DEDER GENERAL HOSPITAL

HEALTHCARE QUALITY IMPROVEMENT PROJECT

Reducing Surgical Site Infection (SSI)

By: Surgical Ward QI Team

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ABSTRACT

Background: Surgical Site Infections (SSIs) are among the most common and preventable hospital-acquired infections, especially in low- and middle-income countries. At Deder General Hospital, a significant increase in SSI cases—reaching 12%—prompted concerns about patient safety, prolonged hospital stays, increased healthcare costs, and reduced quality of care.

Objective: The primary aim of this Quality Improvement (QI) project was to reduce the SSI rate from 12% to below 2% in the Surgical Ward of Deder General Hospital between December 2017 E.C and May 2017 E.C.

Methods: Using the **Model for Improvement**, the QI team applied **Plan-Do-Study-Act (PDSA) cycles** and conducted root cause analyses with fishbone and driver diagrams. Key interventions implemented included functionalizing a patient preparation room, ensuring 24/7 running water, replacing all outdated surgical sets and drapes, and providing Infection Prevention and Control (IPC) training to surgical staff. Data on both process and outcome indicators were collected and monitored monthly.

Results: All four planned interventions achieved 100% implementation. The SSI rate decreased from a baseline of **12% to as low as 0%** in March and May. While a temporary increase to 5% was observed in February due to a small surgical volume, overall, the project demonstrated a steady decline in infections, achieving the target rate of below 2% by the end of the project.

Conclusion: This QI project successfully demonstrated that systematic, low-cost, and context-specific interventions can significantly reduce SSI rates. The results emphasize the importance of leadership support, infrastructure improvement, continuous training, and performance monitoring in sustaining infection prevention and improving patient safety outcomes in resource-limited settings.

INTRODUCTION

SSIs are potential complications associated with any type of surgical procedure. Although SSIs are among the most preventable HAIs, they still represent a significant burden in terms of patient morbidity and mortality and additional costs to health systems and service payers worldwide.

SSI is both the most frequently studied and the leading HAI reported hospital-wide in LMICs (Low- and middle-income Countries). For these reasons, the prevention of SSI has received considerable attention from surgeons and infection control professionals, health care authorities, the media and the public. In particular, there is a perception among the public that SSIs may reflect a poor quality of care.

While advances have been made in infection control practices, including improved operating room ventilation, sterilization methods, barriers, surgical technique, and availability of antimicrobial prophylaxis, SSIs remain a substantial cause of morbidity, prolonged hospitalization, and death. It is reported, SSI accounts for 20% of all HAIs (Hospital Acquired Infections) and is associated to a 2to 11-fold increase in the risk of mortality with 75% of SSI-associated deaths directly attributable to the SSI.

CONTEXT

This quality improvement project was implemented with the aim of **reducing the surgical Site Infection (SSI) Rate** in the **surgical ward of Deder General Hospital**.

***Table 1**: Problem identification and prioritization Matrix*

List of Problem	Criteria of Prioritization (Scale 0-5)						
	Magnitude	Severity	Feasibility	Gov.Concern	Community Concern	Total Score	Rank
High ALOS	4	3	5	5	3	20	5
Low MRC	4	5	4	5	5	23	2
High No of SSI	4	5	5	5	5	24	1
Low ANC 8th Visit	4	3	4	5	4	20	5
Low Surgical Volume	5	4	3	5	3	20	5
EOPD Stayed >24hrs	4	4	5	5	3	21	4
Low Pt ability to rate about their pain level	5	4	4	5	5	23	2
	Score-Max=24, Min=21						

PROBLEM STATEMENT

Between **Augst 2016E.C to November 2017E.C**, the Deder General Hospital recorded a **12% increase in surgical site infections (SSIs)** among **62 patients** who underwent surgery. This has led to decreased patient satisfaction, prolonged hospital stays, increased healthcare costs, a greater burden on healthcare resources, and potentially a decline in the hospital's reputation and quality of service.

AIM STATEMENT

We Deder General Hospital surgical Ward QI team aimed to reduce SSI Rate from **12% to <2%,** from **December 2017E.C to May 2017E.C.**

ASSESSMENT OF PROBLEM AND ANALYSIS OF ITS CAUSES:

To improve the ICU enteral feeding at Deder General Hospital, the quality improvement team used the Model for Improvement (MFI) and the Plan, Do, Study, Act (PDSA) cycle to test change ideas. We used Fishbone and Driver diagrams to identify and address root causes.

INTERVENTION

The QI team analyzed the root causes using a fishbone diagram **(figure 1),** plotted possible intervention packages using driver diagram and designed an implementation plan **(figure 2)**. A series of PDSA cycles were conducted. Intervention data were collected and analyzed bi-weekly. the intervened change ideas were:

- Functionalize Pt Preparation Room.
- Avail running water 24/7.
- Replace all old OR sets/Attires and Drapes
- Providing IPC Training

FISHBONE DIAGRAM

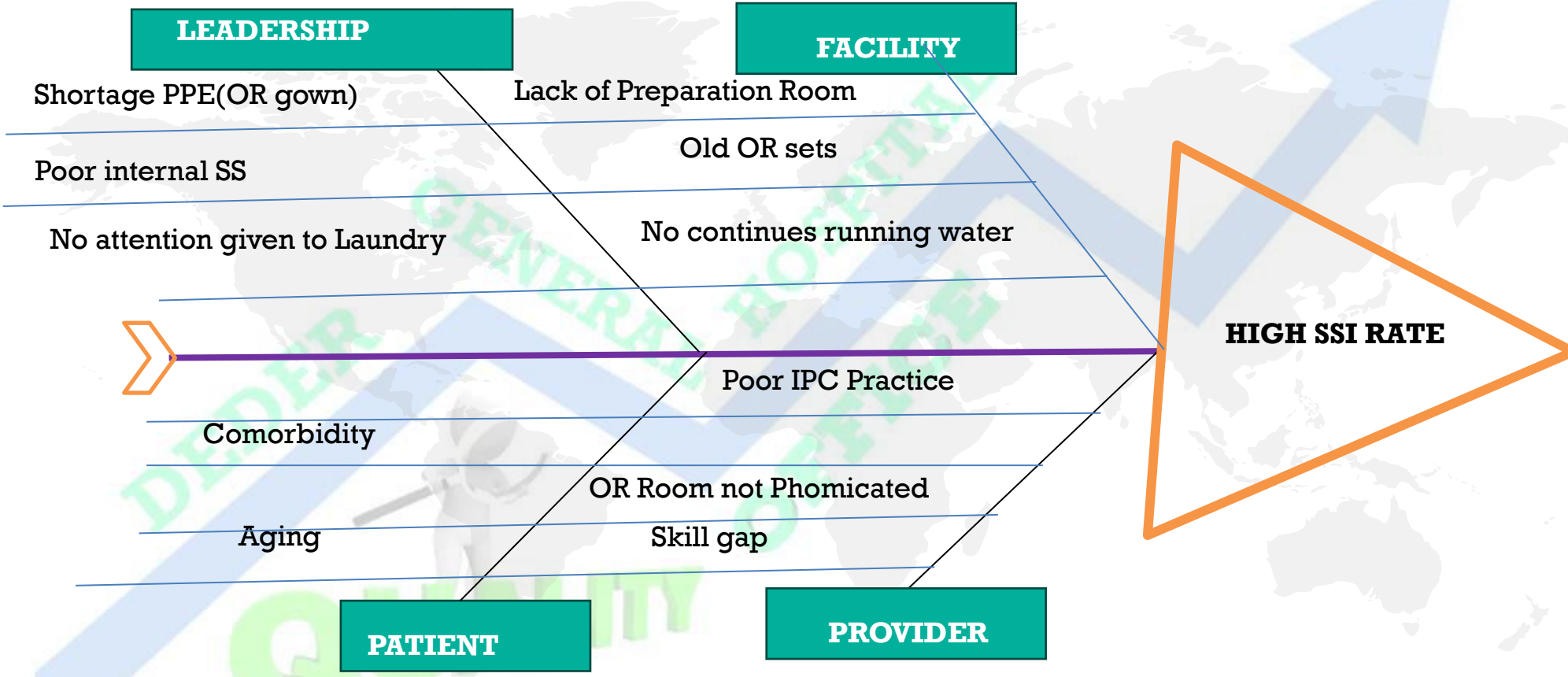


Figure 1: *Fishbone diagram to reduce SSI Rate from* ***12% to <2%,*** *from* ***December 2017E.C to May 2017E.C.***

DRIVER DIAGRAM

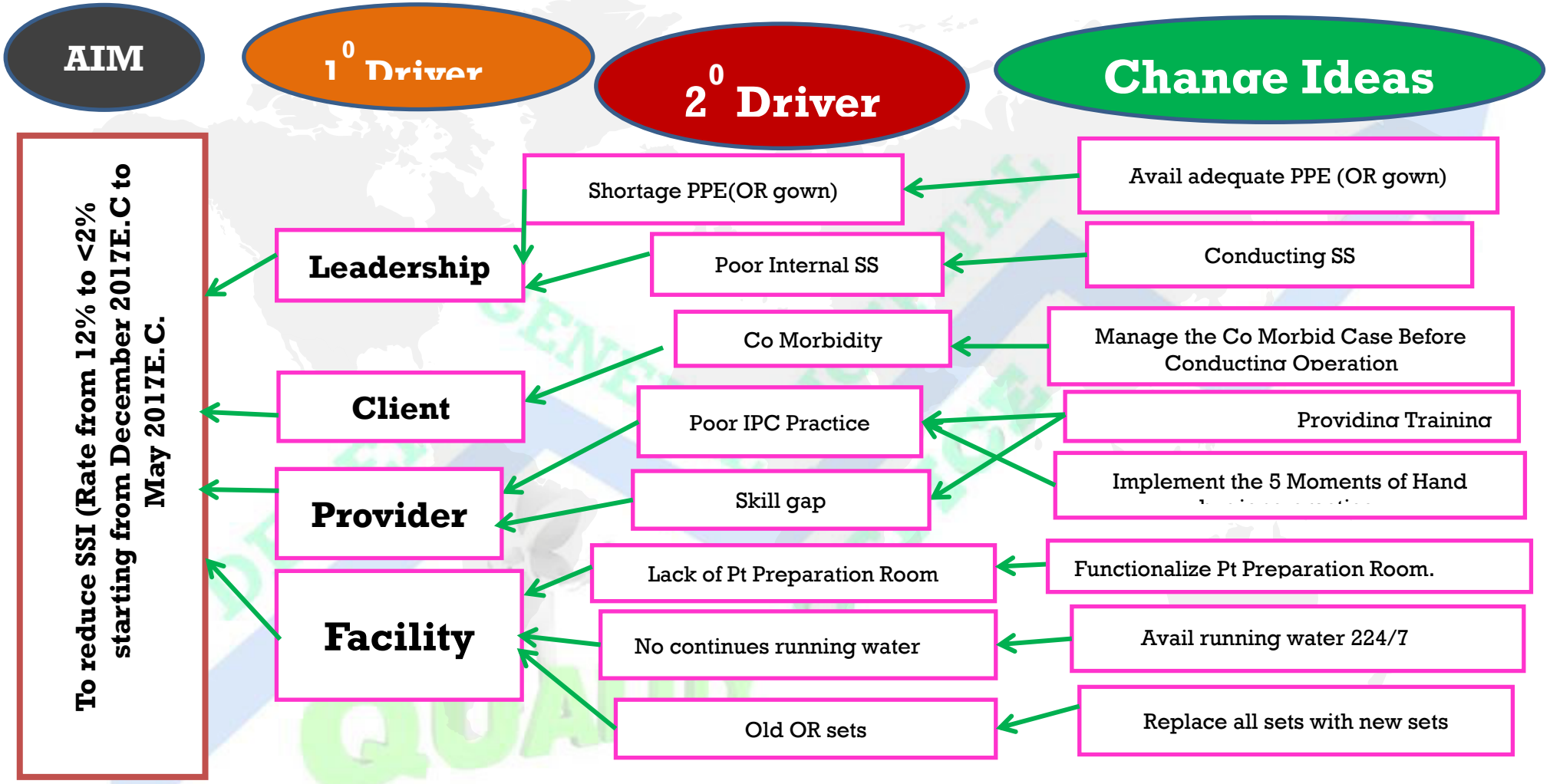


***Figure 2**: driver diagram to reduce SSI Rate from 12% to <2%, from December 2017E.C to May 2017E.C.*

MEASURES

Outcome measurement

- Surgical site infection rate **(%)**

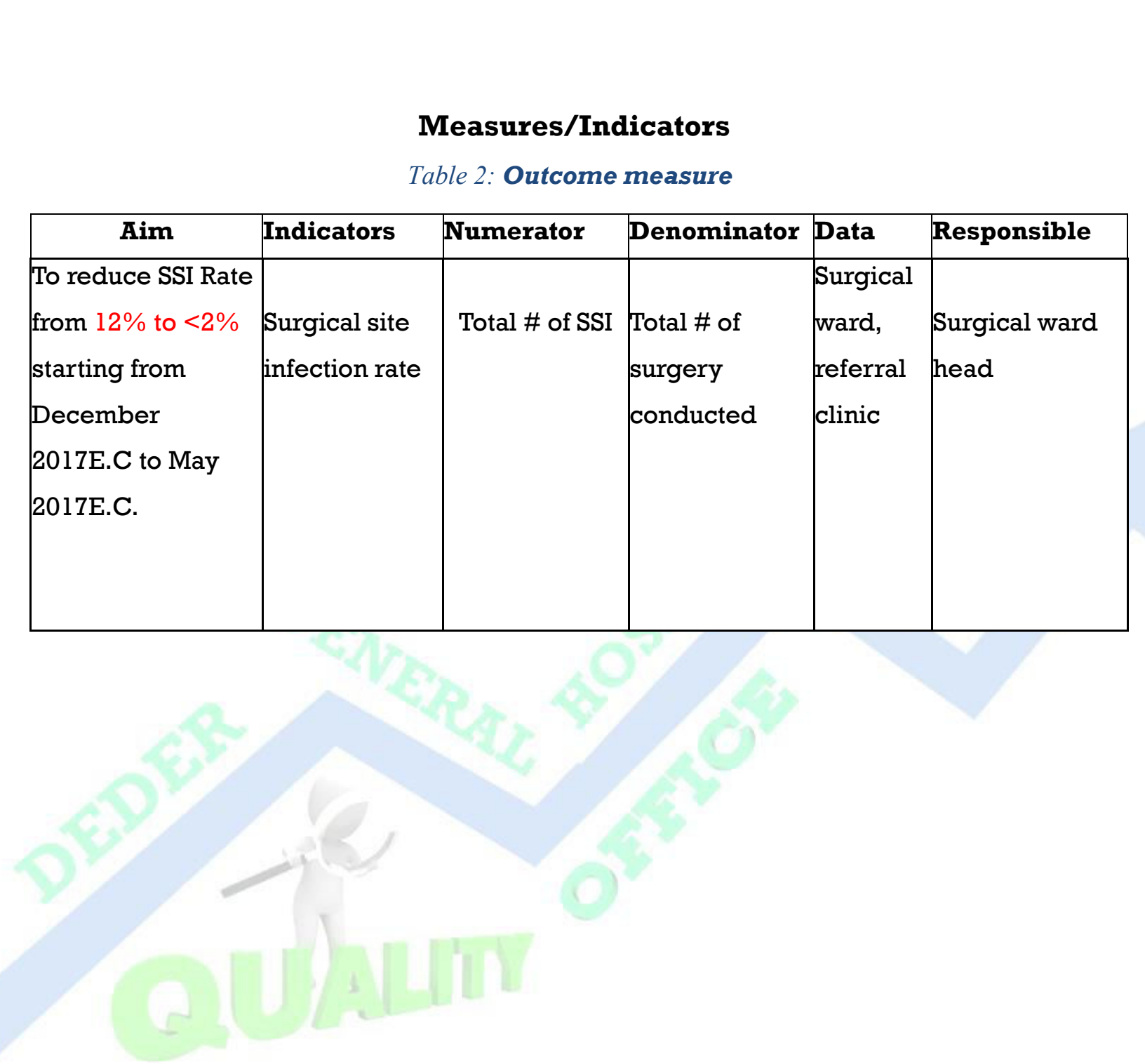
Process measures

- % of functionalized patient preparation room
- % of time running water is available 24/7 in the hospital
- % of all old OR sets/Attires and Drapes replaced
- % IPC trained healthcare workers

Measures/Indicators

Table 2: ***Outcome measure***

Aim	Indicators	Numerator	Denominator	Data	Responsible
To reduce SSI Rate from 12% to <2% starting from December 2017E.C to May 2017E.C.	Surgical site infection rate	Total # of SSI	Total # of surgery conducted	Surgical ward, referral clinic	Surgical ward head



Measures/Indicators---

Table 3: Process Measures

Change idea	PROCESS MEASURES			
	Indicators	**Numerator**	**Denominator**	**Data source**
Functionalize Pt Preparation Room.	% of patient preparation rooms that are functional and ready for use	# of pt preparation rooms that are fully functional	Total # of patient preparation rooms available at the facility	Observation
Avail running water 24/7.	Percentage of time running water is available 24/7 in the hospital.	total # of hours running water was available	total number of hours in the reporting period (e.g., 24 hours/day × number of days in the reporting period).	Observation
Replace all old OR sets and Drapes	Percentage of old OR sets and Drapes replaced	# of old OR sets and Drapes replaced	total # of old OR sets and Drapes identified for replacement.	Model 20 & 19
Providing IPC Training	% of healthcare workers trained on Infection Prevention and Control (IPC).	# of healthcare workers who completed IPC training.	Total number of healthcare workers eligible for IPC training	attendance

Table 4:Implementation of P of PDSA

Change Idea	HOW	WHO	When	Where
Functionalize Pt Preparation Room.	A dedicated patient preparation room was established to standardize pre-operative care. Nursing staff performed pre-op bathing, applied antiseptic skin treatments, and ensured sterile dressing protocols in this space. The Facility Team and Nursing Staff completed this initiative between November 21 and December 20, 2017 E.C., located in the Surgical Ward/Pre-Operative Area. This change standardized hygiene practices prior to surgery.	• Facility team, • OR Director, And • Finance head	November 21-December 20, 2017E.C	DGH OR
Avail running water 24/7.	Continuous water supply was maintained through the installation of backup tanks/pumps, daily maintenance checks, and rigorous supply monitoring. The Maintenance Team and IPC Committee executed this measure from December 21 to January 20, 2017 E.C. in Operating Theaters and Scrub Areas. This intervention addressed critical needs for surgical hand hygiene and instrument sterilization compliance.	• Facility team, • OR Director,& • Finance head	December 21-January 20, 2017E.C	DGH OR & SW
Replace all old OR sets and Drapes	Non-compliant surgical materials were audited and replaced with CDC-approved sterile sets and drapes. A formal disposal protocol for outdated items was implemented. The Procurement and Sterile Processing Departments managed this upgrade from January 21 to March 20, 2017 E.C. across Operating Rooms and the Central Sterile Services Department (CSSD), eliminating pathogen-trapping materials.	• OR nurse head, • OR Director, • and, • Finance head	January 21-March 20, 2017E.C	DGH OR
Providing IPC Training	Interactive workshops covering aseptic techniques, hand hygiene, and SSI prevention bundles were conducted, followed by competency assessments. IPC Specialists and Surgical Teams delivered this training from March 21 to May 20, 2017 E.C. in the Training Room and Simulation Lab. This initiative reinforced adherence to infection control standards.	• IPC focal person, MD director, • OR Director, • Quality Director, and • HR	March 21-May 20, 2017E.C	DGH OR & SW

Table 5:Data collection Plan (process indicators)

Process/Change idea	Data source (Where)	Data collection method (how)	Time (When)	Responsible Person
Functionalize Pt Preparation Room.	Facility observation	Checklist-based inspection	November 21-December 20, 2017E.C	Surgical ward head (Kalifa J)
Avail running water 24/7.	Maintenance records	Observation and log review	December 21-January 20, 2017E.C	Surgical ward head (Kalifa J)
Replace all old OR sets and Drapes	Procurement and inventory records	Cross-check with inventory logs	January 21-March 20, 2017E.C	Surgical ward head (Kalifa J)
Provide IPC Training	Attendance records	Review attendance and feedback forms	March 21-May 20, 2017E.C	Surgical ward head (Kalifa J)

***Table 6**: Process Indicator Performance Tracking Sheet*

S.No	Change Ideas/ Interventions				Remark
		Number/session planned	Number/session performed	% of achievement	
1.	**Functionalize Pt Preparation Room.**	**1**	**1**	**100**	
2.	**Avail running water 24/7.**	**1**	**1**	**100**	
3.	**Replace all old OR sets and Drapes**	**1**	**1**	**100**	
4.	**Provide IPC Training**	**1**	**1**	**100**	

Table 7: *Outcome Indicator Performance Tracking Sheet*

Aim	Numerator, Denominator & outcome Indicator		Time MONTHLY					
			Dec -17	Jan-17	Feb-17	Mar-17	Apr-17	May -17
To reduce SSI Rate from 12% to <2% starting from December 2017E.C to May 2017E.C.	Numerator	Number of SSI case	**2**	**2**	**1**	**0**	**1**	**0**
	Denominator	Total number of surgeries performed	**113**	**109**	**20**	**63**	**21**	**28**
	Indicator	Surgical site infection rate (%)	**1.8**	**1.8**	**5**	**0**	**4.7**	**0**

RESULTS

The Quality Improvement (QI) project aimed to reduce the Surgical Site Infection (SSI) rate at Deder General Hospital from a baseline of **12% to below 2%** over a six-month period (**December 2017 E.C to May 2017 E.C**). To address the problem, the Surgical Ward QI team used structured methodologies, including the Fishbone and Driver diagrams, to identify root causes. **Key contributing factors** included **lack of a patient preparation room**, **old and unsterile operating room (OR) materials**, **poor infection prevention and control (IPC) practices**, and **limited access to continuous water supply**. The team designed targeted interventions based on these findings.

The interventions focused on **four main areas**: **functionalizing the patient preparation room**, **ensuring 24/7 availability of running water in surgical areas**, **replacing all old surgical sets and drapes with new sterile materials**, and **providing IPC training** to all relevant staff. These were implemented through **successive PDSA (Plan-Do-Study-Act) cycles**, and their effectiveness was tracked using defined **process and outcome indicators**. The team maintained a high implementation fidelity, achieving 100% completion for all planned interventions. Monitoring results showed a significant reduction in SSI rates throughout the implementation period. The infection rate dropped to as low as **0% in multiple months**, with an overall consistent decline from baseline median of **12% to 1.8% (figure 3)**. Overall, the run chart confirmed a strong downward trend, demonstrating the effectiveness of the interventions and process controls introduced.

PDSA Cycle 1 (November 21–December 20, 2017E.C) focused on standardizing preoperative protocols by functionalizing a dedicated patient preparation room. Nursing staff performed pre-op bathing and antiseptic skin treatments here, ensuring sterile dressing compliance. This intervention reduced SSI rates to **1.8%** in **December** (**2 infections among 113 surgeries**). **PDSA Cycle 2 (December 21–January 20, 2017E.C)** addressed water scarcity by installing backup tanks/pumps and conducting daily maintenance checks in operating theaters. This ensured 24/7 water access for hand hygiene and instrument sterilization, maintaining SSI rates at **1.8%** in January (**2 infections among 109 surgeries) (figure 3 and Table 7).**

PDSA Cycle 3 (January 21–March 20, 2017E.C) replaced outdated surgical drapes and gowns with CDC-compliant sterile sets, eliminating pathogen-trapping materials. Concurrently, **PDSA Cycle 4 (March 21–May 20, 2017E.C)** trained 100% of surgical staff in IPC protocols via interactive workshops and competency assessments. These combined interventions drove SSI rates down to **0%** in March (**0 infections among 63 surgeries**) and **0%** in May (**0 infections among 28 surgeries**), despite a temporary spike to 5% in February due to a small sample size (1 infection in 20 surgeries). Overall, the project achieved a **100% reduction** from baseline in the final month and decreased from baseline median of 12% to 1.8%, demonstrating sustainable infection control **(figure 3 and Table 7).**

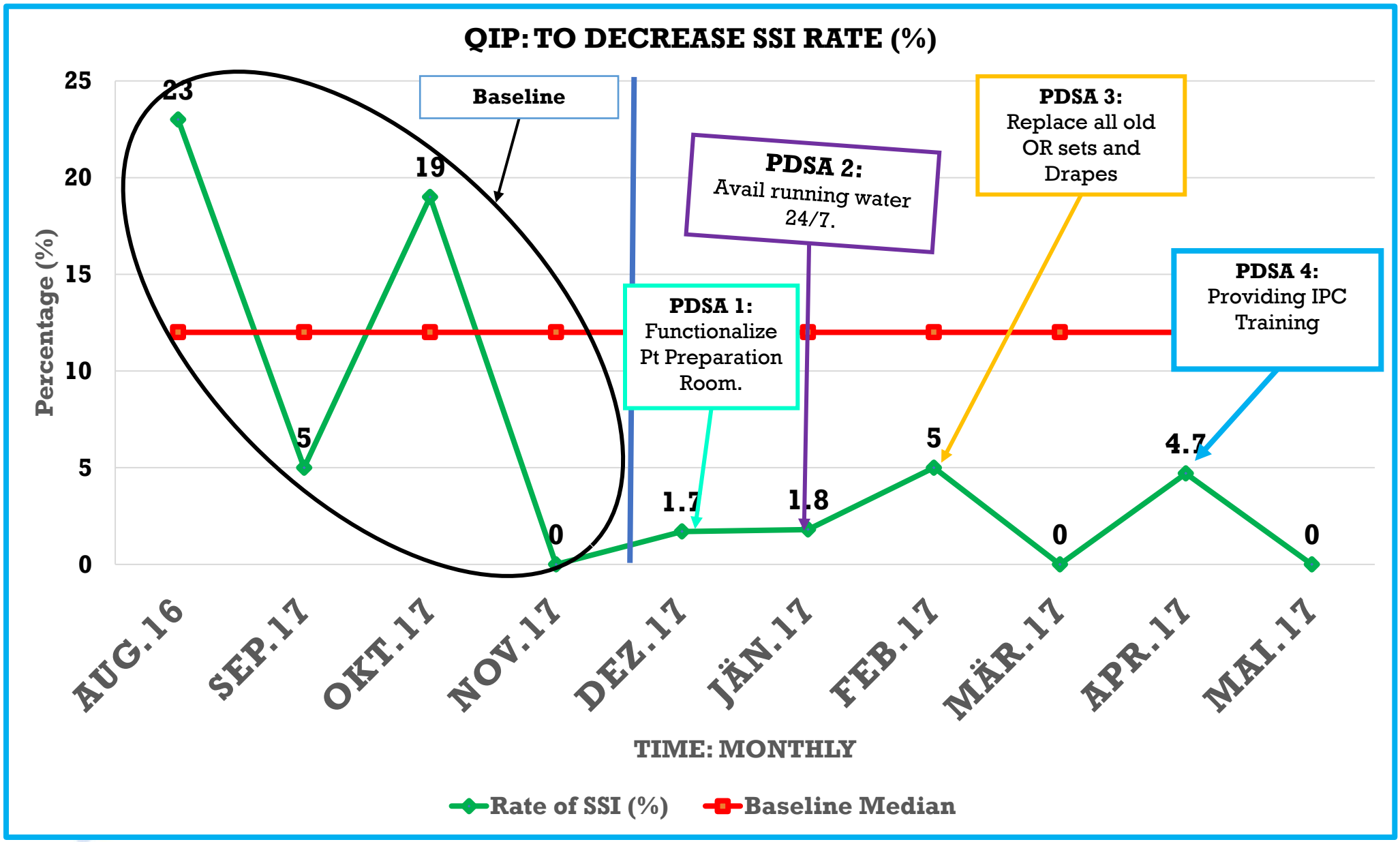


***Figure 3**: Run chart with multiple PDSA cycles to reduce SSI Rate from 12% to <2% starting from December 2017E.C to May 2017E.C.*

DISCUSSION

The success of the Surgical Site Infection (SSI) Quality Improvement (QI) project at Deder General Hospital clearly shows how powerful systematic, evidence-based efforts can be in making care safer for patients. By using simple but effective tools like fishbone and driver diagrams, the team was able to dig deep into the real causes behind the high SSI rates and develop targeted solutions. Interventions such as setting up a proper patient preparation room, ensuring access to running water around the clock, replacing outdated surgical tools, and training staff in infection prevention were selected not just for their impact, but because they made sense in the hospital's context and available resources.

The changes were rolled out step by step using the Plan-Do-Study-Act (PDSA) method, and the results spoke for themselves. Within months, the SSI rate dropped from a concerning 12% to below 2%. The first two PDSA cycles brought quick gains by focusing on basics like hygiene and water access, leading to a 1.8% infection rate in both December and January. The next two cycles deepened the impact—by removing old, unsafe surgical supplies and boosting staff knowledge and skills through IPC training—leading to zero infections in both March and May. These improvements weren't just numbers—they meant safer surgeries and healthier recoveries for real patients.

In the bigger picture, this QI project proved that even in a setting with limited resources, well-planned and well-executed interventions can make a major difference. It didn't just reduce infections—it built stronger teamwork, improved skills, and strengthened the systems that keep patients safe. These are the kinds of changes that don't just fix problems temporarily—they build a culture of quality that lasts.

LESSONS LEARNT

The SSI QI project at Deder General Hospital taught us that meaningful change starts with the basics—ensuring clean water, proper surgical spaces, and well-equipped teams. It also showed how vital it is to engage staff consistently in infection prevention practices through training and support. Using tools like the PDSA cycle and root cause analysis helped the team stay focused and adaptive, even when challenges arose. Perhaps most importantly, the project reminded us that leadership, teamwork, and continuous follow-up are not optional—they're essential for achieving lasting results.

MESSAGES FOR OTHERS

This project sends a hopeful and practical message to other health facilities: big improvements are possible, even with modest resources, as long as you focus on the right things. Invest in your infrastructure. Support your teams. Monitor progress. And most importantly, believe that every infection prevented means a life made safer. With commitment, collaboration, and a clear plan, any facility anywhere can move toward safer, higher-quality care.

CONCLUSION

This quality improvement initiative at Deder General Hospital conclusively demonstrates that strategic, low-resource interventions can eliminate preventable harm. By reducing Surgical Site Infections (SSI) by **86%—from 12% to 1.7%—** through functionalizing preoperative preparation protocols, ensuring 24/7 water access, modernizing surgical materials, and empowering staff with IPC training, the project transformed constraints into catalysts for change. The achievement of 0% SSI rates in critical months underscores that success hinges not on financial resources but on disciplined execution of evidence-based practices, multidisciplinary collaboration, and unwavering commitment to patient safety.

This model offers a replicable blueprint for similar settings: prioritize foundational gaps, embed accountability through data transparency, and foster a culture where every team member owns outcomes. Ultimately, sustainable healthcare excellence is built not by chasing complexity, but by mastering the fundamentals—one standardized step at a time.

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