ENHANCING HOSPITAL FINANCIAL MANAGEMENT - DEVELOPING "BILLWISEAI" AN AI-BASED TOOL FOR MEDICAL BILL ESTIMATION

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BACKGROUND OF THE STUDY

- Despite notable advancements in India's healthcare sector, there exists a notable shortfall in the integration of contemporary technology, resulting in impediments to both patient care and operational efficiency.
- One area that continues to pose challenges for both patients and healthcare providers is the billing and financial management system.
- Hospitals in India face the ongoing struggle of accurately estimating patient medical bills, which can lead to financial stress and confusion.
- According to National health insurer report – 20% of claims paid are incorrect that is due to inaccurate billing and the denial rate for medical claims is 10-15 %.

AIM AND OBJECTIVES

- To identify the gaps in the financial counselling department and to estimate the variance between estimated billing and the actual billing of the patients in a hospital.
- To develop a mechanism "BillWiseAI" an innovative AI-based tool for medical bill estimation in hospitals.

METHODOLOGY

Study Location: Financial Counselling and Billing Department at a private tertiary care hospital in Chennai, India

Study period: 02.05.2023 to 30.06.2023

Study population: Bill records, Inpatients, financial counsellors and billing executives

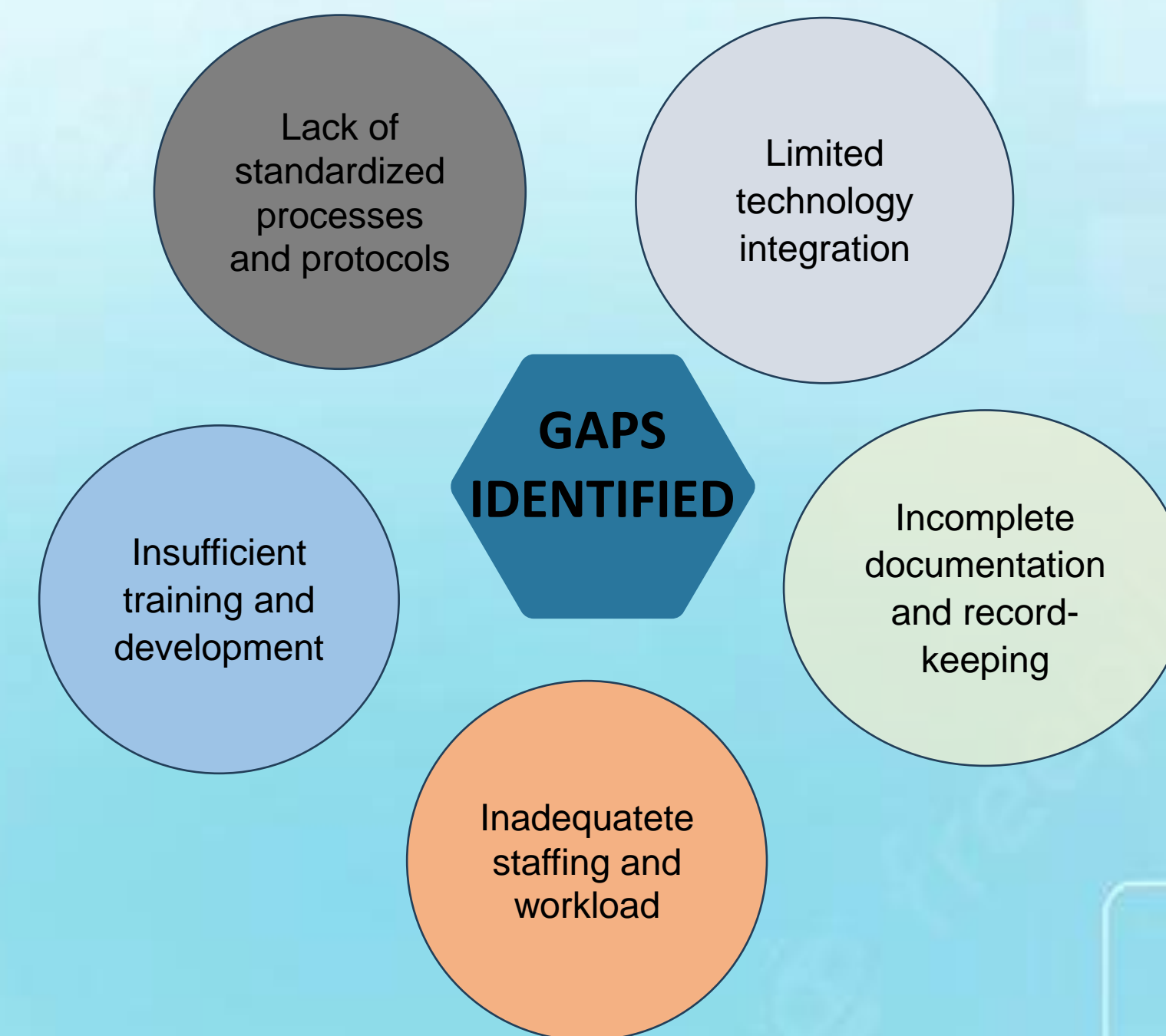**Study Method:** Mixed method study combining qualitative and quantitative methods

Data collection: Retrospective analysis of billing records and interviews with patients and financial counsellors

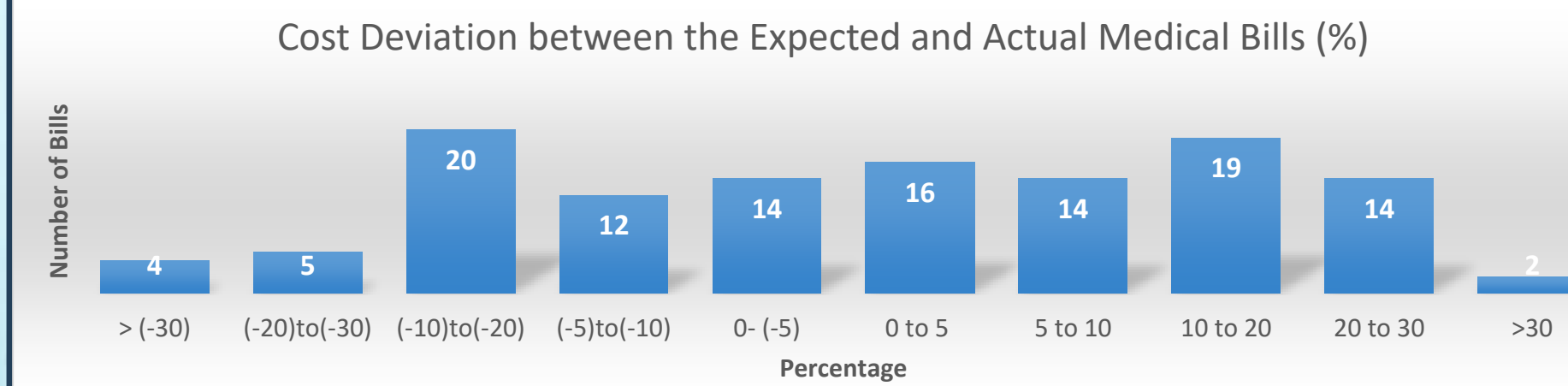**Sample size:** Bill records -150, Patients -42, Billing executives -5

RESULTS

Gaps Identified in the financial counselling and billing department

GAPS IDENTIFIED
- Lack of standardized processes and protocols
- Limited technology integration
- Incomplete documentation and record-keeping
- Inadequatete staffing and workload
- Insufficient training and development

Quantitative Analysis

Cost Deviation between the Expected and Actual Medical Bills (%)

Percentage	Number of Bills
> (-30)	4
(-20)to(-30)	5
(-10)to(-20)	20
(-5)to(-10)	12
0- (-5)	14
0 to 5	16
5 to 10	14
10 to 20	19
20 to 30	14
>30	2

Graph 1 showing cost deviation between the expected and actual medical bills (%)

Nearly 49% of the patients received bills that were lower than what they should have been charged, while roughly 51% of patients encountered overestimated bills during counseling.

Among these cases, approximately 30% of individuals received estimates that closely matched the actual bill, with a percentage difference falling within the range of -5% to 5%.

Furthermore, almost 14% of bills exhibited a variation greater than 20% when compared to the actual bills, stemming from underestimation.

This deficiency in effective financial counseling led to dissatisfaction among patients regarding the hospital's services.
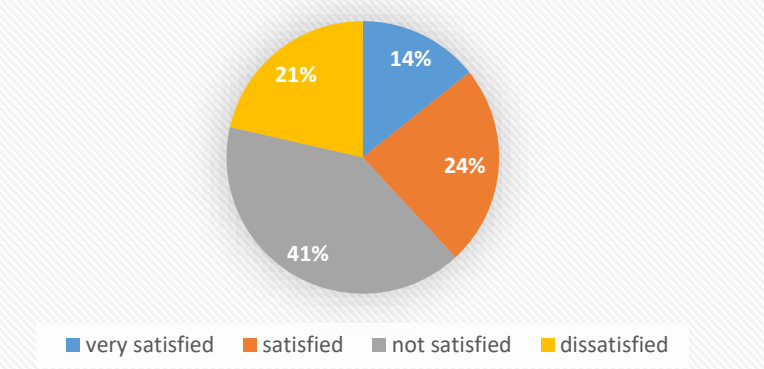
Qualitative Analysis

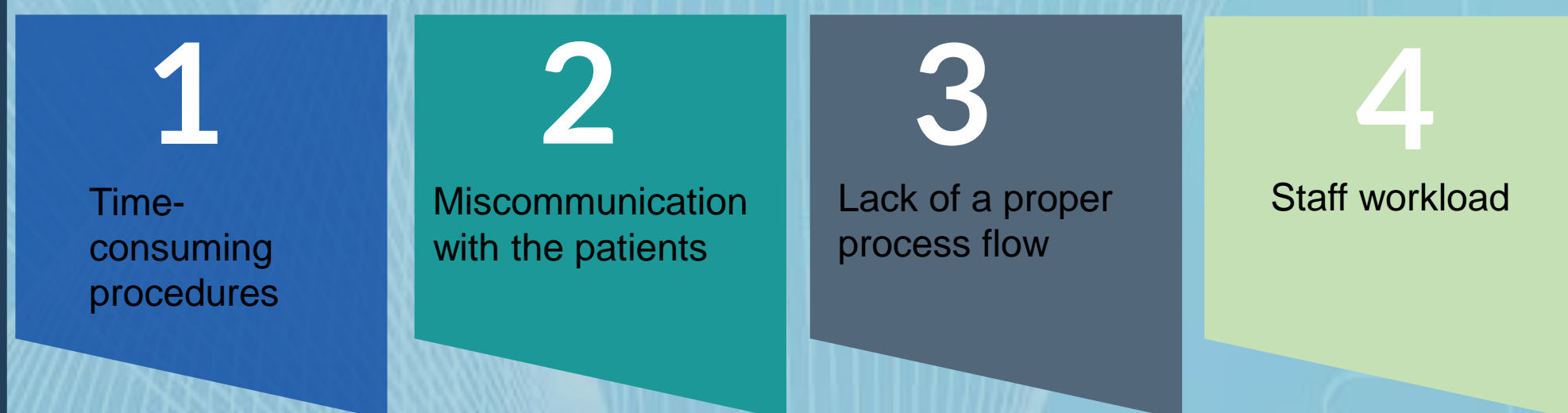**Patient's view on accuracy of billing estimate**
24% / 17% / 12% / 47%
very satisfied satisfied not satisfied dissatisfied
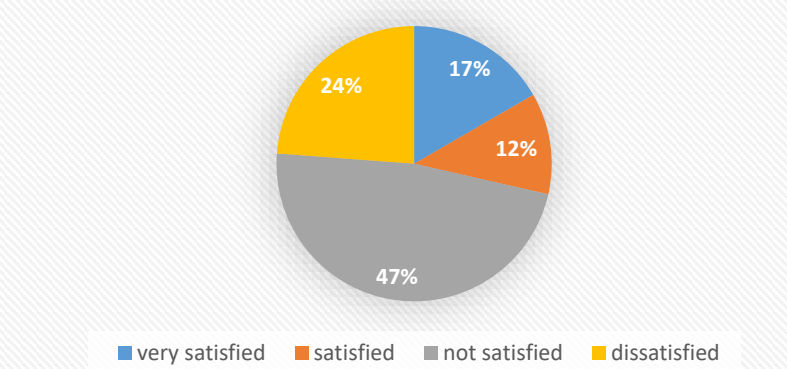
Graph 2 showing patient's view on accuracy of billing estimate

Patient's view on overall billing process
21% / 14% / 24% / 41%
very satisfied satisfied not satisfied dissatisfied

Graph 3 showing patient's view on overall billing process

Issues prioritized by the billing executives

1. Time-consuming procedures
2. Miscommunication with the patients
3. Lack of a proper process flow
4. Staff workload

DISCUSSION

In order to enhance the efficiency and effectiveness of financial counselling department, several measures were implemented. These include:
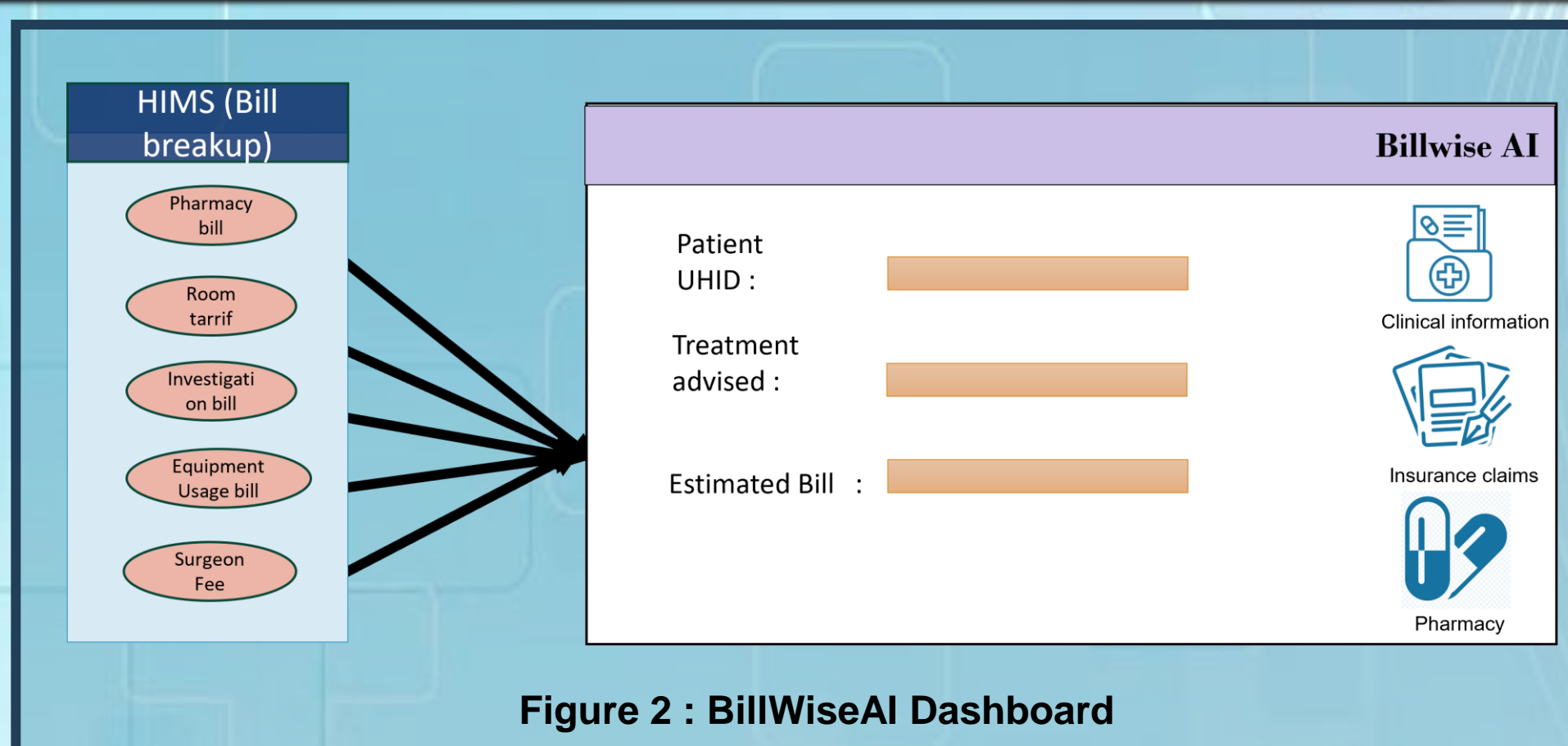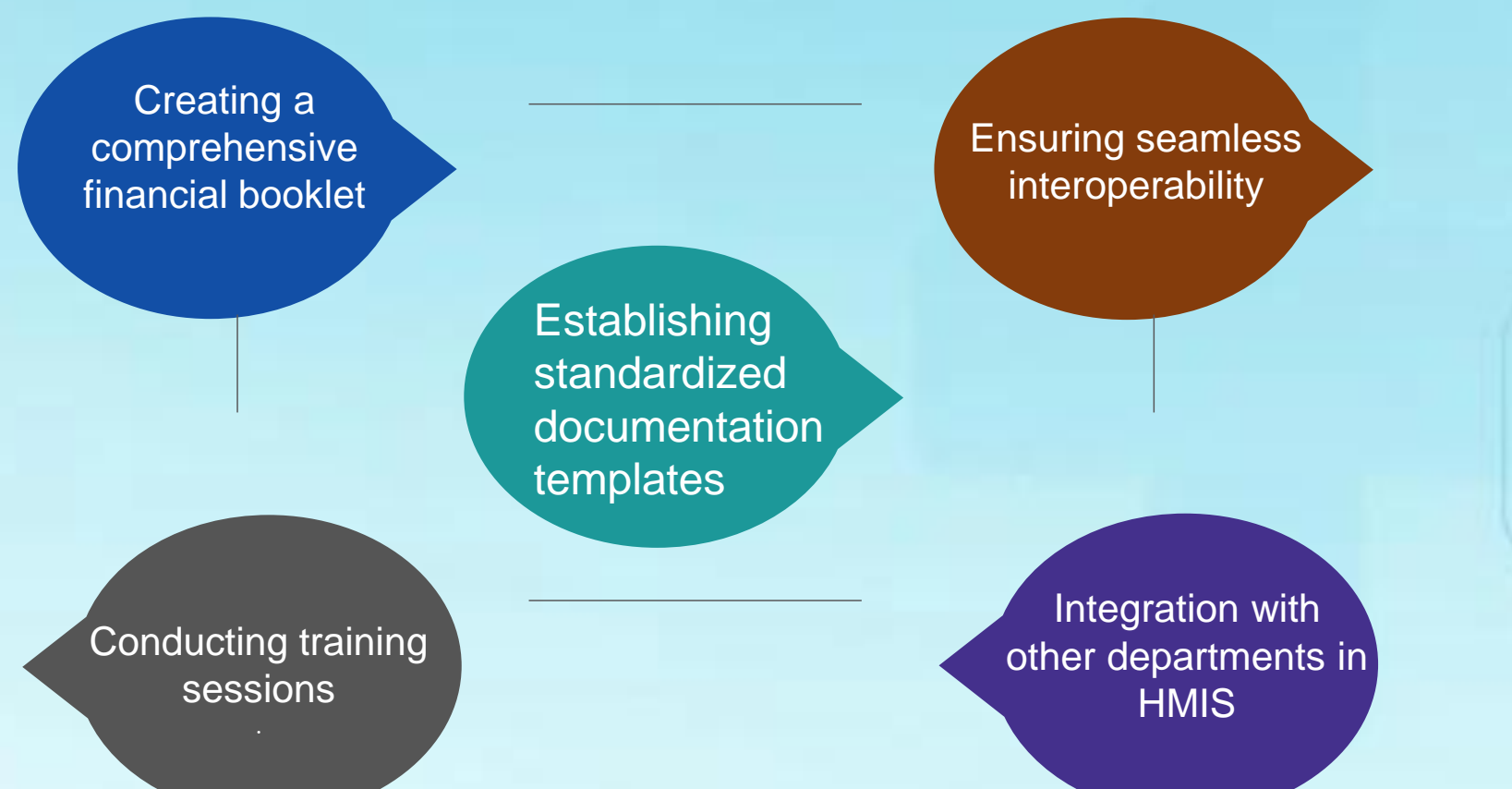
- Creating a comprehensive financial booklet
- Ensuring seamless interoperability
- Establishing standardized documentation templates
- Conducting training sessions
- Integration with other departments in HMIS

Figure 2 : BillWiseAI Dashboard

HIMS (Bill breakup): Pharmacy bill, Room tarrif, Investigation on bill, Equipment Usage bill, Surgeon Fee

Billwise AI: Patient UHID :, Treatment advised :, Estimated Bill :
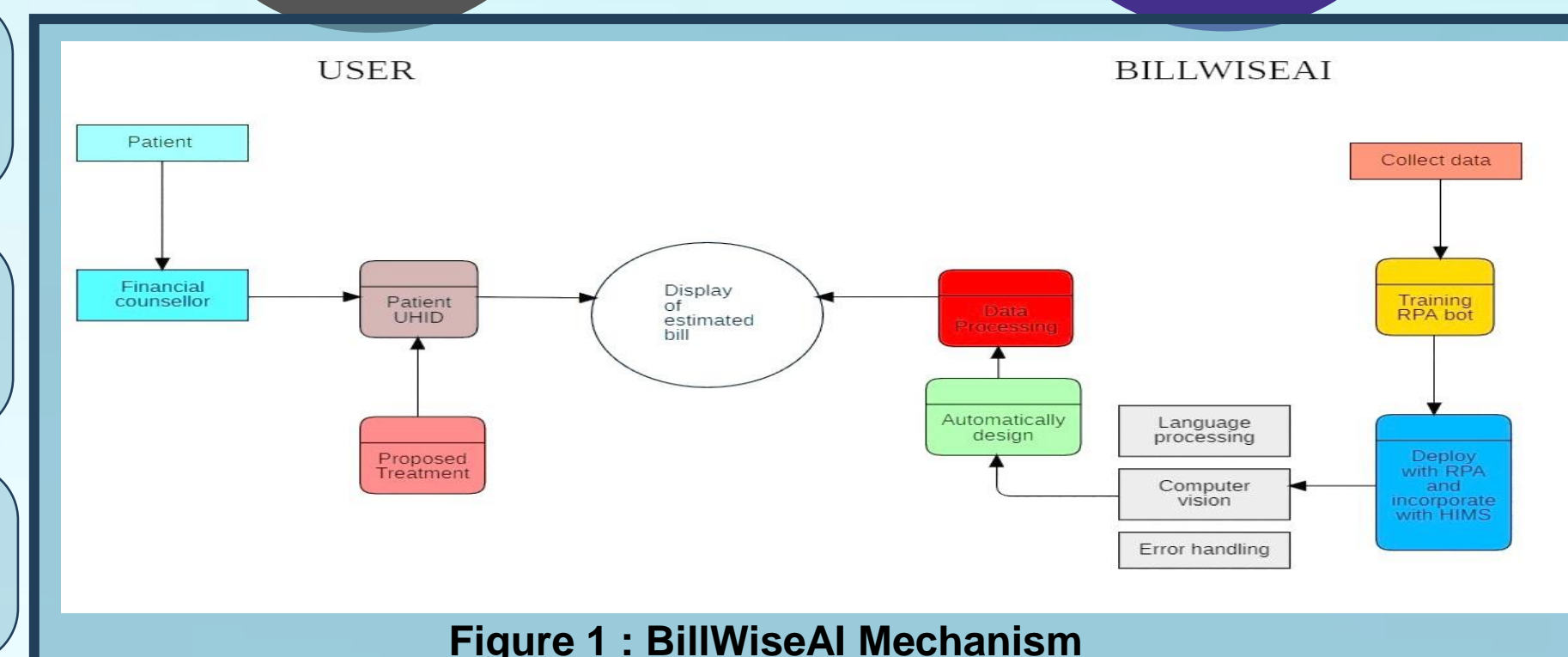Clinical information, Insurance claims, Pharmacy

Figure 1 : BillWiseAI Mechanism

- An intelligent automation solution called **"BillWiseAI"** - Robotic Process Automation (RPA Bots) can be introduced. These bots are designed to extract data from the existing Hospital Management Information Systems (HMIS) and operate through user interfaces, eliminating the need for extensive coding knowledge. Hospitals can revolutionise their financial processes by incorporating RPA Bots into the Hospital Management Information System.

- These bots can assist in various tasks, including bill estimation, actual financial billing, data extraction, insurance verification, claims processing, billing accuracy, integration with accounting systems, process tracking and analytics. This integration allows for optimized revenue cycle management, reduced administrative burdens, and an enhanced patient experience.

CONCLUSION

- The study has shed light on the significant challenges faced by the financial counselling and billing department, which negatively impacted both patient satisfaction and financial well-being.

- To tackle these issues, a series of major recommendations were implemented. Additionally, the introduction of an AI-based tool named "BillWiseAI (RPA Bots)" can be a transformative solution to accurately estimate medical bills and elevate the overall patient experience.

- Therefore, the integration of BillWiseAI alongside a holistic approach to departmental challenges promises to enhance operational efficiency, reduce patient stress, and ultimately improve healthcare services and patient outcomes.

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