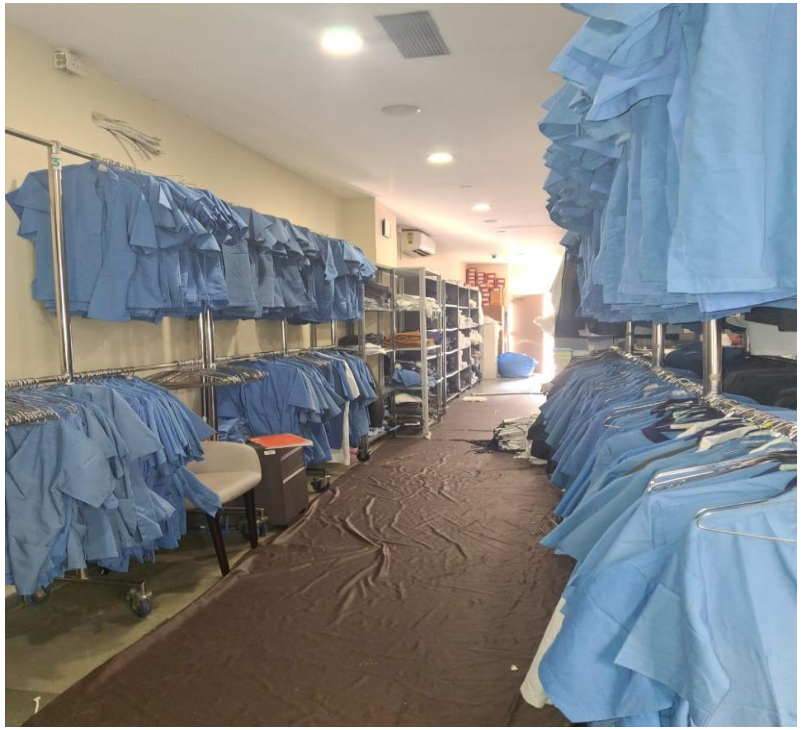
Optimizing Uniform Distribution TAT

Dissertation Report

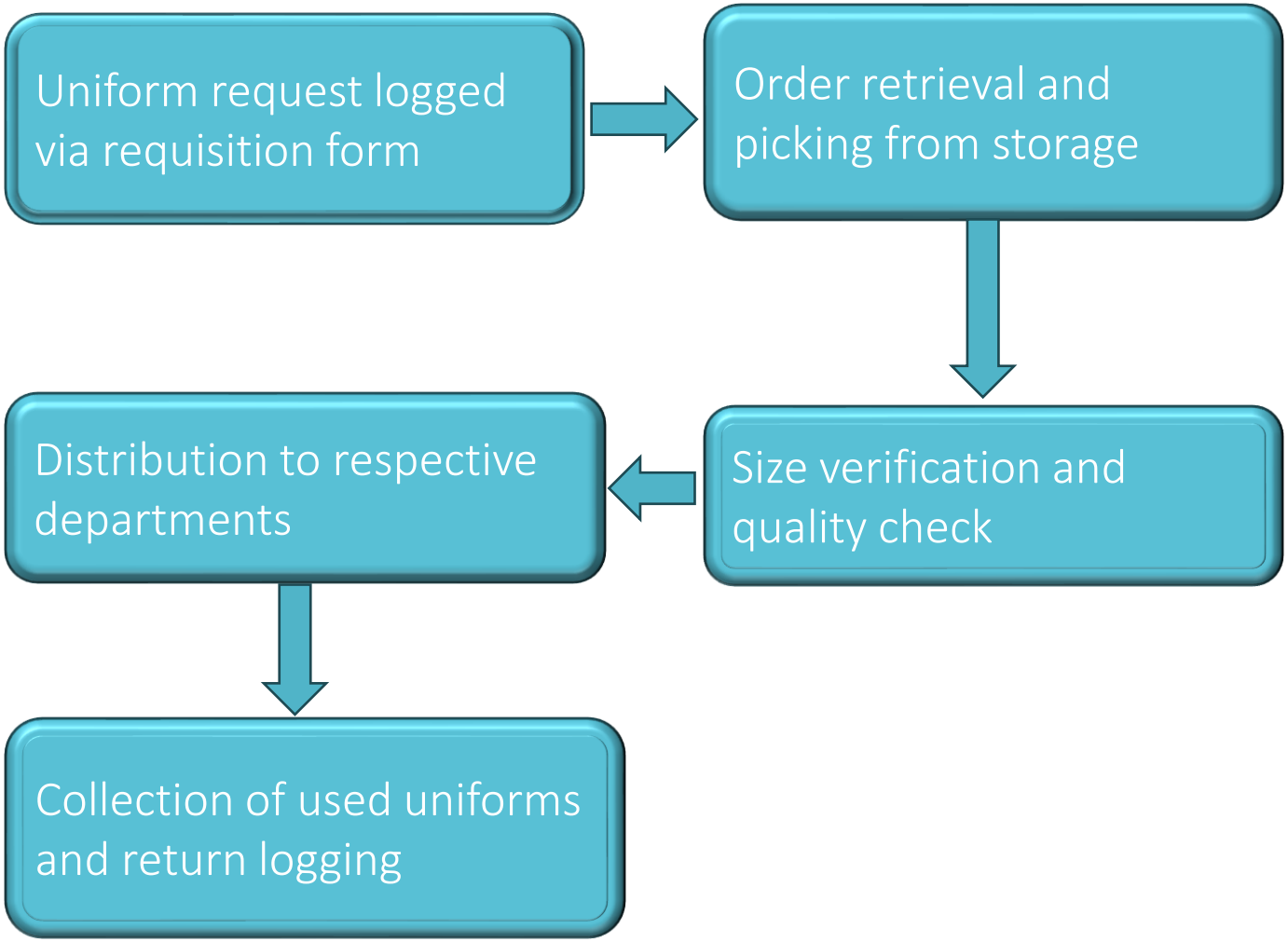
Mahak Yadav | CK Birla Hospital, Jaipur

IIHMR UNIVERSITY

Factors Influencing Turnaround Time in Uniform Distribution and Optimization Strategies in the Linen Department, CK Birla Hospital, Jaipur



Process Flow



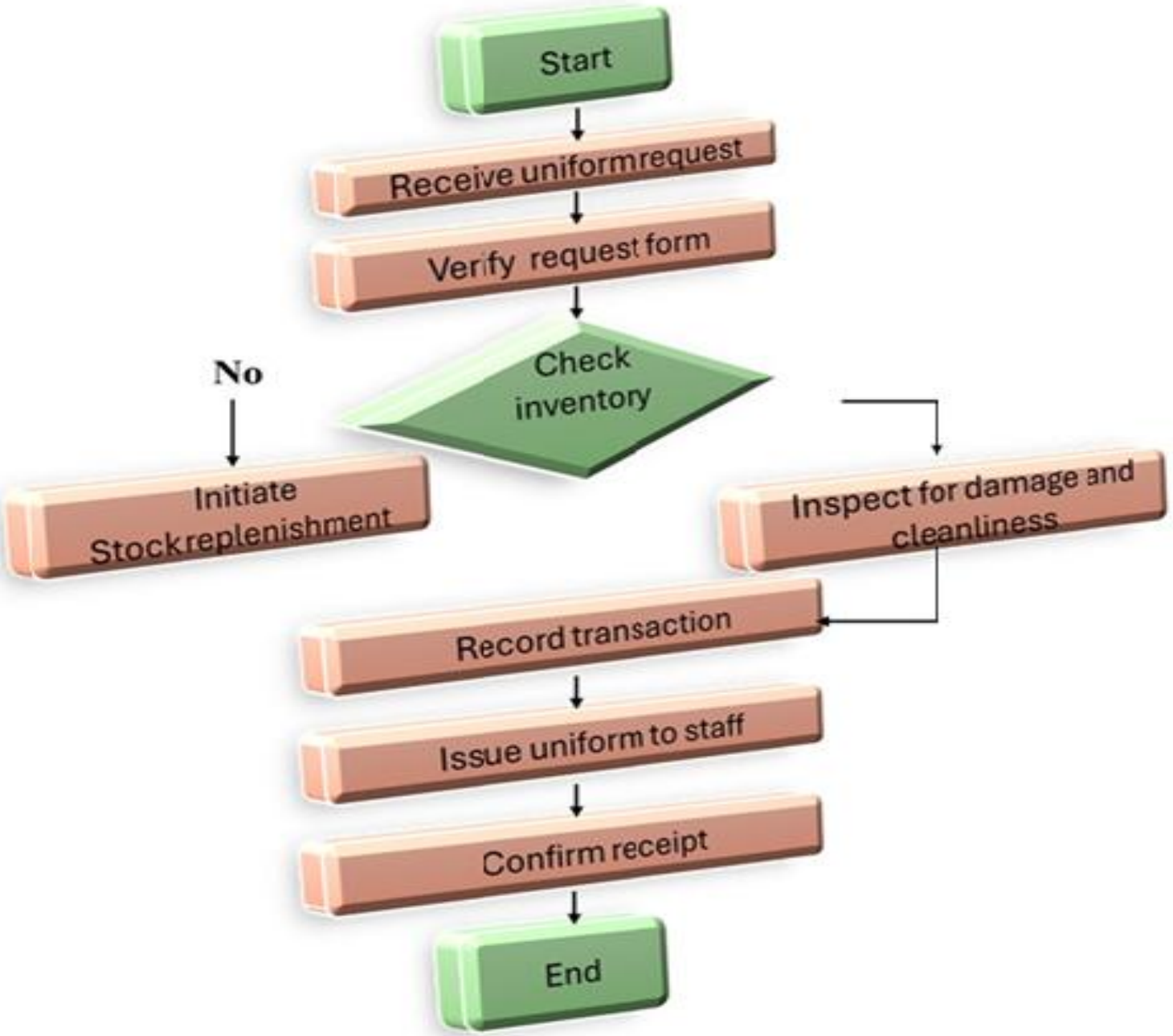
Objective:

This study aimed to

(1) Measure the baseline TAT for individual uniform issuance,

(2) Identify key process gaps contributing to delays and size errors,

(3) Evaluate the impact of lean-based visual control interventions—specifically numeric size tagging and rack re-organization—on TAT and size-mismatch rates.


Start
Receive uniformrequest
Verify request form
Check inventory
No
Initiate Stockreplenishment
Inspect for damage and cleanliness
Record transaction
Issue uniform to staff
Confirm receipt
End

1. Problem Statement & Research Question

- Delays in uniform distribution affecting staff satisfaction
- Size mismatches and inventory errors
- RQ: Factors causing TAT delays and optimization strategies

2. Research Design & Setting

- Mixed-methods: time-motion, interviews, logs
- 230-bed multispecialty hospital, in-house distribution
- Study period: April 1 - May 15, 2025

3. Study Population & Sampling

365 uniform transactions across departments
Purposive sampling: ICU, OT, emergency priority
10 key informant interviews for qualitative insights

4. Data Collection & Variable

- TAT logs, uniform type, size requested vs issued
  Staff feedback, complaint records, SOP review
  Variables: quantitative (TAT metrics), qualitative

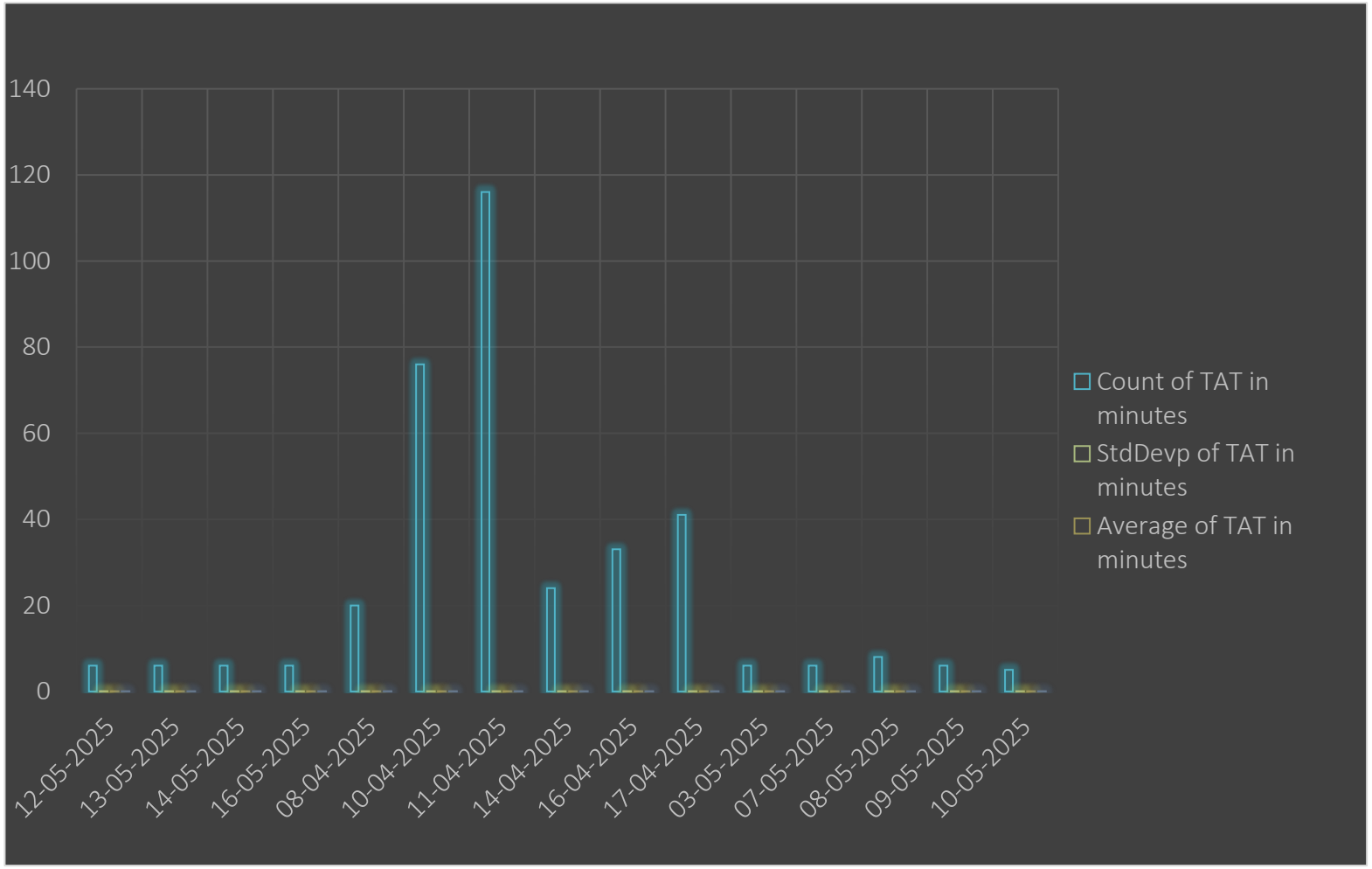
RESULTS

Statistical Analysis

Date	Total Transactions	Avg. TAT	Std Dev	Max TAT
08-Apr-25	20	01:11	00:52	03:00
10-Apr-25	76	01:00	00:36	03:00
11-Apr-25	116	01:16	01:48	19:00
14-Apr-25	24	00:49	00:15	01:00
16-Apr-25	33	00:56	00:55	05:00
17-Apr-25	41	01:32	02:00	13:00

Interpretation: **Dates with high volumes (11-Apr 17-Apr) also recorded the longest TATs, suggesting process strain during high-demand days.**

PIVOT TBLE AND INTERPRETATION



Key Observations:

1. High Volume Days

10-May-2025 (116 transactions) and 11-May-2025 (76 transactions) had the highest counts, indicating peak distribution load.

2. Maximum Delay

Max TAT peaked at 19 minutes on 11-May-2025, significantly higher than other days.

3. Average TAT

Overall average TAT across all dates is 1 minute 13 seconds – relatively short, but spikes on high-load days indicate inefficiencies.

4. Standard Deviation Insight

Higher standard deviation (e.g., 1 min 48 sec on 14-May) shows inconsistent service and lack of uniformity in process efficiency on busy days.

Department-wise TAT Analysis

Department	Avg. TAT	Common Issue Identified
OT	01:45	Uniform exchange, size mismatch
ICU	01:36	Poor communication, improper sizing
IPD	01:12	Size too large, improper measurement
OPD	00:59	Torn aprons, not checked properly
Lab	00:52	Size variation in same label
Pharmacy	01:20	Uniform malfunction, inventory issues
Radiology	01:05	Tight pants, pending alterations
Housekeeping/GDA	01:10	Stock unavailability, worn uniforms

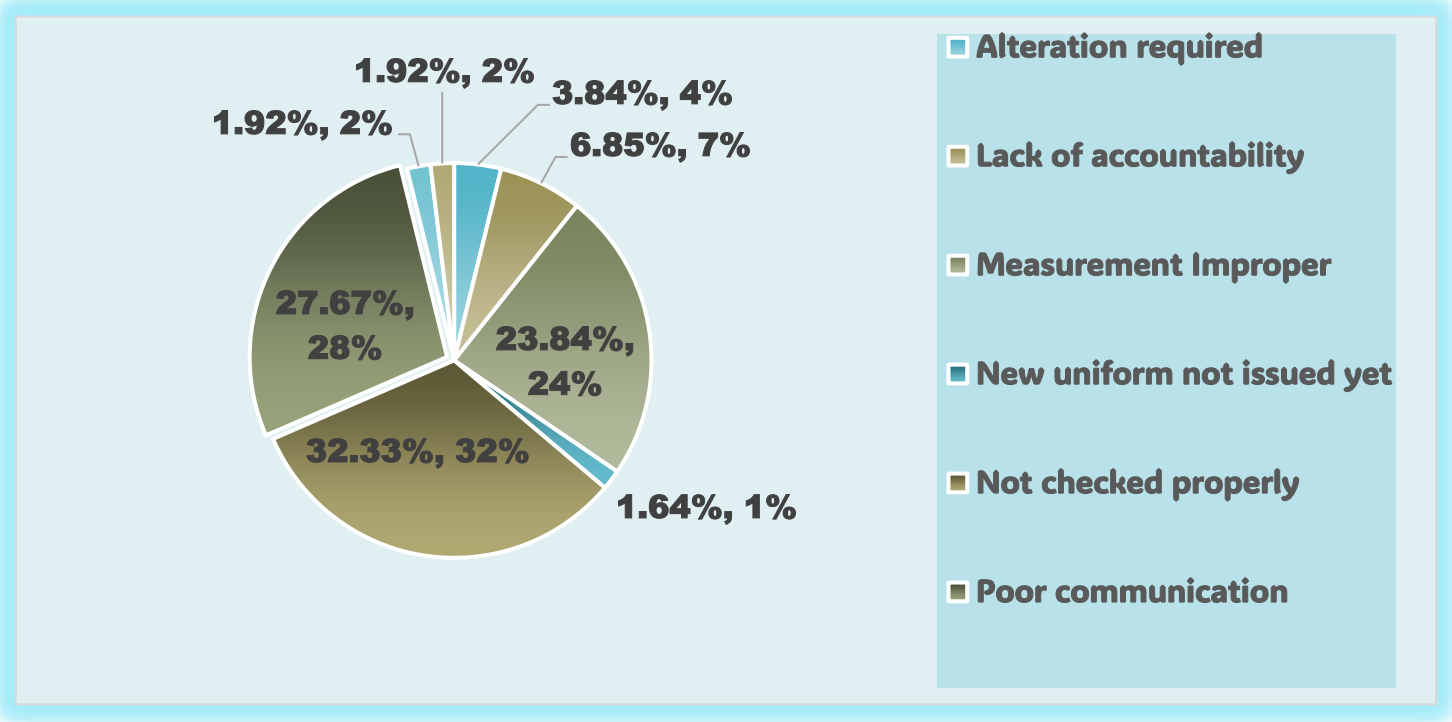
Interpretation: Clinical departments like OT and ICU showed higher TAT, likely due to their larger staff base and critical nature of operations.

Frequency Analysis of Gaps :

Gap Identified	Frequency	Percentage
Not checked properly	118	32%
Poor communication	101	28%
Improper measurement	52	24%

Observation: "Not checked properly" and "Poor communication" together contributed to over 60% of the identified issues.

% of Gaps Identified



Top Issues Identified (with % Share):

1. Not checked properly – 32%

2. Poor communication – 28%

3. Improper Measurement– 24%

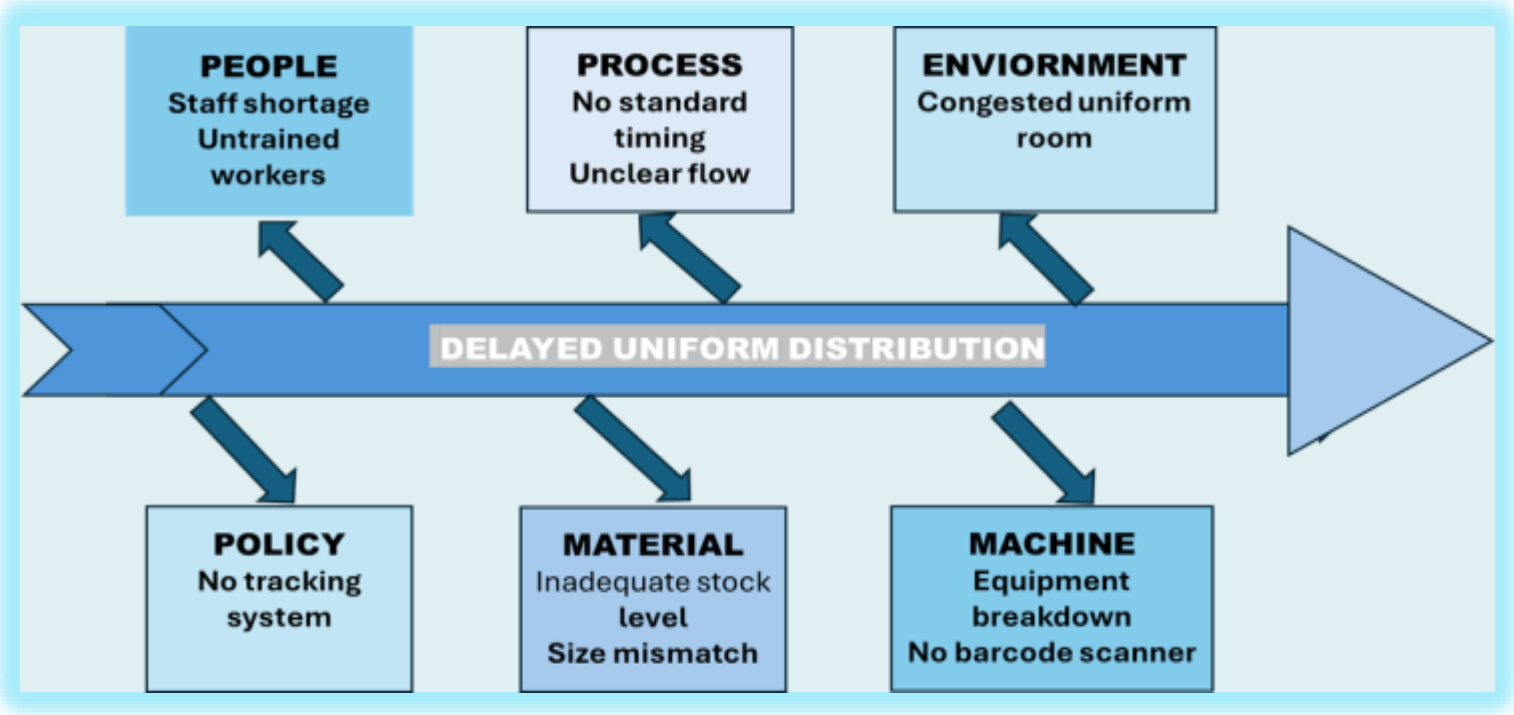
Stepwise Analysis

Process Step	Avg. Time (min)
Request received and logged	00:30
Search for size in storage	00:45
Physical handover and issue	00:25
Complaint/feedback handling (if any)	01:30

Conclusion: Most delays occurred during search and issue phases. Time further increased if stock was disorganized or if the wrong size was issued initially.

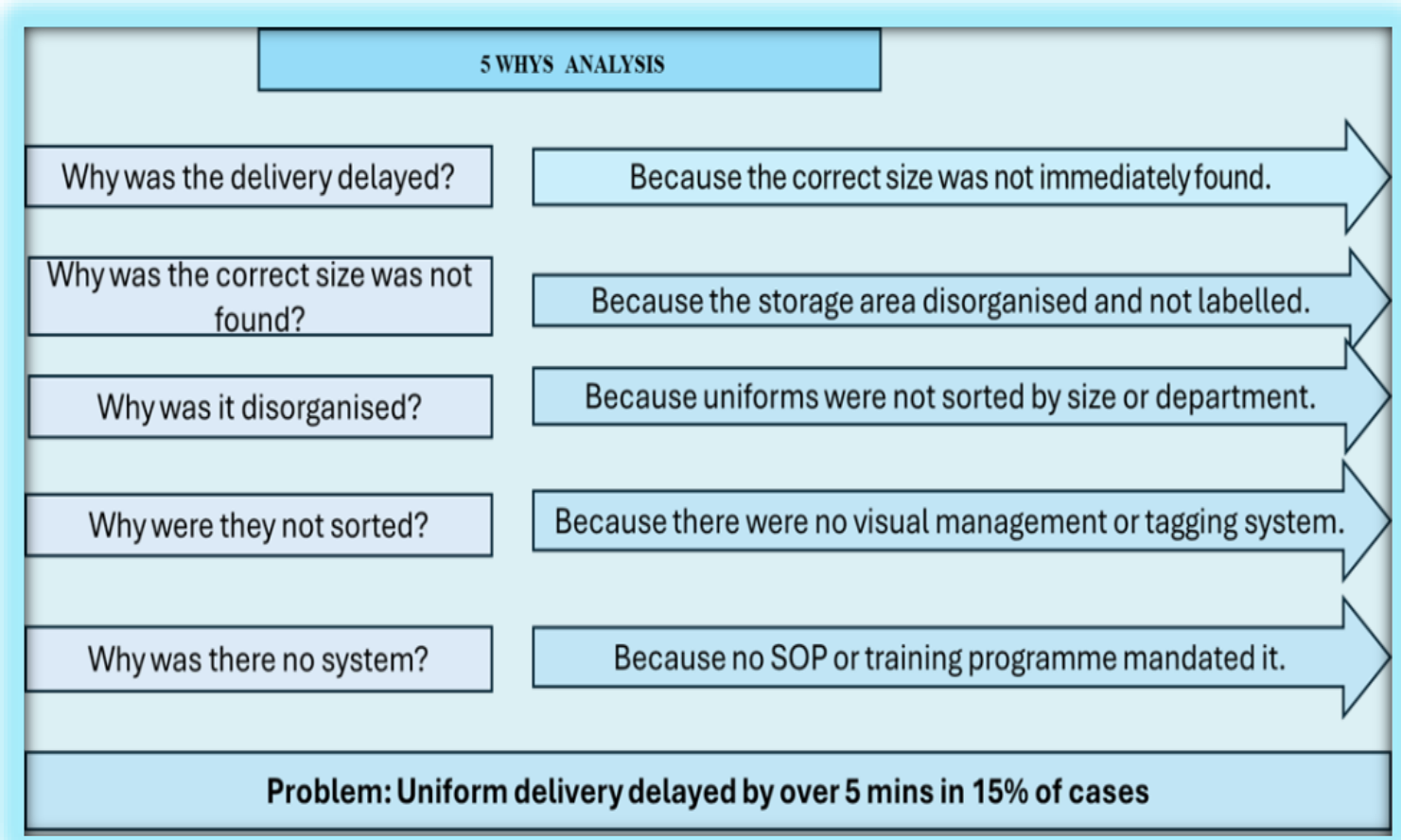
Root Cause Analysis

A Fishbone Diagram (Ishikawa model) was developed to categorize the causes of delay into six domains:



Interpretations and insights: Operational causes (like lack of standard process and poor inventory systems) are as important as physical limitations (like storage space).

5 Whys Analysis



Conclusion: Lack of visual sorting and process standardization caused the delay.

CAUSES FOR DELAY

- **Lack of Standardized Procedures**
No clear SOPs or checklists for size verification and issuance leads to inconsistent handling.
- **Poor Communication Channels**
Reliance on verbal requests causes miscommunication and lost or delayed orders.
- **Disorganized Inventory Layout**
Mixed sizes and unclear labeling in the uniform room significantly extend search and retrieval times.
- **Manual Record-Keeping**
Paper-based logs are prone to missed entries and back-and-forth verification, adding extra processing steps.
- **Insufficient Staffing & Training**
Staff shortages during peak hours and inadequate training on uniform-handling SOPs create bottlenecks.

Recommendations

- Implement visual numeric tags and color-coded shelves

- Develop and train staff on standardized SOPs
- Adopt QR code-based requisition and tracking system
- Schedule periodic audits and real-time stock monitoring
- Conduct regular Lean workshops and RCA sessions

Process-Level Recommendations

- **Implementation of Standard Operating Procedures (SOPs)**
- Develop **comprehensive SOPs** for each stage of uniform handling, including request initiation, measurement, tagging, issuance, return, and logging.
- SOPs should clearly define **acceptable TAT benchmarks**, complaint handling protocols, and roles/responsibilities of staff.
- A periodic **SOP audit** must be conducted quarterly to ensure compliance and identify scope for revision.
- **Daily Workflow Checklists**
- Introduce a **checklist-based verification system** for uniform issuance.
- Include size verification, physical inspection for defects, staff signature post-issuance, and complaint documentation (if any).
- This reduces dependency on memory and ensures that key steps are not skipped under pressure during high-load periods.

Inventory Management Recommendations

- **Visual Tagging and Numeric Sizing System**
- As demonstrated in the study, the introduction of **numeric size tags** (e.g., 32, 34, 36, etc.) and **color-coded visual identifiers** (e.g., blue for OT, red for nursing) improved staff satisfaction and reduced confusion. To expand this:
- Use **laminated numeric cards** on racks, clearly visible from a distance.
- Color-coded symbols for each department streamline identification.
- Label not just size, but also uniform type and gender category (e.g., Scrub-M-34).
- **Real-Time Stock Monitoring**
- Transition from paper registers to **Excel-based inventory monitoring**.
- Implement **weekly stock updates** with column fields for issued, in-stock, returned, altered, or pending items.
- Adopt a **bin card system** to physically tag each rack with stock levels
- **Uniform Replacement Lifecycle**
- Set uniform replacement timelines based on wear-and-tear (e.g., every 6 months or 20 washes).
- Define limits for alterations (e.g., not more than 2 alterations per uniform before discarding).
- Mark altered uniforms with an internal **alteration tag** to avoid repeated adjustments.

Technology-Driven Recommendations

- **QR Code-Based Uniform Requests**
- Design a simple Google Form linked via a QR code for uniform requisitions.
- The form can collect department, name, size required, and time of request.
- This allows for real-time data logging, prevents verbal miscommunication, and helps track high-frequency requesters.
- **Barcode Scanning for Uniforms**
- Assign each uniform a barcode or numeric ID.
- Scan barcodes upon issuance and return using a mobile barcode scanner or app.
- This enables real-time data logging, eliminates manual entries, and allows automatic alerts for low-stock sizes.

Training and Human Resource Recommendations

- **Staff Training on SOPs and Communication**
- Conduct **monthly training workshops** for linen department staff on:
  - SOP adherence
  - Uniform measurement accuracy
  - Communication protocols with departments
- Include role-play scenarios to enhance interpersonal skills, especially for managing complaints calmly.
- **Appointment of a Linen Supervisor**
- Assign or hire a **designated linen supervisor** who monitors the uniform issuance workflow and ensures compliance with SOPs.
- The supervisor should act as a link between department heads and linen staff for request consolidation and feedback handling.

Infrastructure-Based Recommendations

- **Restructuring the Linen Room Layout**
- Divide the uniform storage racks by:
  - Department
  - Gender
  - Size (in increasing order)
- Keep frequently requested sizes at eye level for easy access.
- Ensure lighting is sufficient and space allows for free movement to avoid crowding during peak hours.
- **Separate Counters for Returns and Distribution**
- Create a dual-counter system: one for uniform return and one for distribution.
- This avoids pile-ups, ensures returns are processed properly, and prevents accidental re-issuance of faulty uniforms.
- **Lean Tools for Continuous Improvement**
- The study recommends using lean quality improvement tools as part of ongoing workflow enhancement.
- **Fishbone and 5 Whys Reviews**
- Set up monthly RCA (Root Cause Analysis) review meetings.
- Any TAT exceeding 4 minutes should be analysed using 5 Whys and fishbone diagrams to ensure accountability.

References

- World Health Organization. Practical Guidelines for Infection Control in Health Care Facilities. WHO; 2004.
- Ministry of Health & Family Welfare. National Guidelines for Clean Hospitals. Government of India; 2015.
- Narayan KA, Srinivasan R. Hospital Linen and Laundry Services in Modern Hospitals: A Case Study. J Acad Hosp Adm. 2001;13(2):13–16.
- Sharma M, Madaan N, Sharma R. Role of Hospital Attire in Infection Control. Int J Health Sci Res. 2021;11(4):152–156.
- Patel P, Trivedi K, Gadhvi D. Process Mapping and Performance Analysis of Laundry Services in Healthcare Organization. Int J Curr Res. 2020;12(2):10766–10772.
- Sharma R, Kapoor A. Lean Healthcare Implementation in Hospitals: A Case Study from India. Health Serv Manage Res. 2020;33(4):1–9.
- Joshi P, Tiwari A, Gaur M. Using Fishbone Analysis for Identifying Root Causes in Healthcare: An Observational Study. Int J Health Care Qual Assur. 2022;35(1):31–43.
- National Accreditation Board for Hospitals and Healthcare Providers (NABH). Guidebook to Accreditation Standards for Hospitals. 5th ed. New Delhi: Quality Council of India; 2020.

Thankyou

IIHMR UNIVERSITY