duplicates in the data set, so you have data that you can now trust to analyze. That I did not have to spend time on rectifying, and the KPIs and dashboards prove to be much more reliable.

4.3 Key Performance Indicators (KPIs)

First stage of analysis focused on evaluating major operational and financial performance indicators generated from the MIS database.

Table 4.2 Operational KPI Dashboard

KPI	Value
Total Visits	622
Unique Patients	622
Total Billed Revenue	₹1,283,800
Total Collection	₹1,049,900
Outstanding Balance	₹233,900
Collection Rate	81.8%
Average Bill Per Visit	₹2,064
Paid Visits	520
Free Visits	73

KPI	Value
Balance Visits	29

Interpretation

During study period, Diagnostic centre had 622 patient visits and was able to collect over ₹1.04 million.28 million. They are doing a good job in handling revenue collection with 81.8% collection efficiency.

However, there is still a significant receivable balance of ₹233,900, indicating that they have some cash flow improvement space in terms of receivable management. The average revenue from each visit is ₹2064, indicating a moderate income from patient visits. Total of 11.7% of all visits were free visits, and there are still a few payments outstanding.

KPI dashboard offers a summary of all the operational performance indicators and finance indicators tracked during the study period, as illustrated in Figure 4.1

Figure 4.1 KPI Dashboard

KPI	Value
Total Visits	622
Unique Patients	622
Total Billed	₹1,283,800
Total Collected	₹1,049,900
Outstanding Balance	₹233,900
Collection Rate	81.8%
Avg Bill/Visit	₹2,064
Paid Visits	520 (83.6%)
Balance Visits	29 (4.7%)
Free Visits	73 (11.7%)

Figure Description

KPI dashboard consolidates the essential numbers, such as patient volume, billed revenue, collections, outstanding balances, and payment status, and shows how collections are going.

4.4 Monthly Performance Analysis

Monthly comparison took place to gauge the changes in utilization of patient services, revenue generation and collection.

Table 4.3 Monthly Comparison

Month Visits Billed Revenue Collected Revenue Outstanding Balance Collection %

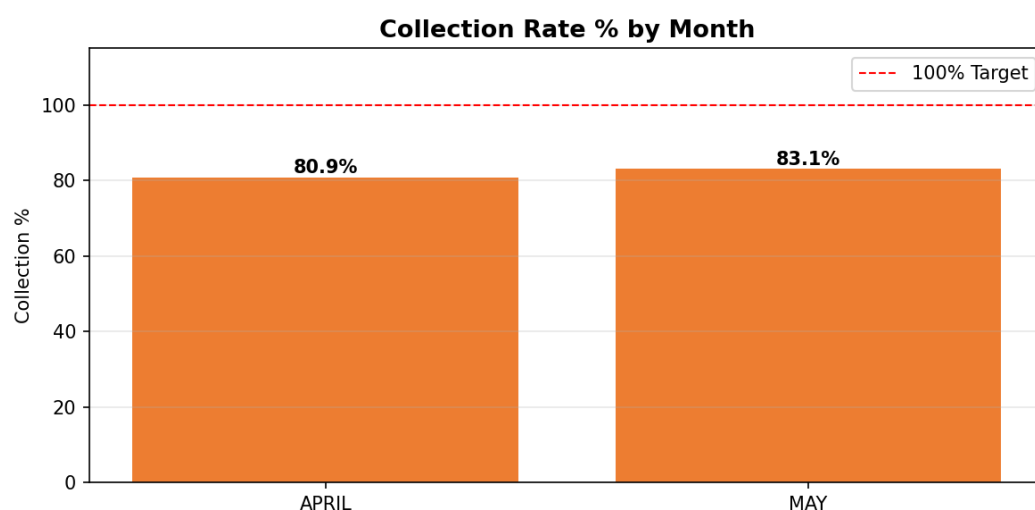
April	355	₹771,500	₹624,200	₹147,300	80.91%
May	267	₹512,300	₹425,700	₹86,600	83.10%

Note: Data has been compiled from a Confidentiality-Compliant Academic Dataset via an MIS Analysis Report for the year 2026.

Interpretation

In April, number of patients seen rose, along with the revenue collected, and in May, it was again more patients and more revenue. Number of patients was reduced, but also there was an increase in collection efficiency from 80.91% in May to 83.10%. This indicates that the team was more efficient in collecting the fees, despite having fewer patients. Monitoring these trends on a monthly basis provides management with the information they need to make appropriate staffing, scheduling and resource decisions when they change.

Figure 4.2 Monthly Patient Volume Trend

**Figure Description**

Results revealed a change in service demand over the study period, with the volume of patients higher in April than in May,

Figure 4.3 Monthly Revenue Trend

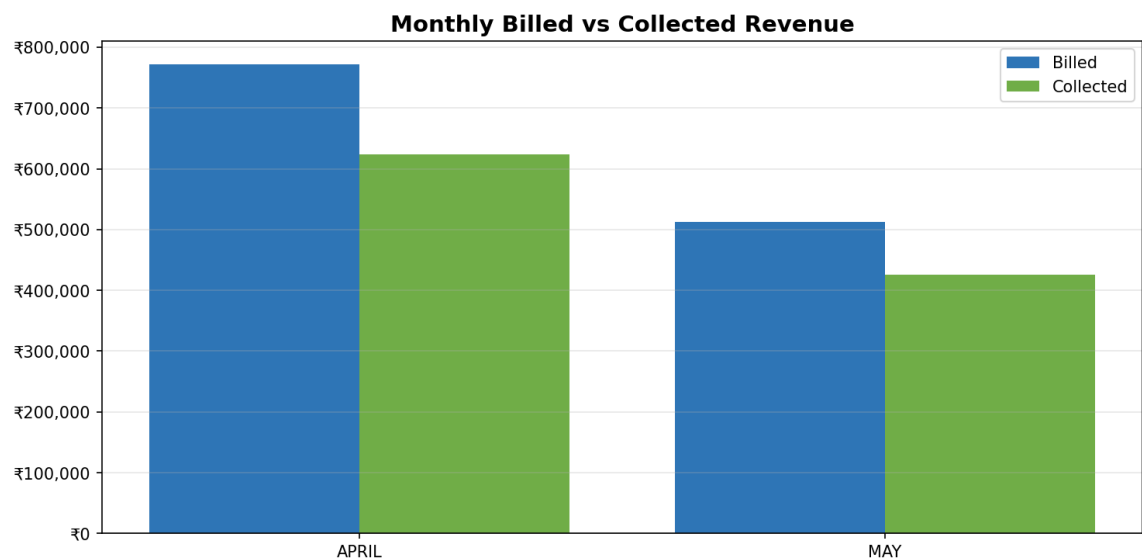


Figure Description

Figure 4.3 compares billed and collected revenue across the two months and illustrates overall collection performance.

4.5 Payment Mode Analysis

A payment mode analysis was performed to gain insight into patient payment preferences and to analyze transactions.

Table 4.4 Payment Mode Distribution

Payment Mode	Count	Revenue	Revenue Share
Cash	219	₹430,500	41.0%
UPI	211	₹430,400	40.99%
Credit Card	93	₹189,000	18.0%
Balance	29	₹0	0%
Free	70	₹0	0%

Data from MIS Analysis Report, 2026 (Prepared from Confidentiality-Compliant Academic Dataset). Interpretation

Cash payments and UPI were the top two payment channels accounting for approximately 41% of

the total revenue collected. This shows that the patients have high acceptability of the digital payment methodology, while cash transactions still have a great significance. A smaller proportion of the total collections was collected in the credit card transactions. Results reveal that digital payments have become a part of healthcare transaction management. Figure 4.4 shows the revenue distribution by payment mode.

Figure 4.4 Payment Mode Revenue Distribution

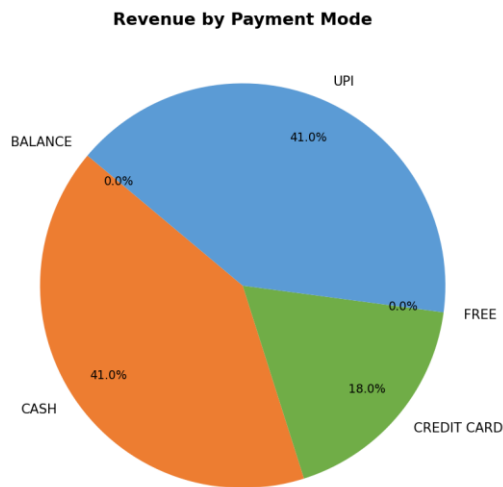


Figure Description

As can be seen from figure 4.4, a significant share of revenue is generated from each payment method and it also shows increasing importance of digital payment systems in the diagnostic healthcare service.

4.6 Payment Status Analysis

Efficiency of collections and the realization of revenue were assessed by payment status analysis.

Table 4.5 Payment Status Summary

Status	Count	Billed	Paid
Paid	520	₹1,063,600	₹1,049,900
Balance	29	₹52,100	₹0
Free	73	₹168,100	₹0

This was extracted from the MIS Analysis Report, 2026 (Based on Confidentiality-Compliant Academic Dataset)

Interpretation

Most of the patients' visits were successfully transformed into revenue collection, thus billing and collection have been effective.

There were, however, 29 excellent visits which helped to balance the overall score. A small percentage can be improved with regular monitoring of overdue payments to increase the effectiveness of collections.

The organization also dished out free services to the tune of Rs 168,100. Such services could be intended to enhance access for patients, relationships with patients referred to them, or outreach for the organisation, but the operating effect of these services should be assessed on a regular basis.

Figure 4.5 Payment Status Distribution

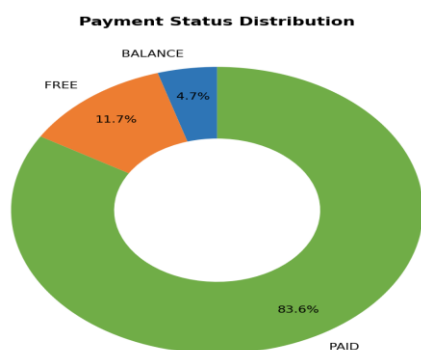


Figure Description

Figure 4.5 graphically illustrates the difference between paid, free and pending visits and offers an overview of the revenue realization performance.

4.7 Service Utilization Analysis

In order to pinpoint high-demand procedures and big revenue contributors, service utilization analysis was performed.

Table 4.6 Top Revenue-Generating Diagnostic Procedures

Study	Count	Revenue
USG A+P	392	₹705,600
Bilateral Carotid Doppler	23	₹73,600
Bilateral LL Arterial Doppler	21	₹67,200
Bilateral LL A+V Doppler	9	₹57,600
Bilateral UL Arterial Doppler	17	₹54,400

Study	Count	Revenue
USG KUB	38	₹53,200
Left LL A+V Doppler	14	₹44,800
Bilateral LL Venous Doppler	8	₹25,600
Bilateral UL A+V Doppler	4	₹25,600
Right LL A+V Doppler	7	₹22,400

Based on a Confidentiality-Compliant Academic Dataset, the MIS Analysis Report, 2026, was prepared

Interpretation

Within the specified time period, the USG A+P was the most frequently used diagnostic procedure and had the most revenue generated by a diagnostic procedure. Conclusion reached in this internship was that services related to sonography were a major facet of the patient visits and actions performed throughout the working day.

It was also discovered during this internship that a number of services, including ultrasound and Doppler services, were high revenue generators for the centre and services with the greatest client numbers during the operational day. Buildings in which the centre is operating and its service offerings may be very well considered, but they may be an extension of the centres specialization, and thus being exposed to low demand.

Through the use of service demand patterns, management can control appointment scheduling, service demand/revenue and optimise use of centre assets and facilities.

Top procedures by revenue are displayed in Figure 4.6. Figure 4.6 shows the top procedures by revenue.

Figure 4.6 Top Procedures by Revenue

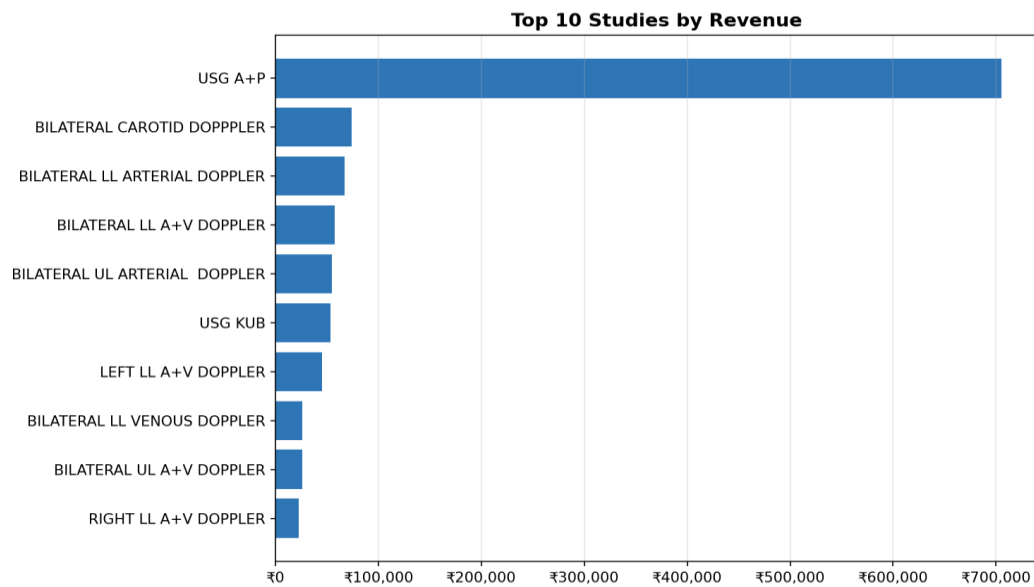


Figure Description

Figure 4.6 illustrates revenue concentration among the major diagnostic procedures performed during the study period.

4.8 Temporal Pattern Analysis

To gain a better understanding of the variations in operational workload and to determine trends in utilization, temporal analysis was performed.

Figure 4.7 Daily Revenue Trend

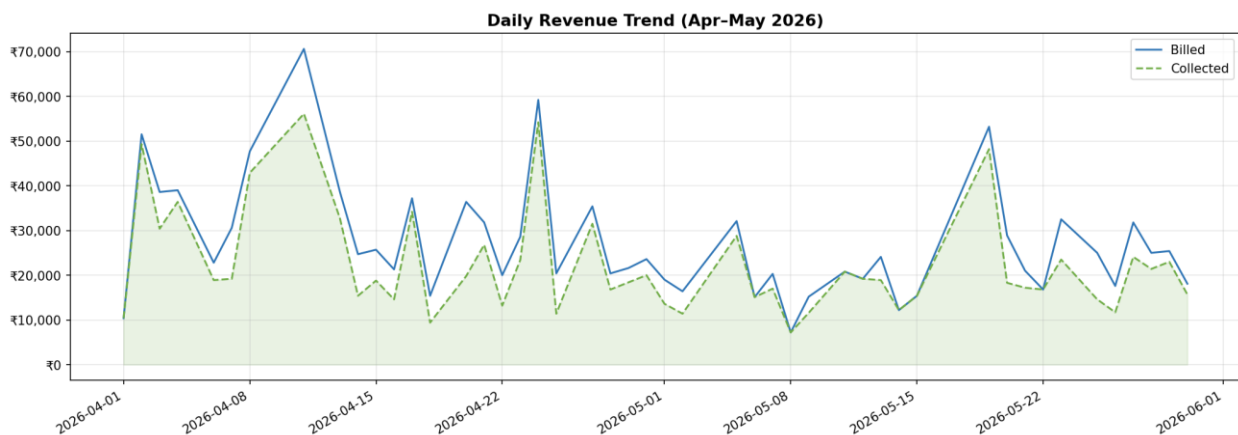


Figure Description

Figure 4.7 shows the daily variations in the earnings that are generated, and highlights the days when more work is carried out.

Figure 4.8 Patient Footfall by Day of Week

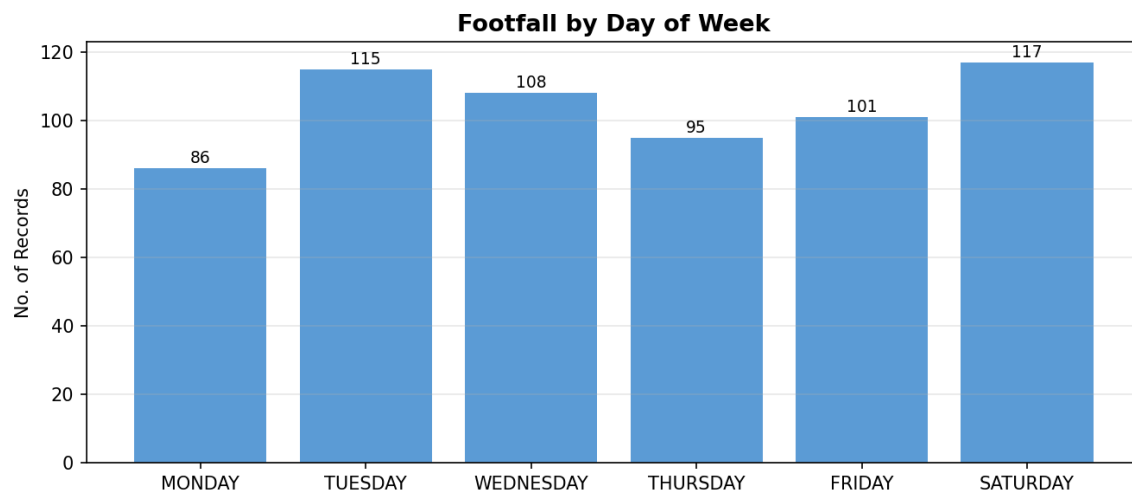


Figure Description

The differences in patient volume by weekday are seen in Figure 4.8 and can be used to assist with workforce planning and appointment scheduling decisions.

Interpretation

Examining daily and weekly trends allowed for a better understanding of patient demand based on days of the week and helped with staff scheduling and workload management. This data can help management to optimize staff deployment, appointment scheduling and operational planning.

4.9 Managerial Observations

Based on the findings generated through MIS analysis, several operational observations emerged.

1. Systematic follow-up of outstanding balances can help enhance cash-flow management, collection performance was satisfactory.
2. Outstanding receivables are one of the areas where finance can benefit from better monitoring of receivables.
3. Nearly equal adoption of UPI shows a growing preference of patients towards digital payment options,
4. Free visits accounted for a notable proportion of total visits and should be periodically reviewed to ensure operational sustainability.
5. Revenue generation is still largely limited to ultrasound and Doppler procedures, suggesting a reliance on a narrow service mix.
6. Patient utilization patterns can be used to optimize appointments and workforce.
7. In the internship phase it was found that operational decisions were mainly made based on

periodic MIS reports and not on dashboards. The results indicated that the use of automatic dashboard reporting might help managers gain better visibility and facilitate quick decision making.

4.9.1 Overall Operational Assessment

My internship revealed that Crystal Diagnostic Centre, Thane was consistently receiving patients, doing collections and earning money with a proper flow throughout. They have a good collection process and good flow of patients, which indicates good day-to-day operations.

However, there is plenty of room for improvement. They could improve their receivable management practices, increase services offered, and better leverage dashboards to monitor receivables on a daily basis. Not to mention, they would greatly benefit from leveraging deeper into healthcare analytics to aid their decision making.

CHAPTER 5

DISCUSSION

5.1 Introduction

Primary objective of this study was to examine how operational analytics and MIS based reporting can support decision making and improve service efficiency within a diagnostic healthcare setting. MIS data reviewed during the internship provided practical insights into patient flow, revenue generation, payment trends, and utilization of diagnostic services.

Chapter discusses the findings presented in Chapter 4 and relates them to existing literature, healthcare analytics concepts, diagnostic centre operations, and practical observations made during the internship at Crystal Diagnostic Centre, Thane. Discussion also highlights the managerial implications of the findings and demonstrates how data driven decision making can contribute to operational improvement.

5.2 Interpretation of Key Findings

5.2.1 Data Quality and MIS Reliability

One of the initial observations from the analysis was the availability of a structured and organized MIS dataset. The absence of major data quality issues indicated that the organization maintained systematic records of operational and financial transactions.

From an analytics perspective, data quality is a critical prerequisite for effective decision-making. Reliable data ensures that performance indicators accurately reflect operational conditions and support managerial actions. During the internship, it was observed that timely and accurate data entry played an important role in generating meaningful MIS reports.

This finding aligns with healthcare information system literature, which emphasizes that high-quality information systems improve organizational visibility and managerial control.

5.2.2 Patient Volume and Service Demand Patterns

Analysis demonstrated consistent patient utilization across the study period, indicating stable demand for diagnostic services. Monitoring patient volume is particularly important in diagnostic centres because fluctuations directly affect operational workload, resource allocation, appointment scheduling, and revenue generation.

During internship it was observed that sonography services contributed significantly to daily operational activities.

Appointment schedules, patient arrivals, reporting timelines, and equipment utilization were all

influenced by patient demand patterns.

Ability to monitor patient volume through MIS reports enables management to:

- Forecast workload requirements.
 - Improve appointment management.
 - Allocate staff efficiently.
 - Reduce patient waiting time.
 - Enhance service delivery planning.
-

5.2.3 Revenue Performance and Financial Monitoring

Revenue analysis highlighted the importance of continuous financial performance monitoring within diagnostic healthcare organizations. Revenue indicators serve as an important measure of operational sustainability and business performance.

During the internship, it was evident that financial performance monitoring formed an integral part of operational management. Revenue reports were used to review service performance and support managerial discussions regarding operational efficiency.

Findings support observations of Bates et al. (2014), who emphasized that healthcare organizations increasingly depend on analytical insights for financial management and operational decision making.

Revenue analytics helps organizations to:

- Track performance trends.
 - Monitor revenue leakage.
 - Improve billing efficiency.
 - Support strategic planning.
-

5.2.4 Collection Efficiency and Payment Monitoring

Analysis of collections and payment status highlighted the importance of monitoring cash inflows and collection efficiency.

Collection related indicators provide management with information regarding:

- Payment realization.
- Outstanding balances.

- Revenue conversion effectiveness.
- Financial performance stability.

During internship period it was observed that payment monitoring was closely linked with operational reporting activities. Efficient collection management contributes to better cash flow management and improved organizational sustainability.

Based on the analysis, regular review of collection related KPIs can help management identify outstanding payments and improve financial monitoring.

5.2.5 Service Utilization Analysis

Service utilization analysis provides valuable insights into demand patterns across different diagnostic procedures.

Understanding service utilization is important because it helps management:

- Identify high-demand services.
- Evaluate resource utilization.
- Support equipment planning.
- Improve scheduling efficiency.
- Optimize service portfolios.

During the internship, sonography services were observed to play a central role in daily operations. Patient flow, scheduling activities, and reporting processes were significantly influenced by sonography-related demand.

5.2.6 Payment Mode Analysis

The analysis of payment methods revealed changing payment preferences among healthcare consumers.

Digital payment methods are increasingly becoming common in healthcare organizations due to convenience, speed, and transaction transparency.

Monitoring payment mode distribution provides several benefits:

- Understanding patient payment preferences.
- Supporting financial planning.
- Enhancing transaction efficiency.

- Improving customer experience.

During the internship, it was observed that digital payment acceptance contributed to smoother transaction processing and improved operational convenience.

5.3 Linkage with Existing Literature

Findings of the present study are consistent with several studies in healthcare analytics and management information systems.

Raghupathi and Raghupathi (2014) emphasized that healthcare analytics supports operational efficiency and evidence based decision making. The present study similarly demonstrates how analytical reporting can assist diagnostic centre management in monitoring operational performance.

Islam et al. (2018) reported that healthcare analytics enables organizations to transform operational data into actionable insights. Dashboard and KPI based reporting approach adopted in this study supports this conclusion.

Menachemi and Collum (2011) highlighted the importance of healthcare information systems in improving organizational management. Structured MIS environment observed during the internship reflects this relationship.

Brossard et al. (2022) found that analytics capabilities create organizational value by improving visibility and decision quality. Findings of the present study suggest that even relatively simple descriptive analytics can provide valuable operational insights within diagnostic centres.

Overall present findings collectively helps to understand and suggest the importance of integrating MIS and healthcare analytics for effective organizational management.

5.4 Operational Implications

Study has several practical implications for diagnostic centre operations.

Improved Performance Monitoring

Regular KPI monitoring enables management to track operational performance and identify deviations.

Better Resource Allocation

Patient volume and service utilization reports assist in planning staffing requirements and equipment utilization.

Enhanced Financial Control

Revenue and collection analytics support financial monitoring and improve accountability.

Improved Operational Visibility

Dashboard based reporting provides managers with a consolidated view of organizational performance.

Data-Driven Planning

Analytical reporting supports evidence based planning and operational decision making.

These operational benefits shows that the practical value of healthcare analytics within diagnostic organizations.

5.5 Healthcare Analytics Implications

Study highlights how healthcare analytics can be applied beyond clinical settings.

Many healthcare analytics studies focus primarily on patient outcomes and clinical decision support.

However the present research shows that analytics also plays a significant role in operational management.

Applications observed during the internship are:

- Revenue monitoring.
- Service utilization analysis.
- KPI development.
- Performance reporting.
- Operational trend analysis.

5.6 MIS Based Decision Support

One of the most important observations during the internship is the role of MIS reports in supporting managerial decisions.

MIS served as a central information source for below points:

- Performance monitoring.
- Revenue review.
- Operational reporting.

- Service utilization tracking.
- Administrative planning.

Integration of analytics with MIS enhanced the usefulness of operational data by transforming raw records into meaningful insights.

Findings indicate that organizations can improve decision quality by strengthening MIS reporting capabilities and integrating analytical dashboards into routine management practices.

5.7 Internship Reflections

Internship at Crystal Diagnostic Centre, Thane provided valuable practical exposure to diagnostic healthcare operations and healthcare analytics applications.

Although the primary area of involvement was sonography operations, the internship provided opportunities to understand broader organizational processes including:

- Patient registration workflows.
- Billing procedures.
- MIS reporting mechanisms.
- Operational performance monitoring.
- Data management practices.

Participation in data cleaning, dashboard development, KPI reporting, and analytical activities helped bridge the gap between academic learning and practical healthcare management.

One of the key learnings from internship is that healthcare analytics it is not restricted to complex predictive models or advanced software. Routine MIS reports, KPI tracking, and simple dashboard visualizations were frequently used to review performance and support operational decisions.

This practical exposure helped in understanding how analytics can contribute to healthcare management at the operational level.

Experience also helped me to understand importance of data quality, structured reporting, and evidence based management within healthcare organizations.

5.8 Contribution of the Study

Study contributes to both academic and practical understanding of healthcare analytics.

Academic Contribution

- Application of academic learning of healthcare analytics to diagnostic centre operations.
- Practical application of MIS based analytics.
- Provides a diagnostic centre case study from the Indian healthcare context.

Practical Contribution

- Use of KPI dashboards for operational monitoring.
- How MIS data can support managerial decisions.
- Highlights opportunities for operational improvement through analytics.

Managerial Contribution

- Supports adoption of dashboard-based performance monitoring.
- Encourages evidence based decision making.
- Promotes greater utilization of operational data for management purposes.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

Overall conclusions after study and recommendations based on the findings during operational analytics and MIS based performance evaluation done at Crystal Diagnostic Centre, Thane.

Chapter provides a summary of key findings of the internship, discusses management implications, considers limitations of the study, and offers practical suggestions for enhancing efficiency of diagnostic services in a data driven manner.

Study was carried out to find out the role of Operational Analytics and MIS in performance monitoring, operational efficiency and managerial decision making of healthcare organizations. Data from diagnostic centre was analysed to examine the following aspects of patient flow: volume, revenue generated, effectiveness of collection, payment behaviour and service utilization patterns.

Experience gained during the internships revealed that in the healthcare sector, significant amounts of operational data were generated which can be converted to useful managerial information, using structured analytical tools and reporting mechanisms. Results highlight the increasing role of healthcare analytics in driving operational excellence and sustainability of organizations.

6.2 Summary of the Study

Study done at Crystal Diagnostic Centre, Thane as a part of MBA (Healthcare Analytics) programme from The IIMR University, Jaipur.

Duration of internship based fieldwork and operational exposure was between 02 March 2026 to 31 May 2026. This was in the period where Researcher was engaged in operational monitoring, MIS reporting, healthcare analytics activities, development of dashboards, KPI analysis, and diagnostic services performance assessment.

Focus of the research was the information gathered from the organization's MIS, which was used to evaluate the operational performance using healthcare analytics techniques.

Analytical work included:

- Patient volume analysis
- Revenue performance evaluation
- Collection efficiency assessment
- Payment mode analysis
- Service utilization analysis

- KPI development
- Dashboard creation
- MIS-based reporting

Analysis during internship indicated that structured MIS reports could be of great help in monitoring performance, identifying performance problems and in assisting managerial decision making.

6.3 Key Findings of the Study

Analysis led to a number of key insights into the operation and performance monitoring of a diagnostic centre.

6.3.1 Patient Volume Performance

Demand for diagnostic services remained relatively constant throughout the internship period as indicated by data reviewed. The trends in patient volume emphasized the need to maintain ongoing monitoring of the need for services and distribution of workload.

Findings showed that patient volume data can support:

- Resource allocation
- Appointment scheduling
- Staff deployment
- Capacity planning

It is important to monitor patient flow regularly to be able to respond to operational needs and enhance service efficiency.

6.3.2 Revenue Performance

- Through a revenue analysis, relevance of financial control for diagnostic health organisations was shown.
- Results indicated that revenue reports in MIS offer good visibility in following operational level:
- Financial performance
- Service contribution
- Revenue trends
- Operational productivity

therefore, Revenue related analytics can assist management in identifying performance variations and support strategic planning initiatives.

6.3.3 Collection Efficiency

Analysis emphasized the importance of regularly monitoring collections and pending balances to support financial stability.

Collection efficiency is an important measure of financial sustainability, as it shows how effective organization is in collecting money billed.

Analysis revealed that KPIs associated with collections could be used to inform management:

- Monitor receivables
 - Improve cash flow
 - Reduce outstanding balances
 - Strengthen financial performance
-

6.3.4 Payment Behaviour

Payment mode analysis showed that digitisation of payment modes increased along with the traditional modes.

Findings suggest that monitoring payment behaviour can support:

- Transaction management, Financial planning, Operational efficiency, Customer convenience

Growing adoption of digital payment mechanisms reflects broader trends in healthcare digitalization.

6.3.5 Service Utilization

Analysis showed differences in the use of various diagnostic procedures.

Service utilization reporting provides valuable insights into:

- Demand patterns
- Resource utilization
- Equipment planning
- Service portfolio management

6.3.6 MIS and Decision Support

Importance of MIS Reporting to managerial decision making was one of the most important findings while in internship.

MIS reports helped in monitoring below figures on daily and monthly basis:

- Patient volume
- Revenue trends
- Collections
- Service utilization
- Operational performance indicators

6.4 Conclusion

Based on the internship experience and analysis of the data gathered during this study, it can be inferred that the role of Operational Analytics and MIS in enhancing the efficiency and further assisting in decision making process at Crystal diagnostic centre, Thane is crucial.

Another important lesson learned throughout the internship is that it is not only important to have complex analytical tools to draw conclusions, but that even basic ones like KPI dashboards, revenue reports, and service utilization analysis can give valuable information for managerial decision making.

Internship at Crystal Diagnostic Centre gave hands-on experience in healthcare operations and the significance of analytics in real-world environments for making decisions within the business. Based on the internship experience it is concluded that MIS based operational analytics helps in:

- Improved organizational visibility
- Better performance monitoring
- Enhanced financial management
- Efficient resource utilization
- Data-driven decision-making

6.5 Recommendations

Several observations and recommendations were made based on the results obtained during the study, which could help in enhancing the operational efficiency and also enable sound decision

making using MIS at Crystal Diagnostic Centre, Thane.

6.5.1 Strengthen Collection Management Processes

Collection efficiency directly impacts on financial health and cash flow of organization.

- Below points should be taken into consideration by management:
- Automated payment reminders
- Receivable tracking systems
- Periodic collection reviews
- Outstanding payment dashboards

Enhancing receivable management can help to boost the financial performance and minimize revenue leakage.

6.5.2 Implement Real-Time Operational Dashboards

Study demonstrated the usefulness of dashboard based monitoring.

Organization may benefit from dashboards displaying:

- Daily patient visits
- Revenue performance
- Collection status
- Pending balances
- Service utilization metrics

Figure 6.1 Proposed Real-Time MIS Dashboard

Achieving Effective Healthcare Management

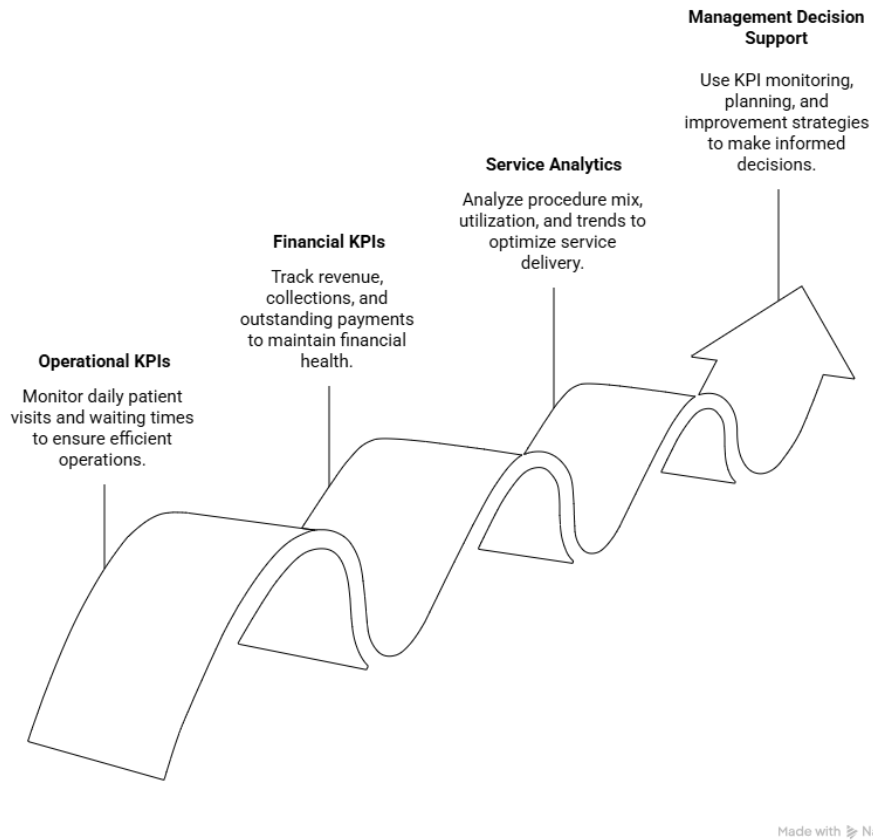


Figure Description

Proposed dashboard integrates operational, financial, and service utilization indicators into a single decision-support platform for management review.

6.5.3 Expand KPI-Based Performance Monitoring

Organization should establish a standardized KPI monitoring framework.

Below Suggested KPIs are:

- Daily patient volume
- Revenue per visit
- Collection efficiency
- Procedure utilization rate
- Appointment completion rate

- Outstanding balance percentage

Regularly monitoring KPI dashboard can improve accountability and operational control.

6.5.4 Improve Service Portfolio Planning

Service utilization analysis indicated that few diagnostic procedures contribute significantly to operational performance.

Management should do periodically evaluation to understand present and historical performance and based on that decision can be taken by considering below points :

- Service demand trends
- Procedure profitability
- Referral patterns
- Resource allocation

Such evaluations can support long-term sustainability and balanced service growth.

6.5.5 Enhance Data Quality Governance

Centre should strengthen data quality practices by considering below points:

- Standardized data entry process
- Validation procedures
- Staff training
- Periodic data quality audits

Improved data quality will help in accurate analysis and correct interpretation of data insights.

6.5.6 Promote Digital Payment Adoption

Management may further encourage digital payments through:

- QR-based payment systems
- Automated receipt generation
- Digital reconciliation processes
- MIS integration

Initiatives can improve operational efficiency and financial transparency.

6.5.7 Develop Predictive Analytics Capabilities

Study primarily focused on descriptive analytics.

- Patient demand forecasting
- Revenue forecasting
- Resource utilization prediction
- Appointment optimization

Predictive analytics can support proactive operational management and future planning.

6.6 Managerial Action Plan

Table 6.1 Recommended Action Plan

Recommendation	Expected Benefit	Priority
Receivable Monitoring System	Improved Collections	High
Real-Time Dashboard	Better Decision-Making	High
KPI Monitoring Framework	Performance Tracking	High
Data Quality Improvement	Reliable Analytics	Medium
Service Portfolio Review	Revenue Diversification	Medium
Digital Payment Enhancement	Faster Transactions	Medium
Predictive Analytics Development	Future Planning	Long-Term

Interpretation

Proposed an action plan provides a structured roadmap for implementing analytics driven operational improvements.

High-priority initiatives were focus on:

- Dashboard implementation.
- Collection management
- KPI monitoring.

And while long-term initiatives was to take predictive analytics and strategic planning.

6.7 Study Limitations

Every research study have some certain limitations, and the present study is no exception. These limitations should be considered while interpreting the findings and conclusions presented in this dissertation.

6.7.1 Data Confidentiality Restrictions

Crystal Diagnostic Centre follows strict policies related to patient privacy, financial confidentiality, and organizational data protection. Due to which actual patient records, financial figures, and operational performance data could not be disclosed within this academic document.

Hence, the analysis presented in this dissertation was conducted using a modified and confidentiality compliant dataset designed to reflect the operational structure, variable relationships, and analytical patterns observed during the internship period. Analytical techniques, MIS framework, dashboard design, KPI calculations, and interpretation approach accurately represent the work performed during the internship, the numerical values included in the study should not be interpreted as actual organizational performance figures.

6.7.2 Single Organization Study

Study was conducted within a single diagnostic centre located in Thane, Named Crystal Diagnostic centre, Thane. And Therefore the findings may reflect the operational characteristics of the one selected organization and same may not be directly generalizable to all diagnostic centres or healthcare institutions.

6.7.3 Limited Internship Duration

Internship was based on fieldwork at the centre of Crystal Diagnostic centre, and the study was conducted from 02 March 2026 to 31 May 2026. Although the internship provided valuable exposure to diagnostic centre operations, MIS reporting, healthcare analytics, and performance monitoring activities, the relatively short observation period may not have captured longer-term operational variations or seasonal demand patterns. Longer study duration could have provided additional insights of service utilization trends, revenue performance, and operational efficiency over time.

6.7.4 Operational Scope of Exposure

Organization offers multiple diagnostic services, the primary area of practical exposure during the internship was sonography operations. Hence, observations related to workflow management and service delivery were influenced largely by this operational domain.

6.7.5 Descriptive Analytics Focus

In study descriptive analytics techniques applied such as KPI reporting, dashboard development, revenue analysis, service utilization analysis, and performance monitoring.

Interpretation of Limitations

Despite these limitations, the study successfully shows the practical application of healthcare analytics and MIS-based decision-making within a diagnostic centre. Results should be viewed as an example of analytical techniques and managerial decision support approaches rather than an accurate reflection of the firm's current state of operation.

6.8 Future Scope of the Study

Current study was completely based operational data collect at single diagnostic centre i.e, Crystal Diagnostic centre Thane, further study can be done on below perspective:

- Multi-centre comparative analysis
 - Longitudinal performance evaluation
 - Predictive analytics implementation
 - Machine learning applications in healthcare operations
 - Patient satisfaction analytics
 - Referral pattern analysis
 - Resource utilization optimization studies
-

6.9 Research Contribution

Study helped to understand how an academic health care analytics learning can be applied in real life operational data for evidence based decision making to improve efficiency and business growth within the diagnostic centre

Academic Contribution

- Extends healthcare analytics literature to diagnostic service operations.
- Demonstrates practical application of MIS-based analytics.

- Provides a diagnostic centre case study from the Indian healthcare context.

Practical Contribution

- Illustrates the use of KPI dashboards for operational monitoring.
- Demonstrates how MIS data can support managerial decisions.
- Highlights opportunities for operational improvement through analytics.

Managerial Contribution

- Encourages dashboard-based performance monitoring.
- Supports evidence-based decision-making.
- Promotes effective utilization of operational data for management purposes.

6.10 Final Conclusion

Healthcare sector is increasingly becoming data-driven, making Operational Analytics and Management Information Systems essential tools for organizational success.

Analysis carried out during the internship showed that routine operational data can be used to understand patient trends, revenue performance, collection, payment patterns, and utilization of diagnostic services.

Internship experience at crystal diagnostic center helped to learn importance of storing data correctly and transforming data in meaningful information for decision making in business through developing MIS report, KPI dashboards, revenue dashboard, Service utilization and operational performance review, the study helped to understand how analytics can support evidence based decision making and operational improvement.

Experience gained during this study suggests that organizations making effective use of MIS reports and healthcare analytics are better to improve efficiency, monitor performance, and support informed decision-making.

Healthcare organizations continue to embrace digital transformation, analytics-driven management will play an important role in achieving operational excellence, long-term organizational success.

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ANNEXURES

Annexure A: Internship Responsibilities

The following activities were undertaken during the internship at Crystal Diagnostic Centre, Thane:

- Understanding diagnostic centre workflows
- Observing sonography operations
- Assisting in MIS reporting activities
- Reviewing operational and financial data
- Data cleaning and validation
- KPI monitoring and dashboard preparation
- Revenue and collection analysis
- Supporting operational performance evaluation

Annexure B: Key Performance Indicators (KPIs)

- Total Patient Visits
- Total Revenue
- Total Collections
- Outstanding Balance
- Collection Rate (%)
- Revenue per Visit
- Service Utilization Rate
- Payment Status Distribution
- Payment Mode Distribution

Annexure C: Dashboard and Analytical Reports created during the study

- Patient Volume Dashboard
- Revenue Analysis Dashboard
- Collection Performance Dashboard
- Service Utilization Dashboard
- Payment Status Analysis

- Monthly Performance Comparison

Annexure D: Software and Analytical Tools

Below tools were used for analysis:

- Microsoft Excel
- Python
- Pandas
- NumPy
- Matplotlib

Annexure E: Key Terminologies

- MIS – Management Information System
- KPI – Key Performance Indicator
- Revenue Collection – Amount received against billed services
- Service Utilization – Usage pattern of diagnostic services
- Dashboard Analytics – Visual representation of performance indicators

Annexure F: Data Sources Used

Based on below information collected at crystal diagnostic centre study was conducted:

- Management Information System (MIS) reports
- Patient visit records
- Billing and collection reports
- Service utilization records
- Operational performance reports
- Internship observations and organizational workflows

Note: Due to organizational confidentiality policies, original data collected at centre is not used for study.