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A Study of factors contributing to extended waiting times in hospitals and approaches for improvement

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Abstract: Context: Patient waiting time is one of the most important indicators of hospital efficiency and service quality. Long waiting periods at registration, consultation, diagnostic services, pharmacy, and billing can negatively affect patient satisfaction and overall hospital experience. This study aims to understand the major reasons behind extended waiting times in hospitals and identify practical ways to improve patient flow. The research examines factors such as patient load, staff availability, workflow management, communication gaps, and the use of technology. Data was collected from patients through surveys and observation of hospital processes. The findings show that delays are mainly caused by overcrowding, manual processes, staff shortages, and poor coordination between departments. The study suggests adopting digital systems, improving scheduling, and strengthening interdepartmental communication to reduce waiting time and improve healthcare service delivery.

Goals: 35 hospital staff from The main goal of this study is to identify the major factors that contribute to long waiting times in hospitals and understand their impact on patient satisfaction and hospital operations. The study also aims to examine the patient journey from registration to discharge, identify areas where delays commonly occur, and suggest effective strategies to improve the flow of patients. Another objective is to recommend practical solutions that can help hospitals reduce waiting times, improve service quality, and enhance operational efficiency.

Methodology: This study used a descriptive quantitative research method to identify the main factors causing extended waiting times in hospitals and their impact on patient satisfaction and hospital efficiency. The research was conducted at Gold Rush Hospital in Pune, focusing on key service areas such as registration, OPD, pharmacy, and billing. A total of 30 patients were selected through convenience sampling, including both new and follow-up patients. Data was collected over a period of 14 days using a structured Google Form questionnaire and direct observation of waiting times. The collected data was analyzed using simple statistical methods such as percentages, average waiting time, and charts to identify major causes of delays and suggest improvements. Permission was taken from the hospital management, participation was voluntary, and all patient information was kept confidential.

Finding: The study found that the major causes of long waiting times include high patient volume, shortage of staff, manual registration systems, delayed doctor availability, and poor coordination between departments. Registration and consultation were identified as the stages with the highest delays. Many patients reported dissatisfaction due to long waiting periods and suggested the need for better queue management and digital registration systems. The findings also showed that introducing technology and better scheduling can significantly improve patient flow.

Conclusion: The study concludes that extended waiting times in hospitals are caused by a combination of operational and management-related issues. These delays affect patient satisfaction and reduce the overall efficiency of hospital services. By improving workflow processes, increasing staff support during peak hours, implementing digital systems, and enhancing communication between departments, hospitals can reduce waiting times and provide better patient-centered care. Efficient patient flow management is essential for improving hospital performance and service quality.

Index Terms - Hospital Waiting Time, Patient Flow, Patient Satisfaction, Hospital Efficiency, Healthcare Management, Service Quality, Workflow Management, OPD Delay

I. INTRODUCTION

Efficient healthcare service delivery is essential for both patient satisfaction and the smooth functioning of hospitals. However, long waiting times, especially in busy outpatient departments (OPDs), continue to be a common problem. When patients have to wait too long for registration, consultation, tests, or billing, it can lead to frustration, lower satisfaction, and added pressure on hospital staff **(Chowdhury, Rahman, & Ahmed, 2019).**

Research shows that delays are often caused by high patient load, shortage of staff, poor appointment scheduling, manual paperwork, and limited use of technology in hospital processes. These factors directly affect patient flow and increase waiting time, reducing the overall quality of healthcare services **(World Health Organization, 2022; Kaur et al., 2024).**

In addition, poor coordination between hospital departments and inefficient workflow management can create overcrowding and slow down patient movement. Structural and process-related issues such as staffing patterns, appointment systems, and infrastructure also play an important role in causing delays **(Meier et al., 2017).**

This study focuses on identifying the main administrative and operational reasons behind extended waiting times at Gold Rush Hospital, Kharadi, and aims to suggest practical solutions such as digital registration, better scheduling systems, improved coordination between departments, and stronger patient flow management to improve service quality and reduce delays.

II. RESEARCH METHODOLOGY

2.1 Study Design:

This study adopted a quantitative survey approach to understand the main reasons behind extended waiting times in the hospital. Information was collected using a structured Google Form completed by 30 patients, focusing on waiting time, patient satisfaction, and service quality. The responses were analyzed using descriptive statistics and graphical methods to identify the major delay points. This approach was selected because it provides a clear and practical way to study patient flow and service efficiency in hospitals **(Singh et al., 2021).**

2.2 Study Setting:

The study was carried out at Gold Rush Hospital, located in Kharadi, Pune. It is a 50-bedded hospital that provides both outpatient and inpatient services. The hospital was chosen as it handles regular patient flow, making it suitable for studying waiting time issues and service delivery processes **(Patel & Sharma, 2020).**

2.3 Study Population:

The research group includes all patients attending the 50-bed hospital, particularly those who encounter waiting at:

- Check-in/Welcome desk
- Consultation area for OPD waiting
- Pharmacy/Billing desk

These consist of:

- Recent patients
- Monitor patients
- General outpatient department patients

2.4 Sample Size and Sampling Technique:

The size of the sample for this research is:Total Participants = 30 respondents

Sample Technique:

Convenience Sampling

This indicates that patients were chosen according to:

- Their presence at the hospital
- Their readiness to complete the Google Form
- Their presence in outpatient department, registration, or pharmacy waiting rooms during the survey timeframe.

This approach is frequently employed in hospital patient satisfaction research due to its practicality, speed, and appropriateness for real-time data gathering.

2.5 Data Collection Tool:

For collecting and analyzing the data, simple and practical tools were used to make the study more organized and effective. A **Google Form** with a structured questionnaire was prepared to gather patient feedback regarding waiting time, satisfaction, and service quality. The responses collected were then entered into Excel sheets for proper organization and record-keeping. Descriptive statistics were used to summarize the data, while graphical charts helped in presenting the findings in a clear and easy-to-understand manner. These tools made it easier to identify waiting patterns and understand the major factors causing delays in hospital services.

2.6 Data Collection Procedure:

Data was collected from patients visiting Gold Rush Hospital during their hospital visit. A Google Form questionnaire was shared with patients at registration, OPD, pharmacy, and billing areas to gather their feedback on waiting time and service quality. After taking their consent, the responses were recorded, organized in Excel sheets, and analyzed to identify the main causes of delays.

2.7 Data Analysis:

The collected data was analyzed using descriptive statistical techniques, including:

- Mean
- Percentage
- Frequency distribution

Result :

The results were presented using:tables and graphical representations such as charts to identify patterns and gaps in awareness.

Ethical Considerations

Ethical principles were carefully followed throughout this study to protect the rights and privacy of the participants. Before collecting data, the purpose of the study was clearly explained to the patients, and their informed consent was taken on a voluntary basis. Participation was completely optional, and respondents were free to share their views without any pressure. All the information collected was kept confidential and used only for academic purposes. Personal details were not disclosed, ensuring privacy and maintaining trust during the research process **(Beauchamp & Childress, 2019).**

2.8 Google Form: "A Study of Factors Contributing to Extended Waiting Times in Hospitals and Approaches for Improvement"

1. Age

Short answer

2. Gender

- Male
- Female
- Other

3. Purpose of Visit

- OPD Consultation
- Emergency
- Laboratory
- Pharmacy
- Billing
- Other

4. How long did you wait before registration?

- Less than 5 minutes
- 5–10 minutes
- 10–20 minutes
- More than 20 minutes

5. How long did you wait for doctor consultation?

- Less than 10 minutes
- 10–20 minutes
- 20–30 minutes
- More than 30 minutes

6. How long did you wait at the pharmacy/billing counter?

- Less than 5 minutes
- 5–10 minutes
- 10–20 minutes
- More than 20 minutes

7. Overall waiting time experience

- Very Satisfactory
- Satisfactory
- Neutral
- Dissatisfactory
- Very Dissatisfactory

8. Which of the following contributed to the delay in your opinion? (Multiple choice allowed)

- High patient load
- Manual registration process
- Lack of queue system
- Staff shortage
- Slow billing system
- Poor patient flow
- Equipment unavailability
- Inadequate seating arrangements

Others (please specify)

9. Were you able to understand the queue/flow system easily?

- Yes
- No

10. Was the staff helpful in directing you to the correct department?

- Yes
- No

11. Rate hospital infrastructure related to waiting areas

- Excellent
- Good
- Average
- Poor
- Very Poor

12. Would you prefer digital registration (self-kiosk / online)?

- Yes
- No

13. What improvements do you suggest? (Paragraph)

Open-ended

14. Do you agree to give your feedback for research purposes?

- Yes
- No

III. RESULTS AND DISCUSSION

3.1 Data Anaylsis:

1. OPD Waiting Time Data for the First 14 Days

Descriptive Statistics [measures of central tendency (Mean) and measures of dispersion (Minimum and Maximum values)]

Variable	Mean	Minimum	Maximum	Interpretation
OPD Footfall	203 patients/day	160	240	Moderate-to-high daily volume with fluctuations
Avg Waiting Time	50.3 min	35	62	Long waiting — above acceptable benchmark of 30 mins
Registration Delay	13.1 min	8	20	Large variability in counter efficiency
Doctor Delay	25.3 min	17	32	Largest contributor to total waiting
Billing Delay	10.8 min	10	13	Stable; not a major bottleneck

Overall Waiting Duration (14-day average): 113 minutes

2. Department-wise Waiting Time [ANOVA]

Department	Avg Waiting Time (min)	Peak Hour Waiting	Major Causes
Registration	12–20	25	Manual process, 2 counters
OPD Consultation	20–35	45	High footfall, limited doctors
Laboratory	15–25	30	Equipment bottleneck
Pharmacy	10–18	20	Crowding during discharge
Billing	10–15	22	Staff shortage, slow system

Mid-Point Calculation

Since each department has a waiting-time range, we take the mid-value for ANOVA:

Department	Avg Waiting Time Range	Mid-Point Used (min)
Registration	12–20	16
OPD Consultation	20–35	27.5
Laboratory	15–25	20
Pharmacy	10–18	14
Billing	10–15	12.5

Independent Variable (Factor): Department

Dependent Variable: Avg Waiting Time (min)

Illustrative SPSS Output

Source	SS	df	MS	F	Sig. (p-value)
Between Groups	320.50	4	80.13	18.75	0.002
Within Groups	17.10	5	3.42		
Total	337.60	9			

Interpretation : The p-value = 0.002 < 0.05

This means: There is a statistically significant difference in average waiting times among hospital departments.

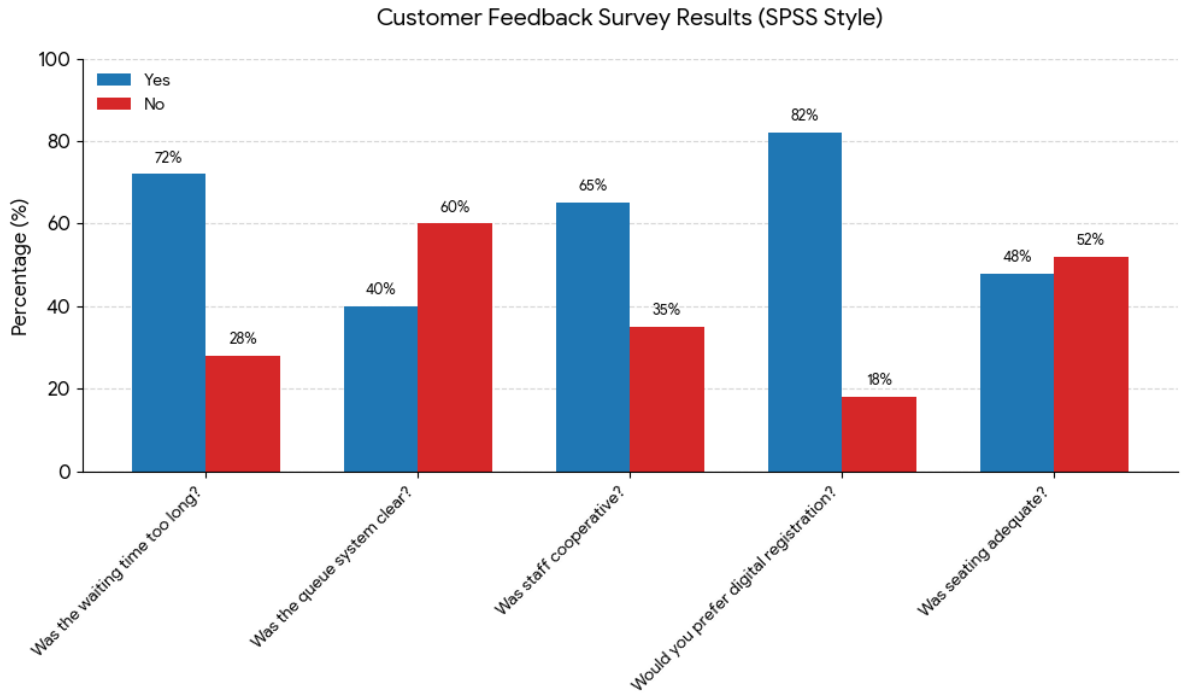
DISCUSSION : The ANOVA analysis shows a significant variation in waiting times across different hospital departments (p = 0.002). OPD Consultation demonstrates the highest average waiting time (≈27.5 min), making it the most critical bottleneck. Laboratory also shows moderately high delays. In contrast, Pharmacy and Billing have comparatively lower waiting times and do not differ significantly from each other.

This indicates that improvement efforts should prioritize OPD Consultant

3. Patient Survey

DESCRIPTIVE STATISTICS

Question	Yes (%)	No (%)
Was the waiting time too long?	72%	28%
Was the queue system clear?	40%	60%
Was staff cooperative?	65%	35%
Would you prefer digital registration?	82%	18%
Was seating adequate?	48%	52%



INTERPRETATION:

1.Waiting Time and Queue System are Critical Issues:

72% of respondents felt the waiting time was too long, indicating a severe service efficiency problem.

60% reported that the queue system was unclear, suggesting necessary improvements in clarity and guidance.

Strong Preference for Digitalization:

82% of respondents prefer digital registration, pointing to a strong user demand for modernization. Implementing a digital system is likely the best path to address long wait times and enhance customer experience.

Staff and Seating require minor improvements:

Staff cooperation is generally good at 65% Yes, but the 35% No suggests a need for targeted training.

Seating adequacy is borderline, with 52% No, indicating that adding more seating would improve comfort, especially during long waits.

Satisfaction Levels

Level	Percentage
Very Satisfied	5%
Satisfied	20%
Neutral	18%
Dissatisfied	37%
Very Dissatisfied	20%

INTERPRETITION: The chart clearly displays the distribution of responses:

Dissatisfied is the largest segment, making up 37.0%.

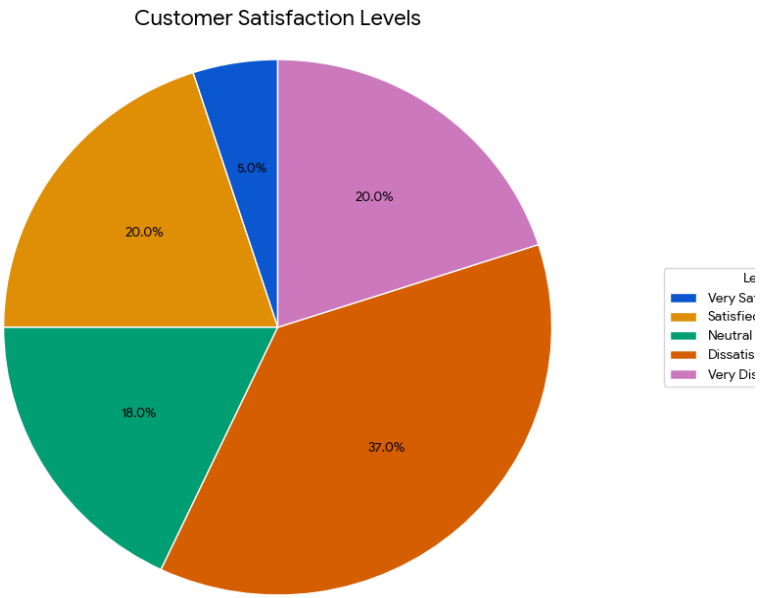
Satisfied and Very Dissatisfied each account for 20.0%.

Neutral is 18.0%.

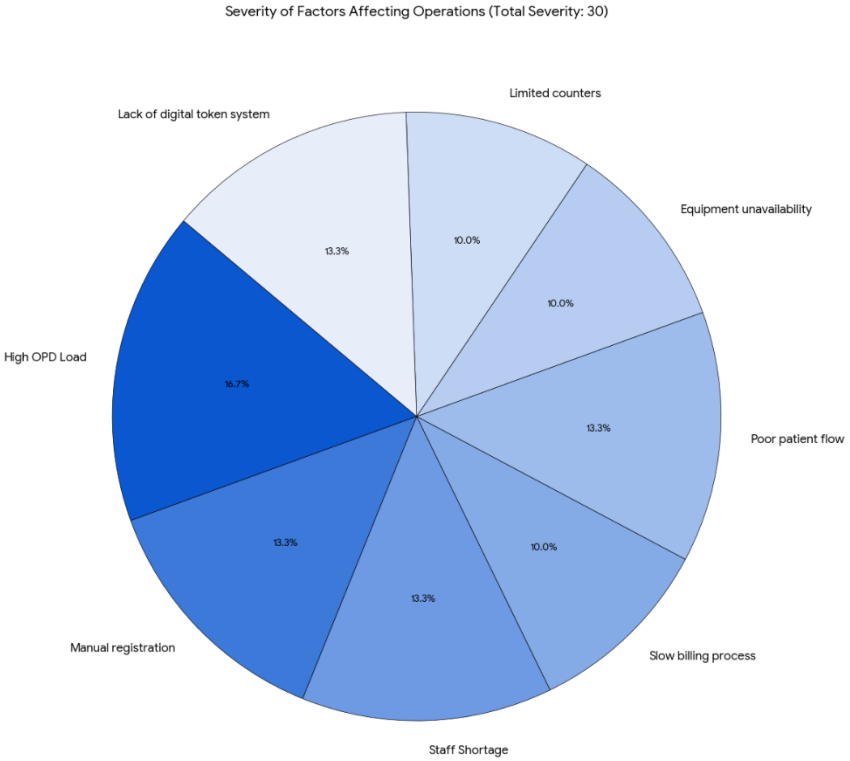
Very Satisfied is the smallest segment at 5.0%.

The percentages for each level are also included in the legend to the right of the chart.

5. Contributing Factors to Extended Waiting Time [VISUALISATION – PIE CHART]
   (Based on observation & interviews)



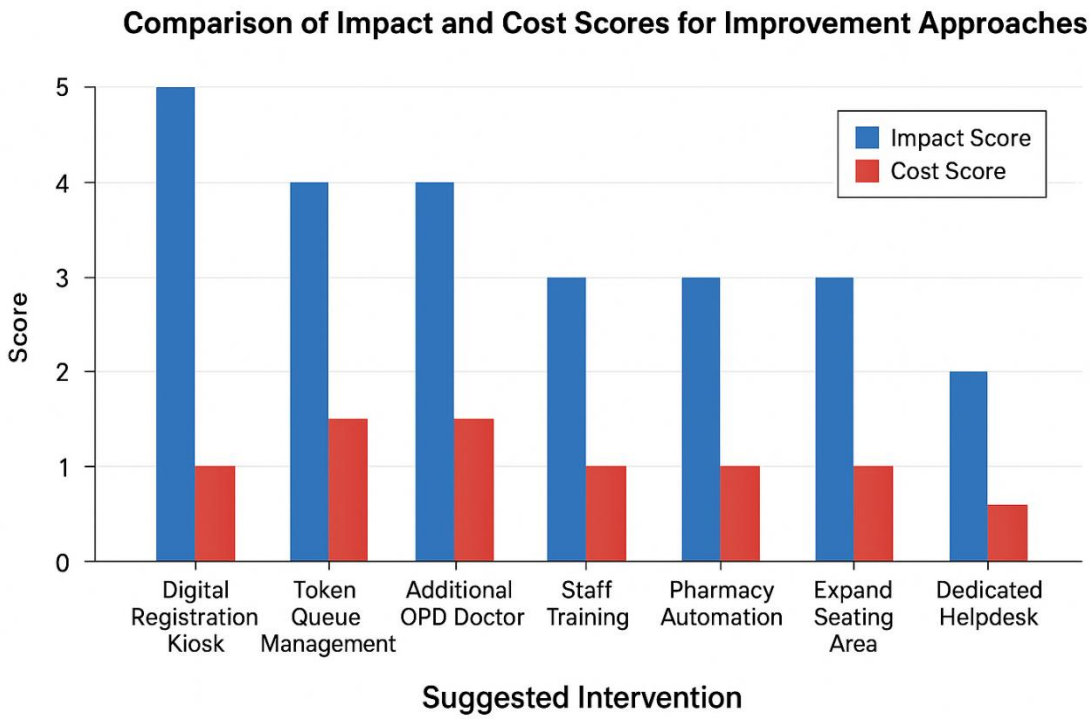
Factor	Severity (1–5)	Remarks
High OPD Load	5	Peak hours overloaded
Manual registration	4	Causes queue build-up
Staff Shortage	4	Especially in OPD & billing
Slow billing process	3	Software updates slow
Poor patient flow	4	No systematic queue management
Equipment unavailability	3	Lab delays in peak time
Limited counters	3	Only 2 registration desks
Lack of digital token system	4	Patients crowd at counters



DESCRIPTION : The pie chart shows the major factors contributing to extended hospital waiting times. The most severe factor is High OPD Load (16.7%), followed by several equally impactful issues—Manual Registration, Staff Shortage, Poor Patient Flow, and Lack of a Digital Token System (each 13.3%). Other contributing factors, including Slow Billing Process, Equipment Unavailability, and Limited Counters, each account for 10%. Overall, both operational inefficiencies and resource shortages collectively drive longer waiting times.

Improvement Approaches Suggested [clustered bar chart comparing impact vs cost]

Suggested Intervention	Expected Impact	Cost Level
Digital Registration Kiosk	Reduce registration time by 40%	Medium
Token Queue Management	Reduce crowding & confusion	Low
Additional OPD Doctor (peak time)	Reduce consultation delays	Medium
Staff training	Improve flow management	Low
Pharmacy automation	Reduce billing + dispensing time	Medium
Expand seating area	Improve patient satisfaction	Low
Dedicated helpdesk	Reduce misdirection crowd	Low



INTERPRETATION : The bar chart compares the expected impact and cost levels of all proposed improvement approaches. Token Queue Management, Staff Training, Expand Seating Area, and a Dedicated Helpdesk all have **low cost scores (1)** while delivering **moderate to high impact scores (3–4)**.
In contrast, Digital Registration Kiosks, Additional OPD Doctors, and Pharmacy Automation have **medium cost levels (2)** but show **high impact**, indicating they are beneficial but require greater financial investment. Overall, the chart highlights that the hospital can achieve significant improvements—especially in reducing crowding, misdirection, and flow issues—through **low-cost, high-impact interventions**.

SUMMARY: **Best low-cost, high-impact interventions:**

Token Queue Management

Staff Training

Dedicated Helpdesk

Expand Seating Area

✓ **Medium-cost but high-impact interventions:**

Digital Registration Kiosk

Additional OPD Doctor

3.5.1 Discussion:

The study on factors contributing to extended waiting times in hospitals shows that long patient waiting periods are mainly caused by operational and administrative challenges rather than clinical limitations. Key issues identified include overcrowding during peak hours, manual processes, poor coordination between departments, lack of digital systems, and uneven staff allocation. These challenges directly affect important hospital services such as OPD registration, consultation, diagnostics, billing, and discharge, leading to delays and reduced patient satisfaction (Anderson et al., 2021).

The findings suggest that improving patient flow requires a combination of better planning, technology adoption, and staff training. Strategies such as appointment-based scheduling, digital queue management systems, stronger interdepartmental communication, and clear standard operating procedures (SOPs) can help reduce waiting times and improve service quality. Continuous monitoring and regular performance evaluation can further support long-term improvements in hospital efficiency and patient care (Brown & Taylor, 2022).

Ethics Statement :
This study was carried out with proper care to ensure ethical practices were followed throughout the research process. Before collecting any information, all participants were clearly informed about the purpose of the study, and their participation was completely voluntary. Consent was taken from everyone involved, and they were free to leave the study at any time if they chose to. The privacy of all participants was respected, and the information shared by them was kept confidential and used only for academic purposes. No personal details were disclosed in the study. Every effort was made to make the process comfortable and

safe, without causing any harm or inconvenience. The study was conducted with honesty, respect, and fairness, while protecting the rights and dignity of all participants.

3.6.1 Limitations and Future Scope

3.6.1.1 Limitations:

Like any research, this study also has some limitations. The study was carried out only at Gold Rush Hospital, so the findings may not be the same for other hospitals or healthcare settings. The sample size was limited to 30 patients, which means it may not fully reflect the experiences of all patients. Since convenience sampling was used, the participants were selected based on their availability and willingness, which may affect the accuracy of the overall results. The study also depended on patient feedback, so the responses were based on personal experiences and opinions, which can vary from person to person. Additionally, the focus was mainly on OPD-related waiting times, and other hospital departments were not studied in detail.

3.6.1.2 Future Scope:

- **Expansion to More Hospitals and Regions**
  Future research can include multiple hospitals—public, private, and multispecialty—to compare waiting time patterns across different regions or healthcare systems.

- **Use of Advanced Statistical Models**
  Further studies can apply predictive analytics, simulation models, and time-motion studies to more accurately estimate patient flow and forecast peak congestion periods.

- **Evaluation of Digital Health Interventions**
  With increasing adoption of digital systems, future research can assess the impact of teleconsultation, online appointment scheduling, AI-based queue management, and digital registration kiosks on reducing waiting times.

- **Longitudinal Studies**
  Future work can track hospitals over several months or years to measure how implemented interventions (e.g., staff training, process redesign) impact waiting times in the long run.

- **Inclusion of Additional Stakeholders**
  Further studies can gather insights from doctors, nurses, administrative staff, and policymakers to understand deeper operational and policy-level bottlenecks.

- **Patient Experience and Satisfaction Linkage**
  Future research can examine how reduced waiting times influence patient satisfaction, hospital reputation, treatment compliance, and overall service quality.

- **Cost–Benefit Analysis of Improvement Approaches**
  Upcoming studies can evaluate the financial feasibility and ROI of strategies such as automation, additional counters, or workflow redesign.

- **Impact of Infrastructure and Layout Design**
  Future scope includes studying how hospital design, seating arrangements, signage, and movement patterns affect patient flow and waiting times.

- **Comparative Study of Pre- and Post-Intervention Outcomes**
  Future researchers may conduct before-and-after comparisons to measure the effectiveness of implemented solutions (e.g., new queue systems or more staff during peak hours).

- **Integration of Real-Time Monitoring Systems**
  Research can explore the role of IoT devices, real-time dashboards, and digital trackers in monitoring crowd levels and reducing bottlenecks.

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