

Improving Care Continuity in Oncology Settings: A Lean Management Approach to Minimize Discharges Without Follow-Up Appointments

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Abstract

Objective: This study aimed to reduce the number of patients discharged without scheduled follow-up appointments by implementing lean management principles. **Methods:** Conducted at the Sultan Qaboos Comprehensive Cancer Center in Muscat, Oman, the research utilized a one-group pretest-posttest quasi-experimental design to evaluate the impact of lean management interventions on the rate of patient discharges without follow-up appointments. Strategies such as the Kaizen principle, Gemba Walks, cross-functional collaboration, standard work procedures, and waste reduction were employed to enhance operational efficiency. **Results:** Spanning from Quarter 3 of 2022 to Quarter 2 of 2023, the study demonstrated a significant decrease in the percentage of patients discharged without planned follow-up appointments. The rate dropped from 9% in September 2022 to 0% in March 2023, with statistically significant differences observed ($X^2= 65.05$, $p \text{ value} < .0001$). **Conclusion:** By effectively implementing lean management principles, this research successfully enhanced care continuity for oncology patients after being discharged.

Keywords: Care continuity- oncology settings- a lean management approach- discharges- follow-up appointments

Asian Pac J Cancer Prev, **25** (4), 1293-1300

Introduction

The discharge process for oncology patients plays a crucial role in healthcare operations, involving the careful and coordinated transition of individuals with cancer from a medical facility to their homes or other care settings [1, 2]. This process holds particular significance in the field of oncology, given the complex and ongoing nature of cancer treatment. As highlighted by DiBenedetto et al. [1], effective discharge ensures that patients leaving the healthcare facility are equipped with the necessary knowledge and resources to manage their medical condition and sustain their treatment regimen.

Comprising a range of tailored responsibilities, the discharge process in oncology is designed to meet the unique needs of cancer patients. According to Callaway et al. [3], healthcare teams assess the patient's treatment progress, potential side effects, and readiness for discharge. They provide education to both the patient and caregivers on the current status of the cancer, treatment

specifics, and potential complications. This study delves into medication management for cancer treatment, pain control, and symptom management [3, 1], offering detailed guidance on medication administration. For patients requiring ongoing therapies like chemotherapy or radiation, arrangements are made to ensure continuity of care post-discharge. Follow-up appointments with specialized healthcare providers are scheduled to monitor the patient's progress and make necessary adjustments to the treatment plan [3, 1].

Maintaining care continuity poses a significant challenge in the discharge process for oncology patients, necessitating effective communication and coordination among diverse healthcare professionals, including oncologists, surgeons, and primary care physicians [3-5]. Post-discharge appointments hold considerable importance in the patient's ongoing healthcare journey, offering healthcare providers opportunities to evaluate the patient's status, refine treatment approaches, and address emerging concerns [3-5].

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The absence of a scheduled follow-up appointment can lead to various adverse consequences, underscoring the importance of post-discharge care coordination in oncology settings. Such deviations have the potential to cause treatment delays, thereby impacting the patient's well-being [6]. Failure to conduct early medical evaluations and make necessary adjustments is associated with an increased risk of disease progression. Non-compliance with the prescribed follow-up schedule may result in deviations from the established treatment plan, potentially compromising its efficacy [7, 6, 8].

Ensuring adherence to follow-up appointments and addressing missed appointments can be challenging, often due to factors such as high workload, unclear appointment systems, and inadequate coordination, particularly in newly established healthcare facilities. These challenges have the potential to disrupt the seamless provision of healthcare services, leading to possible gaps in the patient's treatment course [7, 6, 8].

At the Sultan Qaboos Comprehensive Cancer Center, where a significant proportion of patients, specifically 10%, are leaving without adhering to their scheduled follow-up appointments, there is a pressing need for a project aimed at improving care continuity for individuals undergoing oncological treatment. This percentage represents a notable portion of the patient population, raising concerns about potential adverse outcomes and treatment deficiencies.

The application of lean management principles, including the Kaizen principle [9], Gemba Walks [9, 4], Cross-Functional Collaboration [9, 4], Standard Work Procedures, and Waste Reduction [10, 9, 11], has the potential to effectively address issues related to ensuring adherence to follow-up appointments and managing missed appointments. By implementing fundamental concepts, such as improving the appointment scheduling process and minimizing problems [9, 12, 13], these challenges can be mitigated.

In this specific context, Standard Work Procedures (SWPs) play a crucial role in establishing standardized protocols for appointment scheduling and subsequent follow-up treatment provision. These protocols aim to improve clarity and consistency by setting clear standards for healthcare providers, administrative staff, and patients, ensuring that each party understands their roles and responsibilities in the process. This, in turn, helps reduce complexity and fatigue among staff members [14, 9, 11-13].

The implementation of the Kaizen principle, advocating for continuous improvement, can foster a culture of ongoing enhancement in appointment scheduling processes. By consistently gathering feedback from both staff and patients regarding appointment booking challenges, gradual incremental modifications can be made to improve the overall process [9, 15].

Cross-functional collaboration is a key lean principle in this setting, emphasizing the importance of fostering collaboration across different departments. Healthcare facilities can address coordination challenges hindering patient treatment and leading to missed appointments by involving representatives from various areas such as

clinical, administrative, and IT departments. The concept of Waste Reduction aligns with the primary goal of lean management, which is waste elimination [9, 4, 16, 17, 13, 8]. Cross-functional collaboration plays an essential role in enhancing Organisational citizenship behaviour among staff [14].

By incorporating these principles into the appointment scheduling process, healthcare organizations can identify unnecessary stages or redundancies, optimize resource allocation, and ultimately improve overall efficiency [2, 4, 8, 9, 13]. Finally, the concept of Gemba Walks, which involves leaders personally observing workplace procedures, can be utilized to identify obstacles and gather firsthand insights from staff members. This approach enables the acquisition of essential knowledge needed to make informed decisions aimed at enhancing the appointment scheduling process and addressing any identified shortcomings or inefficiencies [9, 4, 13, 8]. The primary objective was to reduce the number of patients discharged without scheduled follow-up appointments through the implementation of a lean management approach.

Materials and Methods

Setting

The project was conducted across all inpatient units at the Sultan Qaboos Comprehensive Cancer Center in Muscat, Oman, spanning from Quarter 3 of 2022 to Quarter 2 of 2023.

Design

The study employed a one-group pretest-post-test design to evaluate the impact of the intervention on a key performance indicator, which was the percentage of patients discharged without follow-up appointments. The selection of this indicator was based on a thorough review of relevant literature, focusing on indicators that have demonstrated responsiveness to interventions in previous studies [9, 12-14].

In this study, a specific sample was assessed at two distinct time points: before the implementation of interventions (pretest) and after the implementation of interventions (posttest). This design allowed for the evaluation of changes within the same group, eliminating the need for a separate control group. The study aimed to assess the impact of interventions on the identified key performance indicator by analyzing and comparing pretest and posttest data. The project utilized lean management techniques, including the Kaizen principle [9, 15], Gemba Walks [9, 4, 13, 8], Cross-Functional Collaboration [9, 4, 13, 8], Standard Work Procedures, and Waste Reduction [10, 9, 11-13] to improve the existing process and address the primary factors contributing to missed post-discharge appointments (Table 1).

Data Analysis

SPSS version 23 was utilized for data analysis. Frequency and percentage were employed to measure the pre- and post-intervention data. Chi-square tests and p-values were conducted to assess differences in the results

and demonstrate the effectiveness of the intervention.

Ethical Consideration

This study underwent a comprehensive review and received approval from the Institutional Review Board at the Centre. The researchers obtained ethical approval, including an assigned approval number, to conduct the study in compliance with ethical guidelines.

Results

Current Process Mapping

The patient discharge process at the Sultan Qaboos Comprehensive Cancer Center is depicted in Figure 1, illustrating a series of sequential processes. The initiation of the process occurs when the inpatient treatment team determines the appropriateness of discharging the patient and transitioning their care to outpatient clinics, day care facilities, or readmission to the hospital as per their prescribed treatment plan. This pivotal decision serves as the foundation for subsequent activities, guiding the patient towards the next phase of their healthcare journey.

As an essential element of this procedural framework, the attending physician in charge of inpatient care engages in effective communication with the patient's primary care team located in the outpatient department. This team typically includes Clinical Nurse Specialists (CNS) and physicians responsible for overseeing the ongoing care of the patient. This communication style facilitates a seamless exchange of information, enabling a coordinated approach during the patient's transition to outpatient care.

The primary care team collaborates to determine the most suitable follow-up visit for the patient. During this phase, details of the appointment, including the date, time, and purpose, are meticulously finalized. To ensure a smooth continuation of care, it is crucial that appointment details are promptly communicated to both the receptionist in the Outpatient Department (OPD) and the admission office.

Equipped with the appointment details, the receptionist at the OPD takes charge by utilizing the Hospital Information System (HIS) to organize and coordinate the patient's subsequent appointment. The integration of technology in this context streamlines processes and ensures accurate scheduling, thereby improving convenience for the patient.

Importantly, the patient actively engages in the process as the receptionist proactively communicates the scheduled follow-up visit. Communication is initiated by sending a phone message to the patient, followed by a subsequent phone call, to effectively convey all relevant information and ensure that the patient is fully informed and prepared for their upcoming appointment.

Identification of Root Causes for Discharging Patients Without Follow-Up Appointments

Through Current Process Mapping, cross-functional collaboration, and Gemba Walks, several key factors contributing to patients being discharged without follow-up appointments were identified. These factors can be summarized as follows:

1. Discharge Decision After Working Hours: Patients

Table 1. Used Lean Management Techniques Description and Implementation to is to Decrease the Proportion of Patients who are Discharged without Planned Follow-up Appointments

Technique	Description and implementation
Cross-Functional Collaboration	A management practice Involves cooperative interaction among various departments or disciplines within an organization to grantee the incorporation of comprehensive and holistic viewpoints and action plans. In our project, a team was formulated to enhance communication and coordination among different departments to review the process and ensure patients are scheduled for follow-up appointments before discharge. It includes members from nursing, admission, discharge, transfer office, medical oncology, as well as quality and accreditation departments. The team worked together to conduct the project in regular basis
Gemba Walks	A management practice where leaders go to the actual place of work to observe processes first-hand to identify the gaps and allocate the needed resources for making well-informed decisions. In our project, A team, managers, and stakeholders conducted unstructured round many times to identify and address issues in the discharge process by observing and interacting with staff directly involved in patient discharge.
Standard Work Procedures and Waste Reduction	Establishing consistent and efficient value added work processes and eliminating unnecessary steps. In our project, A team streamlined the discharge process to include mandatory scheduling of follow-up appointments, reducing the risk of missed steps and removing unneeded steps. It was done by formulate pre intervention process flow chart to investigate the risks, restriction and limitation in the process that can be led to improper scheduling of patients and modify the current process accordingly
Kaizen Principle	It is a philosophy of continuous improvement in all aspects of work. Including the systematic gathering of feedback in order to obtain valuable insights from both staff members and patients regarding the novel appointment scheduling process. The continuous exchange of ideas and perspectives served as the foundation for a sequence of incremental but significant modifications and initiatives. The cyclical loop lasted, progressively enhancing the process until it reached its ultimate, refined state. Continuously improved discharge protocols and patient communication strategies to increase the likelihood of scheduled follow-up appointments. It is done by gradual implementation of improvement strategies until achieving the desirable results.

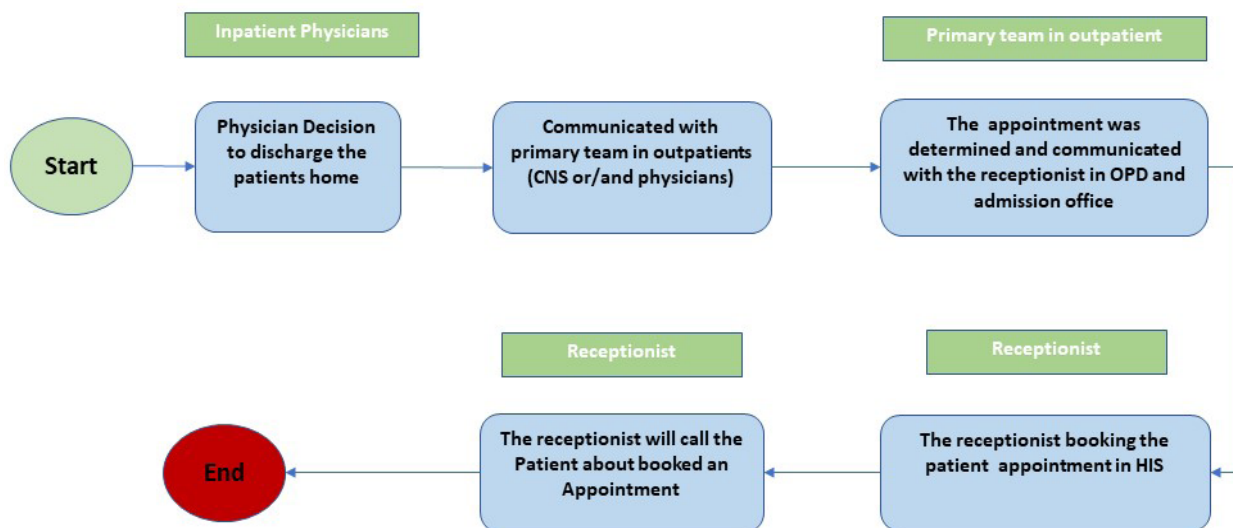


Figure 1. Previous Process for Discharge Patients Home

are often discharged after regular working hours when the primary care team has completed their shifts.

2. Unresponsive Primary Team in Outpatient: Difficulties in reaching the primary care team through phone calls due to high workload or their engagement with other patients.

3. Failure to Inform Receptionist: Instances where the primary team schedules appointments but fails to inform the receptionist, resulting in scheduling gaps.

4. Unimplemented SMS Services: Lack of implementation of SMS services that could assist in appointment reminders and follow-ups.

5. Missed Appointments in Discharge Summary: Appointments being overlooked or omitted from the patient’s discharge summary.

6. Impact of Clinical Nurse Specialists Workload: CNS may be unable to adequately monitor patients post-discharge due to their existing workload.

Based on these identified factors, a root cause diagram (fishbone diagram) was developed (Figure 2).

Standard Work Procedures and Waste Reduction

A standardized procedure for patient discharge has been implemented to enhance appointment scheduling accuracy and address previous inefficiencies within the system (Figure 3). This reformation in the patient discharge process follows a clearly defined sequence of actions. The initiation of patient discharge is primarily determined by the attending physician, playing a pivotal role in subsequent steps. The scheduled follow-up appointment is meticulously recorded in the patient’s discharge report, serving as a key reference point for all stakeholders.

Following the completion of essential documentation, the responsibility of arranging the follow-up visit is assigned to the inpatient services receptionist. Leveraging

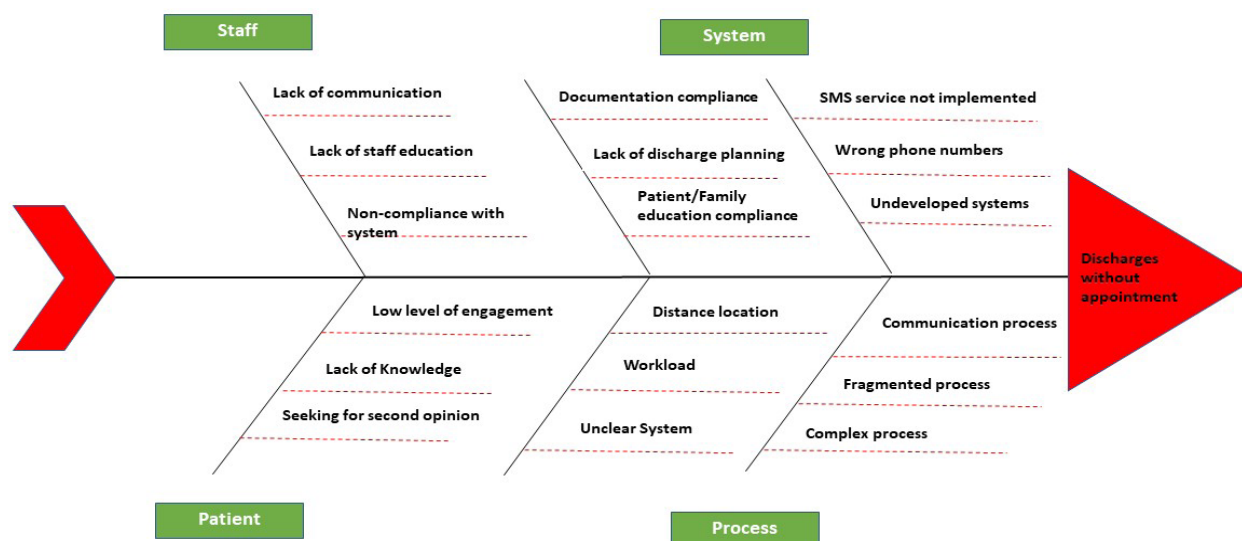


Figure 2. Root Cause Diagram for Discharge Patients without Follow up Appointment

Table 2. The Main Differences between Pre and New Process

Previous process	New process
Focuses on communication between inpatient physician and primary care team.	Centers on the attending physician's decision as the trigger.
Emphasizes communication of appointment details to outpatient receptionist and admission office.	Highlights meticulous documentation of the follow-up appointment in the discharge summary.
Highlights collaborative effort to determine appropriate follow-up appointment.	Inpatient receptionist responsible for scheduling using the discharge summary. Incorporates an automated system for prompt appointment confirmation via SMS. Process concludes with providing the patient a discharge summary with next appointment date. Emphasizes transformation into a structured, efficient, and patient-centered journey.

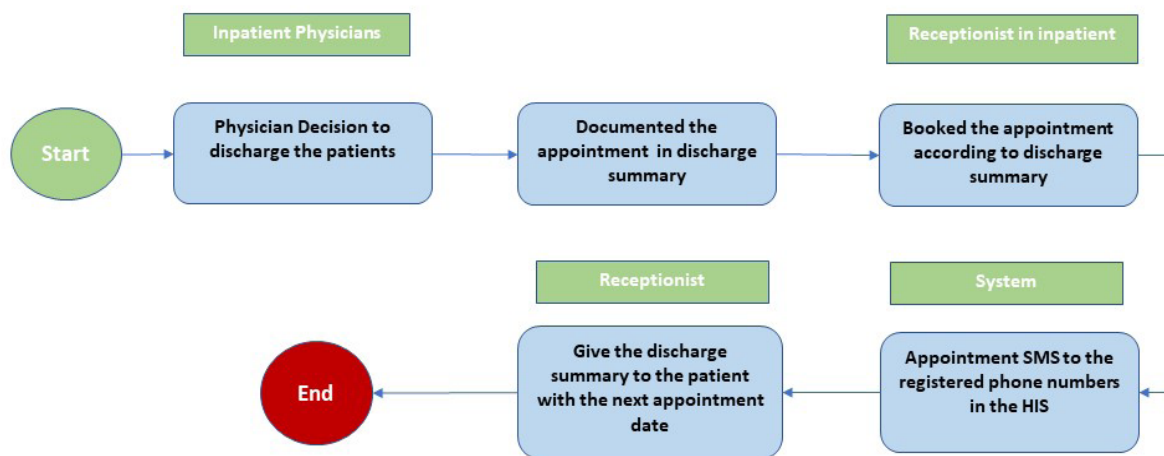


Figure 3. New Process for Discharge Patients Home

information from the discharge summary, the receptionist efficiently schedules the patient's next appointment. To streamline the process, an automated system is utilized to ensure timely confirmation of appointments. This system is configured to send SMS notifications to registered phone numbers within the HIS, effectively informing patients and assisting them in preparing for their upcoming appointments.

Upon concluding this comprehensive process, the inpatient receptionist furnishes the patient with an enhanced discharge summary containing vital details, including the precise date of the scheduled appointment. Equipping patients with this critical information

empowers them to navigate their post-treatment care plan with confidence and clarity. The meticulously planned and coordinated actions outlined above transform the patient discharge process into a well-structured, efficient, and patient-centered experience, fostering an improved perception of ongoing care. Table 2 provides a detailed comparison between the previous process and the newly implemented procedures.

Kaizen Principle

Adhering to the Kaizen principle, our initiative was established on the systematic collection of feedback to gather valuable insights from both staff members and patients regarding the innovative appointment scheduling process. The continuous exchange of ideas and perspectives formed the basis for a series of incremental yet significant modifications and initiatives. This iterative loop persisted, progressively enhancing the process until it reached its refined state.

The notable modifications can be succinctly summarized as follows

The introduction of an Automated Reminder System and Standardized Appointment Messaging was implemented to improve the efficiency of appointment confirmations and reminders by utilizing various communication channels such as phone calls and SMS. Furthermore, the Enhanced Discharge Summaries played

Table 3. Results of Discharge without Follow up Appointment Pre and Post Intervention.

	Month	Rate	χ^2	p value
Pre-data	22-Jul	7%	65.05	<0.0001
	22-Aug	6%		
	22-Sep	9%		
Post intervention	22-Oct	5%		
	22-Nov	2%		
	22-Dec	0%		
	23-Jan	4%		
	23-Feb	1%		
	23-Mar	0%		

a vital role in enhancing appointment management processes through continuous education of physicians and reminder processes. By embracing the Kaizen philosophy, our goal was to achieve substantial transformation through gradual improvements.

Post-intervention Results

The study findings demonstrated a significant reduction in the proportion of discharged patients without scheduled follow-up appointments. The percentage notably decreased from 9% in September to an impressive 0% by March. The differences between the results were statistically significant ($X^2= 65.05$, $p \text{ value} < .0001$), underscoring the effectiveness of the interventions implemented to address the issue of patients leaving the hospital without appropriate appointment scheduling (Table 3).

Discussion

The primary aim of this study was to enhance care continuity for oncology patients during the hospital discharge phase by reducing the percentage of patients discharged without scheduled follow-up appointments. Conducted at the Sultan Qaboos Comprehensive Cancer Center, the study utilized a pretest-posttest methodology to assess changes within the same group over time, eliminating the need for a separate control group. The key performance indicator (KPI) selected for evaluation was the proportion of patients discharged without a planned follow-up appointment.

The interventions implemented were grounded in lean management principles, incorporating the Kaizen principle, Gemba Walks, cross-functional collaboration, standard work practices, and waste reduction strategies. These approaches were strategically designed to address identified issues in the patient discharge process. The use of Gemba Walks enabled a deeper understanding of current workflows and challenges, fostering a collaborative environment that encouraged frontline staff to contribute valuable insights.

Effective cross-functional collaboration was achieved through the formation of an improvement task force comprising individuals from diverse disciplines. This approach ensured a holistic perspective and collaboration, aligning with existing research emphasizing the importance of interdisciplinary cooperation in healthcare improvement initiatives [9, 2].

The revised patient discharge protocol involved meticulous documentation of follow-up appointment details in the discharge summary, coupled with an automated system for appointment confirmation via SMS. These adjustments align with prior research advocating for enhanced documentation practices and technology integration to streamline appointment scheduling processes and enhance patient engagement [18, 19].

The application of the Kaizen principle facilitated continuous input acquisition, leading to incremental yet significant modifications. This approach aligns with previous research emphasizing the importance of gradual changes in achieving lasting improvements [20]. The study was conducted from Quarter 3 of 2022

to Quarter 2 of 2023 and resulted in a notable decrease in the proportion of patients discharged without scheduled follow-up appointments, dropping from 9% in September 2022 to 0% in March 2023. Statistical analysis revealed significant differences ($X^2= 65.05$, $p < .0001$), highlighting the effectiveness of the interventions in addressing identified challenges.

Comparing these findings with existing literature in healthcare quality improvement reveals consistency with prior studies. Interdisciplinary collaboration, technology integration, and patient engagement strategies have been associated with improved care continuity and patient outcomes. The reduction in missed appointments aligns with research emphasizing efficient procedures and effective communication in preventing missed follow-up visits [17, 21, 7, 9, 11, 20, 13, 22] Sarvandi & Shahroodi, 2016).

The study has notable limitations and implications. A key limitation is its quasi-experimental design, lacking a control group that could limit attributing changes solely to the interventions. The study's single-setting focus raises questions about generalizability to other healthcare systems with different structures and demographics. Additionally, the short duration of the study does not allow for assessing the long-term sustainability of improvements. Potential bias from staff trained in lean management methods and a focus on discharge metrics rather than direct patient outcomes pose further limitations.

In terms of implications, the study offers valuable insights into lean management's effectiveness in enhancing operational processes in healthcare, particularly in oncology. These findings could influence hospital policies and practices, emphasizing the importance of structured follow-up care for discharged patients and potentially impacting national healthcare guidelines. Future research could explore long-term outcomes, the applicability of lean methodologies in diverse settings, and their broader impact on patient care and satisfaction.

By prioritizing care continuity through scheduled follow-up appointments, this study highlights the potential benefits for patient outcomes, such as improved cancer treatment management and a potential decrease in readmission rates. Furthermore, the successful implementation of cross-functional collaboration underscores the critical role of interdisciplinary teamwork in healthcare, serving as a model for other healthcare institutions. The educational significance of this study is noteworthy, especially for healthcare management education focusing on lean principles in healthcare contexts.

In summary, this study effectively applied lean management principles to enhance care continuity for discharged oncology patients. The utilization of a quasi-experimental design, cross-functional collaboration, Gemba Walks, and the Kaizen concept collectively led to significant improvements. The results not only demonstrate the effectiveness of the interventions but also align with existing research on enhancing healthcare quality. This endeavor offers valuable insights for healthcare organizations aiming to enhance care

transitions and patient outcomes through systematic process improvements.

Author Contribution Statement

Khalid Al Baimani and Omar Ayaad: supervision of the whole steps of project; Shinnona Hamed AlHarthy, Muna Ali AlBalushi, Rawan Ibrahim, Huda Al-Awaisi, Al Ameer Ahmed Al Mashari, Mohammed Hassan Bait Nasib: Implementing the lean approach and interventions; Omar Ayaad, Rawan Ibrahim, Razan Al Zadjali: Preparing and review manuscripts

Acknowledgements

The authors gratefully acknowledge the support of center leaders, nurses, physicians, admission, discharge, and transfer staff, as well as the research office at the Sultan Qaboos Comprehensive Cancer Care and Research Centre, for their assistance during this study.

Scientific Approval

The study proposal underwent review and approval by the research office at the Sultan Qaboos Comprehensive Cancer Care and Research Centre (SQCCRC) in Muscat, Oman.

Ethical Declaration

Institutional Review Board (IRB) approval for conducting and publishing the project was obtained from the research office at the Sultan Qaboos Comprehensive Cancer Care and Research Centre (SQCCRC) in Muscat, Oman (CCRC-69-2023).

Data Availability

Data is available upon reasonable request.

Conflict of Interest

The authors have no conflicts of interest to disclose.

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