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Impact of a Structured Triage and Patient Flow Intervention on Outpatient Waiting Time in a Secondary Care Hospital in Sri Lanka: A Quasi-Experimental Quality Improvement Study

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ABSTRACT

Background: Patient waiting time is a key indicator of healthcare quality, service efficiency, accessibility, and patient satisfaction. Excessive waiting time contributes to patient dissatisfaction, overcrowding, inefficient resource utilisation, and reduced effectiveness of healthcare delivery. Secondary care hospitals frequently experience high patient volumes, making optimisation of outpatient services an important management priority. ***Objective:*** To assess outpatient waiting time and evaluate the effectiveness of a structured patient triage and flow-management intervention in a secondary care hospital in Sri Lanka. ***Methods:*** A quasi-experimental quality improvement study was conducted in three phases using mixed methods. Phase I involved assessment of baseline outpatient processes through patient time-record forms, key informant interviews, focus group discussions, direct observations, and document review. Phase II consisted of the development and implementation of a structured triage and patient-flow intervention. Phase III evaluated post-intervention outcomes using identical study instruments. Quantitative data were analysed using descriptive and comparative statistics, while qualitative findings underwent thematic analysis. ***Results:*** A total of 249 participants were analysed during the baseline phase and 267 participants during the post-intervention phase. Baseline mean consultation time, pharmacy dispensing time, total outpatient department (OPD) time, and queue waiting time were 3.41, 2.34, 30.95, and 25.20 minutes, respectively. Following implementation of the intervention, consultation time increased to 5.44 minutes, pharmacy dispensing time decreased to 2.05 minutes, total OPD time reduced to 23.06 minutes, and queue waiting time decreased to 19.02 minutes. The intervention resulted in a 25.5% reduction in total OPD time and a 24.5% reduction in queue waiting time while increasing clinician consultation time by 59.5%. ***Conclusion:*** Implementation of a structured patient triage and flow-management system significantly improved OPD efficiency while enhancing clinician–patient interaction time. Low-cost organisational interventions can substantially improve healthcare quality, patient experience, and operational performance in secondary care hospitals.

Keywords: outpatient department; waiting time; patient flow; triage system; quality improvement; secondary care hospital; Sri Lanka

1. INTRODUCTION

The Outpatient Department (OPD) serves as the principal gateway to healthcare services and is often regarded as a critical indicator of hospital performance. Efficient outpatient services contribute significantly to healthcare accessibility, continuity of care, resource utilisation, and patient satisfaction [1,2]. Patient waiting time is internationally recognised as an important healthcare quality indicator and reflects the responsiveness and effectiveness of healthcare delivery systems [3]. Long waiting times are associated with patient dissatisfaction, increased anxiety, overcrowding, inefficient resource utilisation, and reduced confidence in healthcare services [2,4]. Consequently, reducing waiting time has become a major objective of hospital quality improvement programmes worldwide.

According to Donabedian's framework, healthcare quality can be assessed through structure, process, and outcome measures, with waiting time representing a critical process indicator that directly influences healthcare outcomes and patient satisfaction [5]. Similarly, Lean Healthcare principles emphasise elimination of non-value-added activities, including unnecessary waiting, duplication of processes, and inefficient patient movement [6,7]. Secondary care hospitals in Sri Lanka often experience increasing patient demand

amid limited infrastructure and workforce constraints. OPDs in such settings commonly manage consultations, emergency referrals, admissions, minor procedures, investigations, counselling services, and pharmacy dispensing functions within a single service environment. These factors may contribute to congestion and prolonged waiting times.

Previous studies have demonstrated that structured triage systems, patient-flow redesign, queue-management strategies, and process optimisation interventions can significantly reduce waiting times and improve healthcare efficiency (8–11). However, evidence regarding OPD waiting times and effective service redesign interventions within Sri Lankan secondary care hospitals remains limited. Therefore, this study was undertaken to assess patient waiting time, identify factors contributing to service delays, and evaluate the effectiveness of a structured patient triage and flow-management intervention.

OBJECTIVES

General Objective: To evaluate outpatient waiting time and assess the effectiveness of a structured patient triage and flow-management intervention in a secondary care hospital in Sri Lanka.

Specific Objectives

1. To determine the average consultation time in the OPD.
2. To determine the average pharmacy dispensing time.
3. To calculate the total patient waiting time within the OPD.
4. To identify factors contributing to delays in patient flow.
5. To implement a structured patient triage and flow-management intervention.
6. To evaluate changes in OPD performance following implementation.

CONCEPTUAL FRAMEWORK

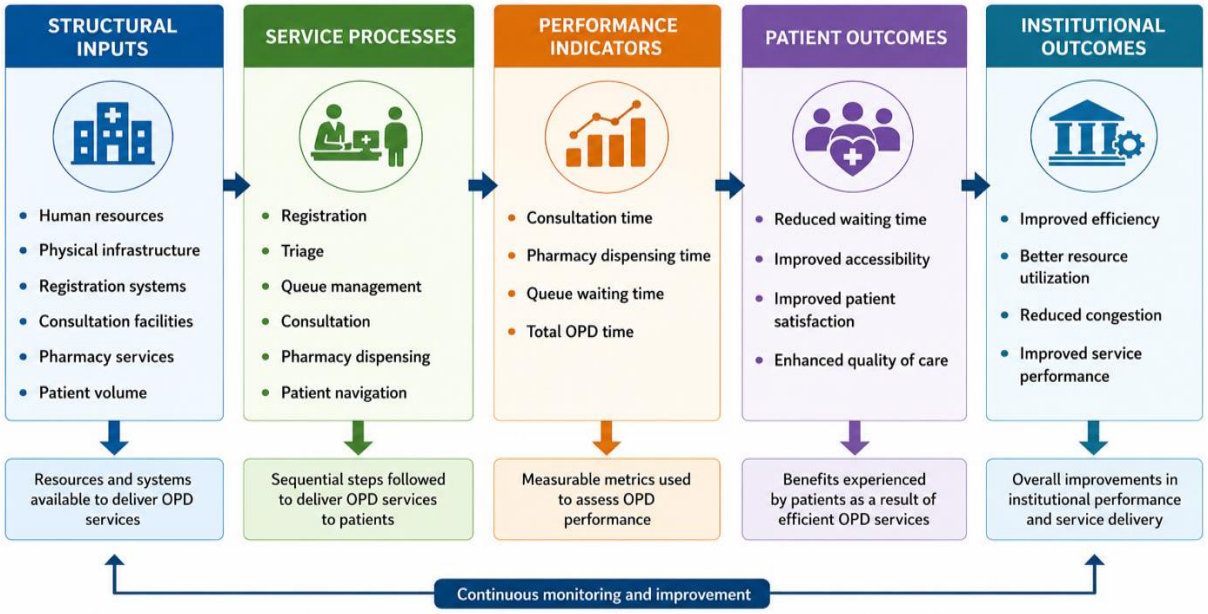

FIGURE 1: Conceptual Framework of the Patient Triage and Flow-Management Intervention Based on Donabedian's Quality Assessment Model.

METHODOLOGY

Study Design: A quasi-experimental before-and-after quality improvement study utilising mixed quantitative and qualitative methods.

Study Setting: The study was conducted in the Outpatient Department of a secondary care hospital in Sri Lanka.

Study Population: Patients attending the OPD during the study period who voluntarily consented to participate.

STUDY PHASES

Phase I: Baseline Assessment

Baseline assessment was conducted to identify existing patient-flow patterns, waiting-time components, service bottlenecks, and operational gaps.

Quantitative data were collected using patient time-record forms documenting:

- Time of arrival
- Time of registration
- Time of consultation
- Time of obtaining medicines
- Time of departure

Qualitative data were collected through:

- Key informant interviews
- Focus group discussions
- Direct observations
- Document review

Phase II: Intervention Development and Implementation

Following analysis of baseline findings, a structured patient triage and flow-management intervention was developed collaboratively with hospital administrators, medical officers, nursing officers, pharmacists, and support staff.

Key components included:

- Establishment of a triage point
- Early identification of priority cases
- Streamlined registration
- Directed patient movement pathways
- Queue management mechanisms
- Improved communication among staff
- Strengthened coordination between consultation and pharmacy services

Phase III: Post-Intervention Evaluation

The same methodology and instruments used during Phase I were employed to assess post-intervention outcomes.

Sample Size

Baseline Phase

- Participants recruited: 270
- Complete responses: 249
- Response rate: 92.2%

Post-Intervention Phase

- Participants recruited: 270
- Complete responses: 267
- Response rate: 98.8%

Total participants analysed: 516.

Data Analysis: Quantitative data were analysed using SPSS version 23, and qualitative data were transcribed, coded, and analysed using thematic content analysis.

Ethical Considerations: Ethical approval and institutional administrative approval were obtained before commencement of the study. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

RESULTS

Baseline OPD Performance

TABLE 1: Baseline OPD Time Indicators.

Indicator	Mean Time (Minutes)
Consultation time	3.41
Pharmacy dispensing time	2.34
Total OPD time	30.95
Queue waiting time	25.20

The mean total OPD time was 30.95 minutes, of which approximately 81.4% was attributable to waiting and administrative processes.

Post-Intervention OPD Performance

TABLE 2: Post-Intervention OPD Time Indicators.

Indicator	Mean Time (Minutes)
Consultation time	5.44
Pharmacy dispensing time	2.05
Total OPD time	23.06
Queue waiting time	19.02

Following the intervention, mean total OPD time decreased to 23.06 minutes, with a corresponding reduction in queue waiting time to 19.02 minutes.

Comparative Analysis

TABLE 3: Comparison of OPD Time Indicators Before and After Intervention.

Indicator	Baseline	Post-Intervention	Percentage Change
Consultation time	3.41 min	5.44 min	+59.5%
Pharmacy dispensing time	2.34 min	2.05 min	-12.4%
Total OPD time	30.95 min	23.06 min	-25.5%
Queue waiting time	25.20 min	19.02 min	-24.5%

The intervention reduced total OPD time by 25.5% and queue waiting time by 24.5%, while consultation time increased by 59.5%.

DISCUSSION

The findings demonstrate that prolonged waiting time within outpatient settings is primarily attributable to inefficiencies in patient flow rather than consultation or dispensing processes. Prior to intervention, more than four-fifths of patient time within the OPD was consumed by waiting and administrative activities.

Following implementation of the structured triage and patient-flow intervention, total OPD time decreased by 25.5%, while queue waiting time decreased by 24.5%. These improvements are consistent with international evidence demonstrating the effectiveness of triage systems, process redesign, and Lean Healthcare interventions in improving service efficiency [8–11].

An important observation was the increase in consultation time from 3.41 minutes to 5.44 minutes following the intervention. This suggests that

optimisation of patient flow enabled medical officers to devote more time to direct patient care without compromising throughput. Similar findings have been reported in studies evaluating Lean Healthcare interventions and workflow redesign initiatives [6,7].

The intervention required minimal additional financial resources and was largely achieved through organisational restructuring and process improvement. Therefore, the strategy represents a cost-effective approach for improving healthcare quality in resource-constrained settings. From a health systems perspective, the intervention strengthened accessibility, responsiveness, efficiency, and patient-centred care. Improved patient navigation, queue management, and prioritisation mechanisms contributed to better resource utilisation and reduced congestion within the OPD environment.

RECOMMENDATIONS

1. *Institutionalise Structured Triage and Patient Navigation:* Implement permanent triage and patient navigation systems to prioritise patients appropriately, streamline movement through the OPD, and reduce unnecessary delays.
2. *Strengthen Patient Flow Monitoring and Management:* Enhance registration, queue-management, and consultation workflows while integrating routine waiting-time monitoring into hospital quality improvement programmes.
3. *Promote Digital Solutions and Patient-Centred Evaluation:* Introduce electronic patient-flow monitoring systems where feasible and conduct regular patient satisfaction assessments to guide service improvements.
4. *Scale and Sustain Best Practices:* Expand successful OPD interventions to other secondary and tertiary healthcare institutions and support multicentre studies to establish national waiting-time benchmarks.

CONCLUSION

This study demonstrated that implementation of a structured patient triage and flow-management intervention substantially improved outpatient service efficiency. Total OPD time was reduced by 25.5%, while queue waiting time decreased by 24.5%. Simultaneously, consultation time increased by nearly 60%, suggesting improved clinician–patient interaction without compromising operational efficiency. The findings provide evidence that low-cost organisational reforms can significantly improve healthcare quality, patient experience, and institutional performance. Adoption of structured triage and patient-flow management systems should therefore be considered a key strategy for strengthening outpatient services in secondary care hospitals.

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