SYNOPSIS

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Adya Tiwari

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Dr. Ritu Vashistha

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SYNOPSIS

1. TITLE

From Consultation to Diagnosis- A Data-Driven Analysis of Lab and USG Conversion Rates and Trends in an OPD Setting at Cocoon Hospital, Jaipur

2. INTRODUCTION

Single specialty hospitals face a unique operational challenge - ensuring that patients who visit the OPD also utilize in-house diagnostic services rather than seeking them elsewhere. For a 24-bedded maternity and women's healthcare facility like Cocoon Hospital, Jaipur, this gap between consultation and diagnosis has direct implications for continuity of care, patient satisfaction, and revenue sustainability.

Despite consistent OPD footfall, a considerable proportion of patients do not proceed with recommended laboratory tests or ultrasound scans within the hospital. Patients often opt for external diagnostic centres for reasons such as cost, waiting time, proximity, or prior familiarity with outside labs. This drop-off at the diagnostic stage disrupts the care journey and limits the hospital's ability to manage patients end-to-end.

When patients choose external diagnostics, the hospital's in-house lab and scan services operate below their optimal capacity. Underutilization of these services not only affects the hospital's revenue but also limits its ability to reinvest in infrastructure, staffing and quality improvement. For a small specialty hospital operating on tighter margins than larger tertiary centres, even a moderate conversion gap can have a measurable impact on financial sustainability and long-term growth.

Understanding where and why patients exit this journey is therefore important. Analysing OPD-to-Lab and OPD-to-USG conversion rates can help the hospital identify these gaps, understand the scale of the problem and work towards targeted interventions that improve diagnostic uptake, strengthen operational efficiency and support the hospital's long-term sustainability.

3. LITERATURE REVIEW

S.No.	Author/Year	Title of the study	Key Findings
1	Engel N. et al. (2017) Global Health Action, PMC	How patients navigate the diagnostic ecosystem in a fragmented health system: a qualitative study from India	Patients in India face major barriers completing diagnostic journeys - cost, turnaround time and distance are key constraints. When the care pathway became complex, patients opted out or switched to external providers. Directly supports the concept of patient leakage and drop-off from in-house Lab and USG services after OPD consultation.

2	Jain R. & Rao B. (2019) Primary Health Care Res Dev, PMC	Role of laboratory services in primary health centre (PHC) outpatient department performance: an Indian case study	Strong positive association was found between in-house laboratory service availability and OPD utilization. PHCs offering in-house lab testing had significantly higher OPD visits - directly establishes that in-house diagnostic availability drives patient retention and supports the hospital impact argument of this study.
3	Holloway B. et al. (2020) BMJ Open, PMC	Utilisation of diagnostics in India: a rapid ethnographic study exploring context and behaviour	Of 129 OPD patients prescribed diagnostics, 46% never returned for follow-up after receiving the diagnostic recommendation - directly measuring patient drop-off at the diagnostic stage. Physicians estimated that only about half of patients sent for diagnostics actually complete and return with results. Cost, illness severity, and preference to treat directly without tests were identified as key reasons for non-completion. This is the most directly relevant evidence for the OPD-to-Lab and OPD-to-USG conversion gap studied at Cocoon Hospital, Jaipur.
4	Kaur R. et al. (2022) J Patient Exp, PMC	Patient Satisfaction Among the OPD Attendees at a Secondary Care Hospital in Northern India	Availability of in-house diagnostic facilities and waiting time at registration were the two lowest-scoring parameters in OPD satisfaction. Confirms that diagnostic service availability and operational efficiency directly determine whether patients complete Lab and USG investigations in-house or seek external care.
5	Andersen R.M. (1995) J Health Soc Behav	Revisiting the behavioural model and access to medical care: Does it matter?	The revised Behavioural Model of Health Services Utilization proposes healthcare use is shaped by predisposing, enabling and need factors. Cost sensitivity, convenience of external labs and prior habit are enabling-resource variables that directly explain why OPD patients may not complete recommended in-house Lab and USG services.

4. THEORETICAL / CONCEPTUAL FRAMEWORK

The study is grounded in two complementary frameworks that together explain patient behaviour between OPD consultation and in-house diagnostic completion.

The “Patient Care Continuum” Model conceptualizes the healthcare journey as a sequence of connected stages- from initial consultation, through investigation, to diagnosis and treatment. In this study, the transition between OPD consultation and in-house diagnostic completion is identified as the critical conversion point where patient drop-off is most likely to occur. Measuring this conversion gap enables targeted operational intervention to improve retention at the right stage.

The study also incorporates “Andersen's Behavioural” Model of Health Services Utilization (1968, revised 1995), which proposes that healthcare service use is shaped by three interacting factors: predisposing characteristics (age, gender, health beliefs), enabling resources (income, cost perception, geographic access, familiarity with providers) and how much you need care.

Together these frameworks establish OPD-to-diagnostic conversion rate as a measurable indicator that connects patient behaviour, hospital operations and resource utilization- making it equally relevant for clinical teams and hospital management.

5. RESEARCH GAP

Previous studies on healthcare service utilization and patient satisfaction in Indian hospitals have largely focused on government and tertiary care settings. Limited research is available on OPD-to-diagnostic conversion specifically in small private specialty hospitals, particularly in the maternity and women's healthcare segment.

There is also a notable absence of studies that use data analytics tools such as Power BI to quantify and visualize actual conversion rates as an operational performance indicator. Most existing research measures patient satisfaction as a subjective outcome rather than using objective, data-driven conversion metrics to assess diagnostic service utilization.

Furthermore, Rajasthan and specifically the private maternity care sector in Jaipur remains underrepresented in research on in-house diagnostic retention. Region-specific evidence is important as infrastructure conditions, patient demographics, and operational dynamics differ from other states where similar studies have been conducted. Therefore, the present study aims to evaluate OPD-to-Lab and OPD-to-USG conversion rates, identify drop-off points and provide data-driven recommendations to improve diagnostic service utilization at Cocoon Hospital, Jaipur.

6. RESEARCH QUESTIONS

What are the OPD-to-Lab and OPD-to-USG conversion rates at Cocoon Hospital?

What is the extent of diagnostic leakage among patients advised laboratory and USG investigations?

What variations exist in diagnostic conversion rates across consultants and months?

Aim

To analyse OPD-to-Laboratory and OPD-to-USG conversion rates and evaluate diagnostic utilization patterns at Cocoon Hospital, Jaipur.

Objectives

Primary Objective

To measure and analyse OPD-to-Laboratory and OPD-to-USG conversion rates among patients attending Cocoon Hospital, Jaipur during the study period.

Secondary Objectives

To assess the utilization of in-house Laboratory and USG services among OPD patients receiving diagnostic recommendations.

To identify and quantify diagnostic leakage between OPD consultation and completion of recommended diagnostic investigations.

To compare consultant-wise and month-wise variations in Laboratory and USG conversion rates.

To develop a dashboard-based performance monitoring framework using healthcare analytics tools for tracking diagnostic service utilization.

To provide data-driven recommendations for improving diagnostic conversion, patient retention, and utilization of in-house diagnostic services.

8. HYPOTHESIS-

Laboratory Investigation Completion

$H0_1$: There is no significant variation in laboratory conversion rates across consultant categories.

$H1_1$: There is a significant variation in laboratory conversion rates across consultant categories.

Hypothesis 2: USG Investigation Completion

$H0_2$: There is no significant variation in USG conversion rates across consultant categories.

$H1_2$: There is a significant variation in USG conversion rates across consultant categories.

9. MATERIALS AND METHODS-

Study Design- Prospective, observational and descriptive study based on secondary data analysis of hospital records, conducted to evaluate OPD-to-Lab and OPD-to-USG conversion rates.

Study Setting- Outpatient Department, in-house laboratory and USG/radiology unit of Cocoon Hospital, Jaipur - a private maternity and women's healthcare facility.

Study Population- All outpatients who visited Cocoon Hospital's OPD during the study period and were recommended one or more laboratory tests or USG scans by the consulting physician.

Inclusion Criteria

- All OPD patients who received a recommendation for laboratory or USG investigations during March and April 2026.
- Patients whose investigation records were complete and available in the hospital information system.

Exclusion Criteria

- Patients referred outside due to clinical necessity (e.g., tests not available in-house).
- Records with incomplete or missing data on investigation recommendations or completion status.

Study Tools: The study tools will include:

- Hospital Information System (HIS) at Cocoon Hospital
- Consultant prescription and investigation recommendation records
- In-house laboratory and USG records
- Microsoft Excel for data entry, analysis and visualization
- Power BI for interactive dashboard preparation and KPI reporting

Duration of Study- The study will be conducted over a two-month period: March and April 2026 at Cocoon Hospital, Jaipur.

Sample Size- Based on available hospital records, an estimated 350-400 patients were recommended diagnostic investigations during the study period. All eligible records meeting the inclusion criteria will be included in the study. No separate sampling will be done.

Sampling Technique- All eligible OPD patients recommended diagnostics during the defined study period will be included for analysis.

Data Collection Procedure

Data will be collected from the Hospital Information System (HIS) and investigation registers maintained at Cocoon Hospital, Jaipur. Details about OPD consultations, investigation recommendations and in-house diagnostic completion will be recorded in Microsoft Excel for analysis. The collected data will be categorized according to Lab and USG service types to assess conversion patterns, drop-off points and monthly trends.

Operational Definitions

- **OPD Consultation**- It refers to a patient visit to the outpatient department resulting in a formal consultation with a doctor and generation of an investigation slip or prescription.

- **Lab Conversion**- Lab conversion refers to a patient who was recommended a laboratory investigation and subsequently completed that test at the hospital's in-house laboratory.
- **USG Conversion**- USG conversion refers to a patient who was recommended an ultrasound scan and subsequently completed that scan at the hospital's in-house radiology/USG unit.
- **Conversion Rate**- It refers to the percentage of patients who completed in-house diagnostics out of the total number of patients recommended those diagnostics.
- Conversion Rate = Number of in-house completions / Total recommended cases × 100
- **Patient Inflow**- The total number of patients attending OPD consultations within the defined study period.
- **Patient Retention**- Patient retention refers to the proportion of patients who opted for and completed in-house diagnostic services after receiving a recommendation from the consulting physician.
- **Patient Leakage / Drop-off**- Patient leakage refers to the proportion of patients who were recommended diagnostics but did not complete them at the in-house facility.
- **Drop-off Rate**-
  Drop-off Rate = (Total recommended - In-house completions) / Total recommended × 100

10. DATA ANALYSIS PLAN

Data will be recorded and analysed using Microsoft Excel. Descriptive statistics such as percentage, mean and averages will be used to evaluate OPD volumes, conversion rates, drop-off patterns and monthly trends. The analysed data will be presented using tables, charts and Power BI dashboards.

11.ETHICAL CONSIDERATIONS

Confidentiality and privacy of patient and hospital data will be strictly maintained throughout the study. Patient identifiers such as names, UHID numbers and personal details will not be disclosed or used in the study at any stage of data management or analysis. Since the study is based entirely on hospital records and operational data, no direct patient intervention will be involved. Permission to access and use hospital records was obtained from Cocoon Hospital administration prior to data collection. Data will be used solely for academic purposes and findings will be reported in aggregate form only.

12. IMPLICATIONS OF RESEARCH

The study will help in identifying operational gaps related to OPD-to-diagnostic conversion, patient leakage, and in-house service underutilization at Cocoon Hospital, Jaipur. The findings may support hospital administrators in improving workflow management, diagnostic service uptake and overall operational efficiency of the hospital. The study also demonstrates the practical application of healthcare analytics tools such as Power BI and Microsoft Excel to real-world hospital operations, contributing to evidence on how data-driven approaches

can strengthen service utilization and financial sustainability in small specialty hospitals in India.

13. TENTATIVE CHAPTER PLAN

S.No	Chapter	Sub-topics
1	Abstract	—
2	Acknowledgement	—
3	List of Tables	—
4	List of Figures	—
5	List of Abbreviations	—
6	Chapter 1: Introduction	1.1 Background and Rationale 1.2 Research Questions 1.3 Aim and Objectives
7	Chapter 2: Review of Literature	—
8	Chapter 3: Research Methodology	3.1 Study Design and Setting 3.2 Study Population and Sampling 3.3 Data Collection Procedure 3.4 Operational Definitions 3.5 Data Analysis Plan 3.6 Ethical Considerations 3.7 Implications of Research
9	Chapter 4: Results and Analysis	4.1 OPD Volume and Diagnostic Recommendation 4.2 OPD-to-Lab Conversion Rate 4.3 OPD-to-USG Conversion Rate 4.4 Drop-off and Patient Leakage 4.5 Monthly Trend Analysis (Apr–May 2025) 4.6 Dashboard and KPI Presentation
10	Chapter 5: Discussion	—
11	Chapter 6 – Conclusion and Recommendations	—
12	References	—
13	Annexures	—

13. REFERENCES

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