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Enhancing Discharge Planning Practices: A Study from Base Hospitals in Central Province-Sri Lanka

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A B S T R A C T

Introduction: A hospital is a medical facility with an organized medical and professional staff and beds available for continuous hospitalization of patients formally admitted for medical observation, care, diagnosis, or surgical and non-surgical treatment. Hospital discharge is the formal release of a hospitalized individual due to the conclusion of the hospitalization stay, either by death, return home, or transfer to another institution. Discharge planning is the development of an individualized discharge plan before leaving the hospital, intending to enhance patient outcomes and reduce costs of care. Furthermore, the discharge planning and follow-up process (DPFP) has become a vital part of the care coordination of patients. Moreover, DPFP affects continuity of care, safety, quality, efficiency, effectiveness, readmissions, effective resource mobilization, patient satisfaction and patient experience.

Objective: To enhance patient discharge planning and follow-up process at medical wards of base hospitals (BH) in the central province (CP) of Sri Lanka.

Methods: A quasi-experimental research project (QERP) was conducted at medical wards of BHs in the CP from February 2023 to September 2024. All four BHs in the CP that are under the administration of provincial health authority were selected on a criterion and matched between interventional group (IG) and control group (CG). Randomly selected IG hospitals were BHs Teldeniya and Rikillagaskada. The other two BHs were selected as CG, viz., BHs Dambulla and Dickoya. Research project (RP) was performed in three phases, viz., pre-interventional, interventional, and post-interventional. Mixed methods were used. In pre-interventional phase, a descriptive cross-sectional study was conducted to assess and identify gaps in the existing DPFP. Interviewer administered questionnaires (IAQ) for patients, self-administered questionnaires (SAQ) for doctors and nurses, interview guides or semi-structured questionnaires (SSQ) of focus group discussions (FGD) and key informant interviews (KII) for relevant stakeholders, checklists of service availability (CLSA) and outcome indicators (CLOI) were used as RP instruments and pre-tested and piloted at a similar setting, viz., BH Gampola which belongs to line ministry of health. An intervention advisory panel (IAP) involved in pre-interventional phase. In interventional phase, based on the pre-interventional results, inputs from key stakeholders and literature review, the existing DPFP was redesigned to address the gaps and designed an "interventional care package"(ICP) that was executed in IG. Executed interventions were introducing new guidelines and new discharge checklists, training of healthcare providers (HCP), and health education of patients and caregivers. An intervention monitoring committee (IMC) involved in interventional phase. Four months later, post interventional assessment was conducted using the same RP instruments. Moreover, enhancement was compared within IG and with CG. Measured indicators were readmission rate (RR), average length of stay (ALOS), bed occupancy rate (BOR), patient experience (PE), healthcare provider satisfaction (HCPS), timeliness of discharge rate (TDR), follow-up rate (FUR) and medication reconciliation rate (MRR). Additionally, a project evaluation was conducted with a project evaluation team (PET). Thematic analysis by using NVivo-11 for qualitative data and SPSS version 26 for quantitative data analysis were used. As per the graphical and statistical methods, t-test and Mann-Whitney U test were applied for inferential statistical analysis.

Results: Almost all the aforementioned outcome indicators were enhanced in IG, especially RR displayed a marked decrease. For instance, BH Rikillagaskada dropped RR from 39% pre-intervention to 22% post-intervention and BOR from 108% to 68%. Additionally, a trivial enhancement of some outcome indicators was observed in CG symbolizing contamination bias. Moreover, t-test analysis revealed all variables within IG compared with pre and post-interventional phases were statistically significant ($P<0.05$, 95% CI). Mann Whitney U test unveiled all variables except ALOS reached statistical significance within IG and between IG and CG compared with pre and post-interventional phases ($P<0.05$, 95% CI).

Conclusions: The ICP implemented in IG had enhanced outcome indicators compared within IG and with CG. The ICP was effective in enhancing DPFP at medical wards of BHs in the CP of Sri Lanka.

Recommendations: The ICP should be promoted at medical wards and other major specialities of base hospitals in the CP as well as other provinces in Sri Lanka to sustain effective DPFP.

Keywords: Patient discharge planning and follow up process, base hospitals, medical wards, interventions, guidelines, discharge checklists, health education, healthcare provider training.

1. Introduction

1.1.Patient discharge planning and follow-up process

A hospital is defined as any medical facility with an organized medical and professional staff and beds available for continuous hospitalization of formally admitted patients for medical observation, care, diagnosis, or surgical and non-surgical treatment. After the treatment or procedures patients are discharged from the hospital. Hospital discharge is defined as the formal release of a hospitalized individual due to the conclusion of the hospital stay, either by death, return home, or transfer to another institution (WHO, 2022). A person is considered an "inpatient" if formally admitted as an inpatient with the expectation of remaining at least overnight and occupying a bed. Even though, it later develops that discharge or transfer to another hospital is possible and a hospital bed is not used overnight. In the simplest form possible, and for any inpatient, their total hospital experience can be divided into three distinct phases, viz., admission, intervention, and discharge. Although they occur in that sequence, these phases tend to overlap (Khurma, 2009). The DPFP concept originated in the United States in 1960s to provide safe care transitions from hospitals to homes or another healthcare facilities using multidisciplinary approaches (Lin *et al.,* 2012). Discharge planning is the development of an individualized discharge plan before leaving the hospital, intending to enhance patient outcomes and reduce costs of care through timely discharge and coordination of HCPs and services following discharge to reduce readmission risk and promote community-based health management (Weiss *et al.,* 2015). Therefore, considering the above advantages, DPFP has become an integral part of care coordination of patients (Jack *et al.,* 2009; Weiss *et al*., 2015). In management purview, inpatient services represent the costliest element of national health services, and the bulk of inpatient activity occurs in public sector hospitals (Perera *et al*., 2009).

An effective DPFP plays an essential role in healthcare by significantly impacting patient and healthcare outcomes. In essence, effective DPFP forms a critical bridge between hospital care and post-discharge life. An effective DPFP not only influences immediate recovery but also contributes to the long-term well-being of patients, reduces the burden on healthcare systems, and ultimately enhances the quality of care provided.

1.2. Importance of discharge planning and follow-up process

DPFP acts as a vital link between hospital care and ongoing management, promoting patient engagement, ensuring continuity of care, and preventing complications. It ultimately contributes to a smoother and more successful recovery process for patients. It has been observed that discontinuity of inpatient care could cause post-discharge complications in fifty percent of adult discharged patients due to increasing vulnerability to various secondary illnesses (Kripalani *et al.,* 2007). When considering readmissions, most of the factors are modifiable, and some of the leading factors are related to the discharge practices such as premature discharge, inadequate post-discharge support, and insufficient follow-up (Eric *et.al.,* 2017). Although there are still limited studies about discharge planning, discharge planning interventions have proved their effectiveness in maintaining care continuity and providing support for families including follow-up visits and combining with community care (Auger *et al.,* 2018; Backer *et al*., 2021). DPFP needs to be more individualized and person centred which leads to better patient governance. Furthermore, both accessibility and continuity need to be enhanced, and especially information given needs to be met with the patient's level of understanding (Eric *et.al.,* 2022). As DPFP is interdisciplinary teamwork, all the team members including doctors, nurses, pharmacists, social workers, psychologists, nutritionists, physiotherapists, and other relevant stakeholders should work together. Moreover, the avoidable RR has been signified as an indicator of the safety and quality of hospital care (Gholizadeh *et al.,* 2018).

Hence, DPFP promotes the safety and quality of inpatient care and it is a timely need to enhance the system (Gholizadeh *et al.,* 2016). Because poorly planned and standardized discharge process and discontinuity and fragmentation of care set the patients at risk of adverse events after discharge or early readmissions (Mennuni *et al*., 2017).

1.3. Challenges in current discharge planning and follow-up process

Existing DPFPs often encounter several challenges that could hinder their effectiveness. Lack of effective communication and coordination among various HCPs involved in the discharge process (Doctors, nurses, pharmacists, social workers, etc.) could lead to misunderstandings, resulting in incomplete or inconsistent discharge plans (Gholizadeh *et al.,*2016). Handoff errors between hospital teams and outpatient providers might be confusing, leading to inappropriate follow-up care or medication discrepancies. Patients face challenges due to barriers like limited availability of medical specialists, geographic constraints, or financial issues. Inadequate monitoring of DPFP could result in missed warning signs of complications, leading to readmissions or worsening conditions. Patients have limited health literacy, making it challenging for them to understand complex medical instructions or treatment plans provided at discharge. Differences in language, cultural beliefs, or communication styles could impede a patient's understanding of discharge instructions. Hospitals encounter resource constraints, time constraints and inadequate access to community resources. Lack of financial resources limits patient's access to medications, follow-up appointments and essential post-discharge services. Addressing these challenges requires a multi-faceted approach involving enhanced communication approaches, enhanced patient education methods, better utilization of available resources, and integration of technology to streamline and enhance DPFP. Collaboration among HCPs, patients, and the community is essential to overcome these challenges and ensure a smoother transition from hospital to home or ongoing care settings (Richards *et al.,* 2020).

1.4. Theoretical frameworks in discharge planning and follow-up process

Several DPFP theoretical models or frameworks guide to enhance patient and healthcare outcomes. The 'IDEAL' discharge planning framework is to engage patients and family members in the transition from hospital to home, intending to reduce adverse events and preventable readmissions. The 'IDEAL' model can be used on its own or in conjunction with other initiatives, including Re-engineering discharge (RED), Care transitions program, and BOOSTing (Better Outcomes for Older Adults Through Safe Transitions) care transitions (IDEAL Discharge Planning, 2018). Transitional care model (TCM) focuses on enhancing care transitions for high-risk populations (Morkisch *et al*., 2020). The chronic care model (CCM) was originally designed for managing chronic conditions and emphasizes a proactive, patient-centred approach.

The CCM comprises six key elements, viz., hospital, community, self-management support, delivery system design, decision support and clinical information systems. The CCM model is often applied to post-discharge care, promoting patient engagement and self-management (Grudniewicz *et al*., 2023). The care transitions intervention (CTI) model was developed by Dr. Eric Coleman in 2007 and focuses on enhancing care transitions and reducing hospital readmissions. The CTI model involves coaching patients and caregivers during transition period, ensuring understanding of the care plan, and addressing potential barriers for adherence. The Bridges transitional care model (BTCM) emphasizes a team-based approach, involving healthcare professionals, patients, and caregivers in care planning and decision-making. The BTCM aims to provide seamless transitions through comprehensive assessments, education, and coordination of services (Xiang *et al.,* 2018). The four pillars approach (FPA) highlights four fundamental components, viz., medication management, follow-up care, patient education, and red flags to watch for after discharge. The FPA aims to ensure that these pillars are robustly addressed to optimize patient outcomes and reduce readmissions (Hartford Annual Report, 2007).

The Case Management to Care Transition (CMCT) model offers the components of DPFP to ensure attention to the full range of processes required for an inclusive approach to hospital discharge (Weiss *et al.,* 2015).

The aforementioned frameworks provide structured approaches to DPFP. They address various facets of patient needs, care coordination, education, and support. HCPs often adapt these models based on specific patient populations, healthcare settings, and available resources to enhance the effectiveness of DPFP.

2. Justification

The Provincial Department of Health Services Central Province consists of three administrative districts, viz., Kandy, Matale and Nuwara Eliya. The PDHS with three RDHSs is responsible for the management of health institutions in the province. There are four Base Hospitals, viz., Teldeniya, Dambulla, Rikillagaskada and Dickoya in CP under the administration of PDHS. There are Medical, Surgical, Gynaecology and Obstetrics and Pediatric wards in a BH. A systematic review concluded in Sri Lanka, has defined as the roles of a nurse have not been established. There are various issues in the discharge planning and follow-up process of patients (Subasinghe & Pathiranage, 2021). Subasinghe and Pathiranage (2021) further declared that very little recent literature is available on patients DPFP in Sri Lanka. Therefore, more studies are needed on this topic in Sri Lanka. Moreover, I would say that I could not find any published similar RPs carried out at medical wards of base hospitals in the CP. However, limited information is available about strategies to prevent readmissions. The objective of this RP was to explore and implement the strategies used by hospital leaders, administrators, and relevant stakeholders in managing and reducing patient readmissions to enhance DPFP. Furthermore, the strategies used to address the re-admission, are one of the main reasons for unavailability of a proper DPFP which must be studied by hospital leaders, administrators, and relevant stakeholders (Zakaria *et al*., 2021).

Interventions that would lead to the reduction of health costs and readmission rates are of utmost needed (Coleman *et al.,* 2005). Additionally, though nurses are involved in the discharge process, their role has not been clarified well due to the lack of conceptualized guidance, and very few engage in a specific role (Coleman *et al.,* 2005). A readmission is defined as an unplanned subsequent hospital admission in the same or a different hospital within 30 days after discharge from the hospital due to the same illness. An 'unplanned' means that patient has been discharged from the hospital and within 30 days of discharge, if the same patient was admitted for the same cause which was not planned by the hospital. Moreover, Patients retransferred or transferred to another hospital for long-term care are not considered as readmissions. By measuring the readmissions, one can analyze the effectiveness of care in a particular hospital (General Circular No.01-38/2016 & Manual on Management of Tertiary and Secondary Care Hospitals by Ministry of Health, Sri Lanka, 2022). Furthermore, the principal investigator (PI) has working experience as Deputy Provincial Director of Health Services in CP, the above problem has been in his mind to find solutions to reduce readmission rates (RR) and bed occupancy rates (BOR). In addition, the empirical shreds of evidence are shown below (Table 1).

Table 1: Information of Base Hospitals in Provincial Department of Health Services, Central Province in Year 2022

Base Hospital	No of Medical Wards	No. of Beds in Medical Wards	No. of Admissions To Medical Wards	Bed Occupancy Rate [BOR] In Medical Wards (%)	Readmission Rate [RR*] In Medical Wards (%)
Teldeniya	2	110	21503	120	34
Dambulla	2	124	48825	140	40
Rikillagaskada	2	74	17651	98	39
Dickoya	2	82	23558	108	32

(*Within 30 days after the previous discharge, Source: Curative Sector Information, Provincial Department of Health Services, Central Province, Kandy, 2022)

Table 1 reveals that the average readmission rate (RR) at medical wards of all BHs was 36.25% (The accepted average RR is 14.56%). This high RR might be due to poor discharge planning and follow-up process at the medical wards of base hospitals in the CP. Furthermore, the average bed occupancy rate (BOR) of all BHs was above 83.00% while medical wards had 116.5%. Hence, it could be considered as overcrowding because the accepted rate is 85% (Manual on Management of Tertiary and Secondary Care Hospitals by Ministry of Health, Sri Lanka, 2022). Furthermore, poor DPFP might cause more post-discharge complications, reduce patients' and healthcare providers' satisfaction, inadequate post-discharge support and a rise in treatment costs etc. The ultimate outcome of this RP is to enhance patients' health outcomes and reduce the government's burden on health for the reason that Sri Lanka is in an economic crisis as well. Therefore, it is justifiable to enhance patient discharge planning and follow-up process at the medical wards of base hospitals in the CP to make sure that every citizen receives patient-centred safe and quality care.

3. Objectives and purpose of the research project

3.1.Research problem

"*High average readmission rate and high average #bed occupancy rate were due to poor patient discharge planning and follow-up process at medical wards of base hospitals in the central province-Sri Lanka"

(*Readmission Rate - 36.25% in 2022; #BOR - 116% in 2022)

3.2.Objectives

3.2.1.General objective

To enhance the patient discharge planning and follow-up process at medical wards of base hospitals in the central province of Sri Lanka.

3.2.2.Specific objectives

1. **To assess** the existing patient discharge planning and follow-up process at medical wards of base hospitals in the central province.
2. **To identify** the gaps in the existing patient discharge planning and follow-up process at medical wards of base hospitals in the central province.
3. **To develop** interventions to enhance the patient discharge planning and follow-up process at medical wards of base hospitals in the central province.
4. **To implement** the interventions to enhance the patient discharge planning and follow-up process at medical wards of base hospitals in the central province.
5. **To evaluate** the interventions in enhancing the patient discharge planning and follow-up process at medical wards of base hospitals in the central province.

3.3.Purpose of the research project

The purpose of the RP was multifaceted and aimed to address several critical aspects of patient care in DPFP. The key purposes of the project are as follows;

- Optimize the resource utilization.

Better DPFP could help efficient use of hospital resources. By ensuring that patients are discharged at appropriate times with proper follow-up care, reducing unnecessary prolonged stays and managing bed occupancy more effectively.

- Increase the patient experience and satisfaction.

Patients were well-informed about their post-discharge care plans and had access to necessary follow-up services, they were more likely to feel secure and supported in their recovery process.

- Reduce readmission rates

One of the main goals was to lower the RR.

- Promote interdisciplinary collaboration

The RP aimed to foster better communication and coordination among HCPs, including doctors, nurses, social workers, and other relevant professionals.

- Develop standardized procedures

By studying current practices and identifying gaps, developed standardized DPFP guidelines and checklists or PODS that were executed in IG.

- Address the barriers to effective discharge.

Identifying and addressing barriers that patients and HCPs face during the discharge process was another key purpose. These barriers included lack of communication, inadequate patient awareness and education as well as inadequate HCP training.

- Evaluate the outcomes

The RP included outcome indicators for evaluating the effectiveness of the enhanced DPFP. They were RR, ALOS, BOR, PE, HCPS, TDR, FUR, MRR, HCP knowledge of DPFP and patient knowledge of DPFP.

By focusing on DPFP, the RP guided to ensure that patients receive the care they need even after leaving the hospital, ultimately leading to better health outcomes and a more efficient healthcare system.

3.4.Conceptual framework of the research project

The Conceptual framework of the RP is illustrated below (Figure 1).

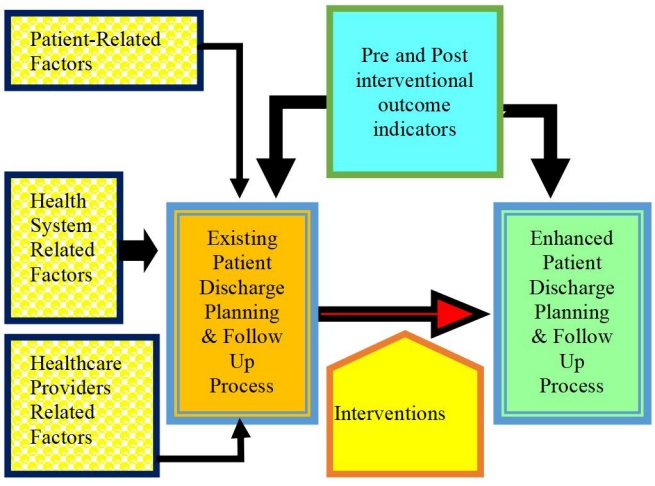

Figure 1: Conceptual framework of the research project

4. Literature review

The literature review was conducted aligning with the RP's objectives. It ensured that the review was relevant and focused. Furthermore, the literature review improved the methodological consistency and facilitated theoretical transparency. By doing so, it provided a strong foundation for conducting meaningful RP.

4.1.Existing patient discharge planning and follow-up process

The DPFP concept initiated in the United States in the 1960s provides safe care transitions from hospitals to homes or another healthcare facilities using multidisciplinary approaches (Lin *et al.,* 2012). The progressive ageing of the population has led to an increase in the number of hospital admissions of complex patients, who require both a multidisciplinary approach and coordination with post-hospital services. Otherwise, number of available hospital beds would be reduced, and the work pressure on HCPs would be increased to reduce the average length of stay (ALOS) of the patients. An unorganized discharge process creates up to 20–50% of either untimely or delayed discharge, often causing avoidable early readmission (Mennuni *et al.,* 2017). Data on admissions to government hospitals showed that admissions due to IHD have steadily increased over the past decade. Hospital admissions for DM have shown a parallel trend, but at a lower level compared to IHD (Ministry of Health, Sri Lanka & WHO, 2019). Declining trends were observed in admissions for gastrointestinal infections and parasitic diseases while emerging new infections such as dengue, epidemic influenza and leptospirosis and re-emergence of old infections such as tuberculosis pose health challenges (WHO, 2018). However, it must be noted that hospital admissions may not reflect the true prevalence of the condition. They identify health service utilization and the burden on healthcare system (Rajapaksa *et al*., 2021). On average 5.7 million live discharges were reported in 2020 to the IMMR system and approximately. There was no proper referral system in the curative sector of Sri Lanka. Patients were free to visit any type of institution for treatment. The reputation gained by some institutions based on resource availability or some other unknown facts may affect the selection of hospitals by patients. However, it is still an unstudied area. Due to this situation, many small institutions were underutilized and some major institutions were overcrowded. DGHs and BHs have increased BOR. (Annual Health Bulletin, MoH, Sri Lanka, 2020). The availability of proper discharge procedures directly affects the clinical care of the patients too. A study carried out in Iran showed glycosylated haemoglobin levels in type II diabetic patients have significantly reduced among the patients with proper DPFP (Dehnabi *et al*., 2018). A Policy Review carried out in USA for evidence-based best practices for discharge planning claimed that optimization of DPFP by incorporating best practices could ensure safer care transitions (Lewis, 2022). In USA about 15% of patients discharged from the hospital are readmitted within 30 days, and 1 in 4 of those readmissions are potentially preventable (Christoph *et al.,* 2021).

4.2.Gaps identified in the patient discharge planning and follow-up process

Readmission was the biggest challenge faced due to poor DPFP (Elysee *et al.,* 2021). Mennuni et al. (2017) suggested that discharge of the patient should be holistic. A qualitative research was conducted in Iran, using WHO guidelines, to understand barriers to develop DPFP. Furthermore, RP identified gaps in six areas, viz., leadership, service delivery, information, financing, health workforce, and medical production. Puvanendran (2011) identified inappropriate discharge destinations and incomplete communication with patients lead to adverse outcomes like unscheduled readmissions, frequent emergency department visits and adverse events. Kemp et al. (2017) claimed that lack of patient involvement in care decisions and not receiving written discharge instructions were associated with unplanned discharge instructions.

An interventional RP was conducted in United Arab Emirates (UAE) and identified gaps included patient and family unwillingness to discharge, medical delays in performing diagnostic tests or procedures, long-term care facility acceptance delays, and prolonged wait times for insurance approvals (Ibrahim *et al.,* 2022). Guan et al. (2021) declared that the discharge process needs to be more individualized and person-centred. Moreover, Krook et al. (2020) declared that accessibility and continuity need to be improved and doctor's role in the discharge process was clearly defined. A RP was conducted in USA revealed that early discharge planning has the potential to positively influence patient outcomes, healthcare costs, RR and patient satisfaction (Hearn Kandiss, 2020). High-performing and low-performing hospitals had made many of the same changes to clinical practices; including follow-up appointments before discharge, phone calls after discharge, medication management, risk stratification, and patient education; suggesting that these changes alone were insufficient to reduce readmissions (Brewster *et al.,* 2016; Nasiri *et al.,* 2022). Alghamdi et al. (2023) showed a statistically significant difference in improvement after implementing medication reconciliation in the percentage of patients with at least one outstanding unintentional discrepancy at admission. Medication reconciliation prevents untimely readmissions and drug errors (Krook *et al.,* 2020).

4.3.Development of interventions to enhance the patient discharge planning and follow-up process

Ahmad et al. (2022) recommend implementing the discharge planning by approving a written discharge planning, educating the HCPs and patients, paying attention to patient follow-up after discharge, enhancing the sub-structure, and considering the patient needs. Puvanendran (2011) endorses implementing medication reconciliation, post-discharge care patient education, and creating a useful discharge summary as interventions to enhance DPFP. Yam et al. (2012) developed interventions to reduce avoidable hospital readmissions, effective discharge planning and appropriate post-discharge support care are key requirements. Zakaria et al. (2020) say that the RED program is comprised of 12 components which include discharge planning and patient teaching. Client teaching, for instance, included teaching patients a written discharge plan in terms of that client. Education related to the client's diagnosis and medicines must be provided at discharge to ensure the client is well-prepared to continue a successful healing process at home. The discharge plan must include telephone reinforcement, expediting the transmission of the discharge summary to patients. All members of the team (Patient, caregiver, primary care physician pharmacist etc.) would be aware of patient management plan. The planned interventions that would be delivered at discharge include review and optimization of medications, assessing patient adherence and providing discharge medication counselling. Enhancement of patients' medication adherence, reduction of hospital readmissions, reduction of drug-related problems, and the attitude of HCPs towards clinical pharmacy services of clinical pharmacy services would be the major outcomes of this RP (Bagyawantha *et al.,* 2021). Mwachiro et al. (2019) recommend to use of Shared PRo forma for Information Gathering (SPRING) form and Soft Systems Methodology (SSM) to understand the perceptions of a range of different health and social care practitioners in the hospital. The 'SPRING' form anticipates future patient needs at the front

door, and has now been rolled out across the hospital. The 'SSM' form to understand the perceptions of a range of different health and social care practitioners in the hospital. Alghamdi et al. (2023) recommend standardized medication reconciliation, developing oversight for implementation, and developing a communication plan for all hospital staff involved in the medication reconciliation process.

4.4.Implementation of interventions to enhance the patient discharge planning and follow-up process

Gallagher (2019) in Michigan used the "teach-back method" in discharge education and a discharge preparedness checklist during hospitalization. Yam et al. (2012) say that the Delphi methodology was adopted to engage a group of experienced healthcare professionals to rate and discuss the framework and components of effective discharge planning. The framework consisted of 36 statements under 5 major themes: initial screening, discharge planning process, coordination of discharge, implementation of discharge, and post-discharge follow-up. Each statement was rated independently based on three aspects including clarity, validity and applicability on a five-point Likert scale. Zakaria et al. (2021) introduced the re-engineered discharge (RED) program to streamline DPFP and to decrease the readmissions at hospitals. Hahn et al. (2021) endorsed that the implementation, spread and effect of the patient-oriented discharge summary (PODS) across Ontario hospitals revealed the adaptability and ease of implementation of the PODS tool. Moreover, RP highlighted the usefulness of implementing PODS to DPFP.

A study carried out in USA aimed to evaluate the implementation of a suite of digital health tools integrated with the EHR. Methods used the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework to identify pertinent research questions related to implementation. The intervention was implemented at a large academic medical centre. Patients who agreed to participate were coached to watch a discharge video, complete a checklist assessing discharge readiness, and request post-discharge text messaging with a physician 24 to 48 hours before their expected discharge date, which was displayed via a patient portal and bedside display. Clinicians could view concerns reported by patients based on their checklist responses in real-time via a safety dashboard integrated with the EHR and choose to open a secure messaging thread with the patient for up to 7 days after discharge. Furthermore, RP supposed that EHR-integrated digital health tools become increasingly useful as part of an institutional strategy to engage patients, caregivers, and clinicians in enhancing DPFP (Theresa *et al*., 2020). A systematic review was carried out and a PRISMA statement was used as a reporting guide. The main outcome of this systematic review was to identify interventions that were developed and implemented to prevent delayed discharge and avoid inappropriate hospital (re)admissions. Articles included in this review were selected using the Population, Intervention, Comparison Outcome and Studies (PICOS) framework (Coffey *et al.,* 2019).

4.5.Evaluation of executed interventions in enhancing the patient discharge planning and follow-up process

The result was that the teach-back education and discharge checklists showed a potential to enhance the quality of care, prevent unnecessary healthcare expenditures that are associated with readmissions, and enhance patient experience and HCP satisfaction with the discharge process (Gallagher, 2019). A structured, systematic and coordinated DPFP is required to facilitate the discharge process to ensure a smooth patient transition from the hospital to the community and enhance patient health outcomes. An effective DPFP benefits the hospital system with fewer unplanned readmissions (Yam *et al.,* 2012). Hager (2010) recognized that the concept of early identification of barriers and an intensive discharge process was associated with decreased adverse events and readmissions within 72 hours and 14 days post-discharge. Mwachiro et al. (2019) suggested that readmitted patients who received follow-up calls post-discharge had significant enhancements in the length of time out of the hospital compared to those who did not receive a follow-up call post-discharge. Moreover, it was emphasized that further studies need to be completed because the results from this single centre cannot necessarily be generalized to other institutions. Additionally, patient appointments and telephone follow-ups by clerical or nursing staff were shown to have successfully reduced RR. In summarizing the effectiveness of RED, there was wide variability in the fidelity of the interventions, engaged leadership and multidisciplinary implementation teams as keys to success, and some challenges such as timely follow-up appointments, transmitting discharge summaries to outpatient clinicians, and leveraging information technology. The RED showed improvement in 30 days (Zakaria *et al.,* 2021). Hahn et al. (2021) found that the quality of PODS content and participation in a community of practice were factors that should be considered by hospitals implementing PODS and similar interventions in the future.

Mwachiro et al. (2019) claim that improved integrated working and SPRING and SSM forms have achieved a significant reduction in length of stay (LOS) for patients with health and social care needs. Coffey et al. (2019) concluded that (re)admission avoidance could result from early discharge planning in hospital, patient-focused education in hospital which continues at home, post-discharge support continuing from hospital including telephone follow-up; integrating the hospital and community care, and transitional care structures with access to a multifaceted multidisciplinary team. A randomized controlled trial was conducted at Colombo South Teaching Hospital (CSTH) in Sri Lanka to evaluate DPFP interventions in enhancing quality of life among elderly patients discharged from a Sri Lankan hospital setting. Moreover, Authors concluded that the improvement of quality of life (QOL) measures in the intervention group (IG) over the control group (CG) was significant. Incorporation of post-discharge plan and follow-up care (PDP&FC) intervention is recommended for enhancing QOL of post-discharge elderly patients in Sri Lankan hospital settings (Damayanthi *et al*., 2021).

5. Methods

5.1.Research project design

A quasi-experimental research project (QERP) was conducted at medical wards of base hospitals in the central province. RP was conducted in three phases, viz., pre-interventional, interventional, and post-interventional.

- Phase 1: Pre-interventional phase

In this phase, a descriptive cross-sectional study was carried out with six RP instruments to assess the existing DPFP and to identify the gaps. Furthermore, based on the results, an "interventional care package"(ICP) was designed.

- Phase II: Interventional phase

In this phase, prioritized ICP was implemented and executed in IG. Moreover, interventions were monitored.

- Phase III: Post-interventional phase

In this phase, an evaluation of RP was conducted using the same RP instruments utilized in pre interventional phase with criteria of relevance, coherence, effectiveness, efficiency and sustainability in IG. Furthermore, enhancement in DPFP was compared within IG and with CG.

5.2.Research project settings

RP settings were the medical wards of all base hospitals in the CP that are under the management of provincial department of health services. There are four BHs namely Teldeniya, Dambulla, Rikillagaskada and Dickoya in the CP. BH Teldeniya belongs to Kandy district. BH Dambulla belongs to Matale district. BH Rikillagaskada and BH Dickoya are in Nuwara Eliya District. There are two medical wards (Male & Female) in each BH and details are illustrated in Table 1. These four secondary care institutions provide services mainly through the four common specialities, viz., Medicine, Surgery, Pediatrics, Obstetrics & Gynaecology. The CP is located in the central hills of Sri Lanka and consists of three districts namely Kandy, Matale and Nuwara Eliya. The land area of the province is 5674 square kilometers which is 8.6% of the total land area of Sri Lanka. The CP lies on 6.6°- 7.7° Northern latitude and between 80.5°-80.9° Eastern longitudes. The elevation in the province ranges from 182.8 meters to over 1828.8 meters above sea level. The CP is bordered by North CP from the North, the Mahaweli River and Uma Oya from the East, the mountain range of Adams Peak from the south, and the mountain ranges Dolosbage and Galagedara from the West. The population density for the CP was 483 persons per square kilometre. The CP is equipped with an extensive network of healthcare institutions. The Department of Health Services of the Central Government and Provincial Government cover the entire range of promotive, preventive, curative, rehabilitative and palliative services (Annual health bulletin, department of health services, central province, 2022).

5.3.Sampling unit

A medical ward was considered as sampling unit.

5.4.Experimental or interventional group (IG)

Out of four base hospitals in the central provincial department of health services, two hospitals were selected randomly for the IG, viz., BH Rikillagaskada and BH Teldeniya (BHTD). Two medical wards in BH Rikillagaskada (BHRD) and two medical wards in BH Teldeniya were selected as the IG.

5.5.Control group or comparison group (CG)

The other two base hospitals were selected as the CG, viz., BH Dambulla and BH Dickoya. Two medical wards in BH Dambulla (BHDM) and two medical wards in BH Dickoya (BHDK) were selected as the CG.

5.6.Research project period

The RP was conducted from February 2023 to September 2024.

5.7.Resesrch project populations (Study populations)

There were mainly two study populations.

1. Healthcare provider population

2. Patient population

5.7.1.Sample size calculation for populations

5.7.1.1.Healthcare provider population

PDHS, RDHSs, Medical Superintendents (MS), Consultant Physicians, Doctors, Special Grade Nursing Officers (SGNO), Chief Pharmacists (CPh), ward masters (WM), ward sisters (WS) and Nurses were taken as HCP population. The sample size calculation for HCPs was not indicated as all were recruited for the RP. There were four HCP study populations.

5.7.1.1.a.Healthcare provider population for SAQD

A purposive sample was taken from the study population. It was planned to recruit all doctors who completed more than three months of service experience in medical wards.

5.7.1.1.b.Healthcare provider population for SAQN

A purposive sample was taken from the study population. It was planned to recruit all nurses who completed more than three months of service experience in medical wards.

5.7.1.1.c.Healthcare provider population for FGDs

Purposive samples were taken from the study population. It was planned to recruit all doctors and nurses who completed more than three months of service experience in medical wards.

5.7.1.1.d.Healthcare provider population for KIIs

A purposive sample was taken from the study population. It was planned to recruit the PDHS, all RDHSs, MSs, Consultant Physicians, SGNOs, CPhs, WMs and WSs.

5.7.1.2.Patient population

5.7.1.2.a.Patient population for IAQDPFP

Patients who had been discharged and were about to leave the ward were taken as the patient population according to inclusion and exclusion criteria (Sections 5.7.1.2.b. & 5.7.1.2.c.). Charan and Biswas (2013) published a review article on how to calculate sample size for different study designs and explained a formula for sample size calculation for comparison between two groups. When the endpoint of an intervention research is qualitative like satisfied or not satisfied, then the following formula can be used for sample size calculation for comparison between two groups. Both groups were kept under observation and at the end of the research, both groups were compared. The below-mentioned formula was applied to decide the number of patients to be included in the RP (Charan & Biswas, 2013).

$$\boldsymbol{N = 2(Z_{\propto/2} + Z_{\beta})^2\, P(1-P) \div (P_1 + P_2)^2}$$

N = Minimal sample size

If the study permits a 5% type I error (α error),

$$\boldsymbol{\propto/2 = 0.05/2 = 0.0250}$$

According to Z table,

$$\boldsymbol{\propto/2 = 1.96}$$

If the power of the study (1- β) is defined as 80%

Then, β error is 20% (0.020)

Refer to the Z table, **β=0.842**

P = Pooled prevalence

As there were no published similar RPs found at medical wards of BHs in the CP of Sri Lanka, it was assumed that the baseline proportion of the event was 50%. The RP expected a 20% increase in the proportion of events (e.g. Patient experience) in the IG due to proposed interventions. The proportion of events in the CG was assumed to be the same with the time factor. Hence,

P_1 = 50% = 0.50

P_2 = 70% = 0.70

P = (P_1+P_2) ÷ 2 = (0.50 + 0.70) ÷ 2 = 0.60

(P_1 – P_2) = Difference in proportion of events in two groups = **(0.5-0.7)**

When applying the values in the formula,

$$N = 2(1.96 + 0.842)^2 0.6(1 - 0.6) \div (0.5 - 0.7)^2$$

N **= 94.214448 ≈ 94**

A non-response rate of 10% was assumed

i.e. expected response rate was 90%

Then, ***N*** **= 94×100/90 = 104.444444 ≈105**

Therefore, the sample size for each group was 105

i.e. 105 patients for IG & 105 patients for CG

5.7.1.2.b.Inclusion criteria for the patient population for IAQDPFP

- Patients who were admitted to medical wards.
- Diagnosed patients with a medical condition according to ICD-10.
- Patients with age more than 18 years.
- Patients stayed in the medical ward for more than 3 days and were about to leave.
- Patients who could provide informed written consent or had appropriate proxies available to provide consent if necessary.

5.7.1.2.c.Exclusion criteria for the patient population for IAQDPFP

- Patients with terminal illnesses or those in palliative care, as their discharge and follow-up needs might differ significantly.
- Patients with severe psychiatric conditions that could affect their ability to participate or adhere to discharge plans.
- Patients who had been transferred to another healthcare facility or discharged to a different type of care setting due to different follow up processes were about to leave the medical ward.

5.7.1.2.d.Probability proportionate sampling technique (PPST) for allocating patients to control group and interventional group samples for IAQDPFP

The probability proportionate sampling technique was used to allocate the sample for each hospital, as a sampling frame was not readily available. Furthermore, this technique prefers to carry out RPs with resource constraints (Abrahamson, 2008). BOR of medical wards in all four hospitals was almost 100% (Provincial Department of Health Services, Central Province, Kandy, 2022). Therefore, the number of medical ward beds available in each hospital was chosen to allocate the number of patients in each sample (Table 2).

Table 2:Bed distribution and allocation of patients to IG and CG samples in medical wards of base hospitals

Group	BH	No of Beds	Proportion	Allocated patients
IG	BHTD	110	60%	63
	BHRD	74	40%	42
	Total	184	100%	105
CG	BHDM	124	60%	63
	BHDK	82	40%	42
	Total	206	100%	105

5.7.1.2.e.Systematic sampling technique (SST) to recruit patients for patient population sample for IAQDPFP

The systematic sampling technique was used to recruit the patients for the sample. In this method, the investigators select subjects to be included in the sample based on a systematic rule, using a fixed interval. In some situations, it is not necessary to have a sampling frame if there is a specific hospital or centre which the patients are visiting regularly. In this case, the researcher can start randomly and then systemically choose the next patients using a fixed interval (Elfil & Negida, 2017). It was decided to collect the sample for twenty-one days. The sample size was 105.

Therefore, the number of patients to be selected for a day was 105÷21 = 5

The average number of patients discharged from medical wards for a day was 14 patients from the 1st of January to the 31st of December 2022 in all four BHs in the CP (Curative sector information, PDHS, CP, 2022). Hence, the sampling interval was calculated by dividing patients discharged for a day by the number to be selected for a day.

Sampling interval=14÷5 = 2.8 ≈ 3

Therefore, the sampling interval was considered as 3.

Based on the discharged register, patients fulfilling the selection criteria were selected. The first patient was selected randomly between one and three. Next, based on the sampling interval others were selected. If any patient refused to participate, the very next patient was selected. On every data-collecting day, the selection of patients was carried out until the required sample size was reached (Table 2).

5.8.Definition and operationalization of the research project variables

There were dependent and independent variables. The variables included performance indicators or outcome indicators as well (Clare & Hofmeyer, 1998; Hedges *et al.,* 1999).

5.8.1.Readmission rate (RR)

A readmission is defined as an unplanned subsequent hospital admission in the same or a different hospital within 30 days after discharge from the hospital due to the same illness. 'Unplanned' means that patient has been discharged from the hospital and within 30 days of discharge, if the same patient is admitted for the same cause which was not planned by the hospital. The average RR is 14.56% (Manual of Management for THs and BHs, 2022 & General circular 01-38/2016 by Ministry of Health, Sri Lanka).

By measuring RR, the effectiveness of care in a particular hospital could be analysed. Patients retransferred or transferred to another hospital for long-term care would not be considered as readmissions.

5.8.2.Average length of stay (ALOS)

ALOS is the average number of days a patient stays at a hospital. ALOS (for one inpatient) is the number of calendar days from admission to discharge. A shorter stay would reduce healthcare expenditure. Premature discharges can cause readmissions. Staying longer would enhance patients' outcomes or reduce chances of readmission. To validate ALOS, readmissions must be considered (OECD, 2017; Manual on Management of Tertiary and Secondary Care Hospitals by the MoH, Sri Lanka, 2022; Moore *et al*., 2021).

5.8.3.Bed occupancy rate (BOR)

BOR is the percentage of beds occupied in the hospital in a given day/month/year. If BOR is more than 85% then it is considered overcrowding. Usually, 15 % of beds are reserved for emergencies. So the accepted rate is 85%. BOR is used to understand how the beds are utilized in a hospital. In Sri Lanka, line ministry institutions BOR is 71%. But unit wise it differs. For ENT units, it may be 40% or 50 % but in Medical units, it is sometimes 200%. BOR helps to identify the need for hospital beds for a particular region in planning, upgrading or putting up new hospitals or units (Manual on Management of Tertiary and Secondary Care Hospitals by Ministry of Health, Sri Lanka, 2022).

5.8.4.Patient experience (PE)

PE is the process of receiving care that feels like for the patient, their family and carers with their healthcare facility. Furthermore, it is the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care (NHS, 2013). Better PEs are associated with better patient safety, improved clinical outcomes and higher PE scores. Administration of a checklist or patient-oriented discharge summary (PODS) on discharge or doing post-discharged surveys would assess PE (Zakaria *et al.,* 2020). This could be evaluated using emojis or a Likert scale.

5.8.5.Healthcare provider satisfaction (HCPS)

Satisfaction of HCPs (Doctors, nurses, medical technicians, etc.) is related to healthcare service quality and outcomes. Low satisfaction is a major cause of psychological and social stress in HCPs and correspondingly of employee turnover. Healthy interactions between HCPs and patients are extremely important and can improve both the physician-patient relationship and the nurse-patient relationship. This can encourage HCPs to improve their work efficiency and medical service quality and can also promote patient recovery (Meng *et al.,* 2018). Furthermore, Healthcare is a high-labor-intensive business that requires regular interactions between healthcare employees and patients. Accordingly, employees' evaluation of internal quality and satisfaction is essential to providing high-quality services. This could be assessed by surveys, focus group discussions or one-to-one interviews using emojis or a Likert scale (Goula *et al*., 2022).

5.8.6.Timeliness of discharge rate (TDR)

TDR is defined as measuring how promptly patients are discharged from the hospital once they are medically ready (WHO, 2023). Hoyer et al. (2016) claimed that timely discharge summary completion time may be a quality indicator to evaluate current practice and as a potential strategy to improve patient outcomes. Furthermore, Hoyer et al. (2016) emphasized that longer days to complete discharge summaries were associated with higher rates of all-cause hospital readmissions. Lewis et al. (2021) found association between discharge summaries completed more than seven days had an increased association with RR.

5.8.7.Follow-up rate (FUR)

Coppa et al. (2021) say that post-hospital discharge follow-up appointments are intended to evaluate patients' recovery following a hospitalization. Moreover, lowering RR has been a priority of many health systems as this is a key metric of hospital quality and performance. Furthermore, Coppa et al. (2021) compared the benefit of patients arriving at their post-discharge appointments with patients who missed their follow-up visits or had no follow-up scheduled and found that a follow-up appointment within seven days of discharge was significantly associated with lower readmission risk across all patient types, including medical and surgical patients. FUR measures the percentage of patients who attend scheduled follow-up appointments after being discharged. This could be done daily, weekly, monthly, quarterly, or annually. FUR assesses the hospital's success in ensuring that discharged patients are receiving appropriate follow-up care. A higher FUR indicates better compliance with follow-up appointments, which is important for continuity of care and patient outcomes. By calculating and monitoring FUR, hospitals can ensure that discharged patients receive the necessary post-discharge care, leading to better health outcomes and reduced risk of readmission.

5.8.8.Medication reconciliation rate (MRR)

Medication reconciliation is the process of creating the most appropriate medication that a patient is taking with the involvement of patients and caregivers during transitions. Alghamdi et al. (2023) exhibited a statistically significant difference in improvement after implementing medication reconciliation in the percentage of patients with at least one outstanding unintentional discrepancy at admission. For this improvement project the execution of multilayered strategies for intervention such as a standardized medication reconciliation process throughout the hospitals, developing oversight for implementation, and developing a communication plan for all hospital staff involved in the medication reconciliation process. That is measuring the accuracy and completeness of medication reconciliation processes during transitions of care, such as admission, transfer, and discharge. Furthermore, Medication reconciliation minimizes medication errors and their associated healthcare costs in the transitions of care. Furthermore, MRR assesses the hospital's effectiveness in conducting medication reconciliation during transitions of care. A higher MRR indicates a higher level of accuracy and completeness in medication reconciliation processes. A declining MRR may indicate issues with medication reconciliation processes, such as inadequate documentation or communication among HCPs (Lnu Licentiate No. 41, 2023; Ziaie *et al.,* 2022).

5.8.9.Patients' knowledge of discharge planning and follow-up process

Patients' knowledge of DPFP is defined as patients' perception of the necessary steps, instructions, and resources associated with their transition from hospital to home or another care setting.

5.8.10.HCPs' knowledge of discharge planning and follow-up process

HCPs' knowledge of DPFP is defined as HCPs' perception of the detailed procedures, responsibilities, and best practices necessary for effectively transitioning a patient from hospital care to home or another care setting.

5.9.Quality of data

Pretesting and piloting of all the RP instruments were carried out and the needed changes were made after getting experts' opinions. Furthermore, content validity ratio (CVR), content validity index (CVI), Pearson correlation coefficient (PCC), Cohens' kappa test (CKT) and Cronbach's alpha (CA) were calculated, and necessary changes were made accordingly. PI was available all the time in the RP setting for the clarification of the questionnaire

and for other related matters regarding the RP. RAs were trained by the PI before the data collection. Data collection of the RAs was observed by the PI and corrected accordingly. The editing of data was completed on the spot where needed. All qualitative data from KIIs and FGDs were recorded, transcribed, and encoded through open coding, focal coding and axial or thematic coding (Nowell *et al.,* 2017). The thematic analysis was conducted based on the WHO six building blocks framework. It was carried out by the software NVivo-11 and also manually by the PI and by a professional data analyst.

5.10.Research project instruments

Six study instruments were used in this RP. Both quantitative and qualitative methods were used as follows.

- Quantitative methods

1) Interviewer administered questionnaire for Patients (IAQDFPF)

2) Self-Administered Questionnaire for Doctors (SAQD)

3) Self-Administered Questionnaire for Nurses (SAQN)

4) Checklist for service availability (CLSA)

5) Checklist for outcome indicators (CLOI)

- Qualitative methods

6)Semi-structured questionnaire (SSQ) or the interview guide for KIIs and FGDs with relevant stakeholders.

5.10.1.Interviewer-administered questionnaire for patients (IAQDPFP)

IAQDPFP with Likert scale was developed by the PI according to the objectives including all the variables based on reviewing the literature including PubMed and Google Scholar etc. The face and content validations were carried out with experts in the field. IAQDPFP has four main sections, viz., one, two, three and four. Section one includes the general information. Section two includes the DPFP. Section three includes communication and support. Section four includes the overall experience. IAQDPFP was prepared in English and then it was translated into Sinhala and Tamil by professionals who were supposed to be experts in languages. Next, it was back-translated into English with the help of Medical Officers. The minor changes were made after the translation. Consensual validation was obtained from an expert panel. Pretesting and piloting of IAQDPFP were conducted at BH Gampola and necessary changes were made. Data collection was carried out by the PI and RAs.

5.10.2.Self-administered questionnaire for doctors (SAQD)

SAQD with a Likert scale for doctors was developed by the PI according to the objectives including all the variables based on reviewing the literature including PubMed and Google Scholar etc. Face and content validations were carried out with experts in the field. The six sections of the questionnaire included demographic information, DPFP, collaboration and communication, education, information and overall assessment respectively. Consensual validation was obtained from an expert panel. Doctors have a high level of English proficiency and are comfortable understanding and responding to questionnaires in English. Therefore, translation into Sinhala and Tamil languages was not required. Pretesting and piloting of SAQD were completed at BH Gampola and necessary changes were made. Data collection was operated by the PI and RAs.

5.10.3.Self-administered questionnaire for nurses (SAQN)

SAQN with a Likert scale for nurses was developed by the PI according to the objectives including all the variables based on reviewing the literature including PubMed and Google Scholar etc. Face and content validations were carried out with experts in the field. Consensual validation was obtained from an expert panel. Pre-testing and piloting of SAQN were conducted at BH Gampola and necessary changes were made. Sections of the questionnaire included the same as SAQD (Section 5.10.2.). Nurses have a reasonable level of English proficiency and are comfortable understanding and responding to questionnaires in English.

Hence, translation into Sinhala and Tamil languages was not required. Pretesting and piloting of SAQN were completed at BH Gampola and necessary changes were made. Data collection was operated by the PI and RAs.

5.10.4.Checklist for service availability (CLSA)

CLSA was developed concerning DPFP at medical wards of BHs in the CP by the PI (Based on SARA, 2017; SLESP, 2019., MoH, Sri Lanka). Face and content validations were made with experts in the field. Consensual validation was obtained from an expert panel. Pretesting and piloting of CLSA were conducted at BH Gampola and necessary changes were made. Data collection was carried out by the PI with the help of hospital and medical ward staff.

5.10.5.Checklist for outcome indicators (CLOI)

CLOI was developed regarding DPFP at medical wards of BHs in the CP by the PI (Clare & Hofmeyer, 1998; Hedges *et al.,* 1999). Face and content validations were made with experts in the field. Consensual validation was obtained from an expert panel. Pretesting and piloting of CLOI were conducted at BH Gampola. Data collection by using a CLOI was carried out by the PI with the help of hospital and medical ward staff.

5.10.6.Semi-structured questionnaire (SSQ) or the interview guide for key informant interviews and focus group discussions

SSQ was developed by the PI based on reviewing the literature including PubMed and Google Scholar etc. Face and content validations were done with experts in the field. Consensual validation was obtained from an expert panel. SSQ consisted of an introduction, DPFP, collaboration and communication, addressing patient needs, evaluation and enhancement, challenges and opportunities, best practices and recommendations. Pre testing and piloting of SSQ were carried out at BH Gampola and necessary changes were made. KIIs and FGDs were carried out by the PI.

5.11.Pretesting and piloting of research project's instruments

Pretesting and piloting of all RP's instruments were done at a similar setting in BH Gampola which belongs to Line MoH. Administrative permission was obtained on 2nd October 2023. After pretesting and piloting, changes needed were made with an expert panel's opinion.

5.11.1.Validity of research project's instruments

Validity is defined as the extent to which a measure adequately represents the underlying construct that it is supposed to measure (Drost, 2011). It is identified as having four common forms namely face, construct, content, and criterion. The significance of content validity in psychometric instruments and their correlation with reliability have rendered it a crucial phase in the instrument development process (Zamanzadeh *et al.,* 2015). Evidence on the extent to which an assessment instrument's components are pertinent to and reflective of the intended construct for a given assessment purpose is provided by content validity. The literature has addressed the following four crucial elements of content validity, viz., definition, representation, relevance and suitability of the test construction process (Almanasreh *et al.,* 2019). The content validity index (CVI) is the mean of the content validity ratio (CVR).

5.11.1.a.Content validity of IAQDPFP

Content Validity Index - 0.94

5.11.1.b.Content validity of SAQD

Content Validity Index - 0.95

5.11.1.c.Content validity of SAQN

Content Validity Index - 0.95

5.11.2.Reliability of research project's instruments

According to Drost (2011), reliability is the extent to which measurements are repeatable when different people measure different occasions, under different conditions, supposedly with alternative instruments which measure the construct or skill.

Test-retest reliability (Pearson coefficient correlation) is a measure of a test's consistency over a period of time. Test-retest reliability assumes that the construct being measured is relatively stable over time.

Scale reliability (Commonly called internal consistency or internal scale reliability) is a measure of how well the items on a test relate to each other. The standard statistic for scale reliability is Cronbach's alpha (Daniel *et al.,*2018).

Inter-rater reliability is the extent to which two or more raters (or observers, coders, or examiners) agree. It addresses the issue of consistency in the implementation of a rating system. Inter-rater reliability can be evaluated by using several different statistics. Some of the more common statistics include percentage agreement, kappa, product-moment correlation, and intraclass correlation coefficient (Lange *et al.,* 2011). Piloting of all the study instruments was carried out at BH Gampola.

5.11.2.a.Reliability of IAQDPFP

- Cronbach's alpha-0.84
- Pearson correlation coefficient-0.81

- Cohen's Kappa test-0.76

5.11.2.b.Reliability of SAQD

- Cronbach's alpha-0.97
- Pearson correlation coefficient-0.92

5.11.2.c.Reliability of SAQN

- Cronbach's alpha-0.88
- Pearson correlation coefficient-0.94

5.12.Data Analysis

Thematic analysis by using NVivo-11 for qualitative data and SPSS version 26 for quantitative data analysis were used.

5.13.Ethical consideration

Ethical clearance was obtained on 27th September 2023 and administrative permission was obtained on 2nd October 2023. The study was conducted as per the international ethical guidelines for health-related research involving humans prepared by council for international organizations of medical sciences in collaboration with WHO and ethical principles for medical research involving human subjects by Declaration of Helsinki.

5.14.f.Conflict of interests

There was no conflict of interest.

6. Development of an Interventional Care Package (ICP)

Addressing the gaps found in the pre interventional phase was crucial as interventions were designed to enhance DPFP and advance overall patient outcomes. After identifying gaps performed SOWT and TOWS analysis. Furthermore, the Theory of Change (TOC) and Logical Framework Analysis (LFA) were carried out. Next, developed an ICP. Finally, ICP was prioritized considering feasibility and impact of interventions. ICP included four interventions with the IDEAL model which has six steps.

I Include patients in decision making process

D Discuss with patients and caregivers

E Educate patients and caregivers

A Assess patients and caregivers

L Listen to patients and caregivers

Step 1: Identify the roles and responsibilities of each member of the interdisciplinary team. E.g. Discharge Nursing Officer (DNO)

Step 2: Determine the estimated discharge date on admission

Step 3: Use the whiteboard in the patient's ward to communicate with the patient and caregivers

Step 4: Administration of discharge checklists or PODS by DNO

Step 5: Post-discharge calls followed the SCOTCH structure by Follow up Telephone Callers or Coordinators (FTC)

Step 6: Monitoring of DPFP

6.1.Summary of the qualitative results of the pre-interventional phase

The qualitative data was gathered from KIIs and FGDs. Thematic analysis was conducted as per the WHO's six buildings of the health system. They revealed numerous systemic challenges affecting DPFP (Table 3). Moreover, Lincoln and Guba's four-dimensions criteria (FDC) for trustworthiness in qualitative research were applied in FGDs and KIIs, viz., credibility, transferability, dependability and confirmability. Furthermore, strategies used to achieve trustworthiness were prolonged engagement, persistent observation, triangulation and peer debriefing (Forero *et al.,* 2018; Lincoln & Guba, 1985; Nowell *et al .,* 2017). By tackling these systemic issues head-on, healthcare facilities can create a more supportive environment that facilitates successful transitions from hospital to home or other care settings, ultimately leading to better health outcomes.

Table 3: Summary results of qualitative data during the pre-interventional phase

Theme	Subtheme	Item
GOVERNANCE	Systematic approach	Lack of guidelines on discharge planning & follow-up process (DPFP)
		Lack of priority to DPFP
		Lack of patient-centred approach
	Structure	Lack of structured, systematic and coordinated system
		Lack of specific standards on DPFP
	Management	Poor monitoring and evaluation system
		Inaccurate comprehension of DPFP
	Communication	Lack of interdisciplinary communication
		Inconsistent information sharing
		Inadequate explanation of DPFP
		Failure to address language and cultural barriers
	Advocacy	Lack of home care system
		Lack of powerful supportive centres (e.g. CBO)
SERVICE	Structure	Poor communication among healthcare providers
DELIVERY		Use of medical jargon and complex instructions.
		Ineffective follow-up system
		Poor linkage between hospital and community care
		Poor system of patient education and training
		Overloaded number of patients in medical wards
	Standard	Lack of guidelines on DPFP
		Lack of patient-friendly materials.
		Insufficient use of visual aids and simple language
		Lack of scheduling of follow-up appointments
		Lack of access to post-discharge hotlines
		Lack of telehealth usage for monitoring
		Delayed or incomplete discharge summaries
	Attitude	Lack of systematic approach to service delivery
		Lack of belief in continuing the care
		Cultural differences related to home visits
		Patients' low trust in medical personnel
		No need for patients' opinions in DPFP
	Medication	Lack of medication reconciliation system
		Lack of patient education on medications
INFORMATION	Facilities	Lack of effective communication between hospital & home
		Lack of integrated hospital information system (HIS)
		Lack of electronic health file training

		Lack of follow-up feedback such as post-discharge surveys
	Training	Lack of up-dated training materials
		Patients' unfamiliarity with DPFP
		Lack of patient involvement in DPFP
FINANCING	Allocation	Insufficient budget and financial resources support
		Economic crisis in the country
	Payment	High out-of-pocket spending (OOPS)
		Inadequate assessment of the patient's home environment
HEALTH WORKFORCE	Management	Discrepancy between workforce and workload
		The vagueness of the workforce's roles and duties
	Motivation	HCPs' resistance to change in the implementation
		HCPs' inadequate motivation
		Lack of the spirit of teamwork
	Empowerment	Lack of trained HCPs for DPFP
		HCPs and managers' poor knowledge of DPFP
MEDICAL PRODUCTION	Access to essential medicines and technologies	Lack of essential medicines to implement DPFP
		Lack of technology to implement DPFP
		Lack of electronic follow-up system to implement DPFP

6.2.Outcome indicators in the pre-interventional phase

The summary results of outcome indicators in the pre-interventional phase are displayed in Table 4 which reveals substantial variations in hospital performance across different metrics in the pre-interventional phase. Tackling these issues was essential as initiatives were developed to implement effective interventions aimed at enhancing service delivery at medical wards.

Table 4:Summary results of outcome indicators at medical wards of base hospitals in the central province in the pre-interventional phase

Outcome Indicator	Control group (CG)		Interventional Group (IG)	
	BH Dambulla	BH Dickoya	BH Teldeniya	BH Rikillagaskada
RR (%)	40	32	34	39
ALOS (Days)	3.8	4.2	5.7	4.8
BOR (%)	140	108	120	108
PE(%)	55	48	52	61
HCPS (%)	70	76	64	58
*TDR (%)	0.0	0.0	0.0	0.0
*FUR(%)	0.0	0.0	0.0	0.0
*MRR (%)	0.0	0.0	0.0	0.0
HCP Knowledge (Mean score)	4.06	3.34	4.29	4.30
Patient Knowledge (Mean score)	2.08	2.06	1.90	1.91

(*Data were not available as hospitals were not practising)

6.3.Prioritized ICP

The prioritized ICP to enhance DPFP was as follows;

1) Introduction of new DPFP guidelines with IDEAL model
2) Introduction of a new discharge checklist or PODS
3) Implementation of training programmes for HCPs

- Lecture discussions
- Powerpoint presentations
- Practical sessions

4) Implementation of Health Education (HE) and awareness programmes for patients and caregivers

- HE video clips playing on TV screens in medical wards and clinics
- Displaying HE posters for patients and caregivers
- HE leaflets for patients and caregivers
- Face-to-face HE talks with patients and caregivers by trained HCPs
- HE sessions with patients and caregivers by trained health education nursing officer (HENO)
- Uploading Health education video clips to Facebook pages of IG

7. Interventional phase

7.1.Implementation and execution of ICP

This section describes comprehensively how the ICP was implemented at medical wards in the IG, viz., BHs Teldeniya and Rikillagaskada. At the outset, an IMC was established to oversee the implementation and execution of the interventions. Following consultation with this committee, the interventions were started.

7.1.a.Implementation and execution of training programs for HCPs

The training program had three sessions. The program was conducted over a period of three weeks with one session for a week. The participants were informed via notices displayed in each medical ward. All doctors and nurses in medical wards were invited irrespective of participation in the primary survey during the pre-interventional phase. The program was conducted in Sinhala and English.

At the beginning, a "pre-training questionnaire" was given to all participants. At the beginning of the first session, the HOI welcomed the gathering and requested their support for the enhancement of the DPFP. PI addressed the gathering about the importance of DPFP. A consultant physician addressed the gathering about the technical aspects of the DPFP. The participants were educated about the newly introduced guidelines and checklist and expected their role in the process while using PowerPoint presentations. At the end of each lecture, there was an interactive question-and-answer session. Refreshments were provided at the middle of each session and expenses were borne by the PI. Each session was conducted from 10.00 a.m. to 12.30 p.m. in a way with minimal disturbances to the routine work.

The objectives of the program were to enhance the knowledge about DPFP and train the HCPs on a training of trainers (TOT) basis. At the end of the program a "post-training questionnaire" was given to all participants to evaluate the program at the "reaction level" of Kirkpatrick's tool.

7.1.b. Implementation and execution of educational programs for patients and caregivers on DPFP

The awareness program was done similarly in both BHs Teldeniya and Rikillagaskada. Awareness and educational sessions were conducted at medical clinics over 30 minutes by the HENO. The questions raised by patients were answered. This was conducted continuously for four weeks in every medical clinic while patients with their caregivers were waiting for consultation. Inward patients were educated during their stay as well as at the discharge time by a nurse or a doctor as they were trained TOT basis.

The printed HE leaflets were pasted on clinic books or diagnosis cards of the patients at the time of discharge from the medical wards. It would be seen by the patients several times without being misplaced. The HE posters were displayed in medical clinics, medical wards, OPDs and canteens. The short HE video clip of two minutes was played on TV screens of medical wards and clinics several times each day. Furthermore, it was uploaded to the Facebook pages of the IG hospitals. The following processes were conducted.

- Health education video clips played on TV screens in medical wards and clinics.

Link for HE video clip:

https://youtu.be/58cD_5FwhOc?si=LSxTmSomNiHa7i4U

- HE posters displayed at medical wards, clinics, and canteens
- Pasted HE leaflets on patients' clinic books or diagnosis cards
- HE talks were conducted with patients and caregivers at medical wards by HCPs.
- HE sessions were conducted at medical clinics for patients and caregivers by HENO.
- Uploaded HE video clips to the Facebook pages of the IG hospitals.

7.1.c.Implementation and execution of DPFP guidelines for HCPs

Conducted practical sessions for doctors and nurses of medical wards to familiarization, operationalization of IDEAL discharge planning model and monitoring of the DPFP adhering to the guidelines on a TOT basis. The same program was conducted in both BH Teldeniya and BH Rikillagaskada separately using the same methodology. Implementation of the new guidelines was done similarly in both hospitals.

7.1.d.Implementation and execution of the discharge checklist or PODS

Conducted practical sessions for doctors and nurses of medical wards to fill the checklists or the PODS as in the guidelines on a TOT basis. The same program was conducted in two hospitals separately using the same methodology and the same resources. Implementation of the new discharge checklist was done similarly in both BH Teldeniya and BH Rikillagaskada. The PI arranged a brief meeting with HCPs at the medical ward. A discharge nursing officer (DNO) and a follow-up telephone caller or coordinator (FTC) were nominated and requested to do assigned duties as per the guidelines. Once a patient is discharged, the DNO fills out a discharge checklist and attaches it to the patient's BHT. Furthermore, the patient was given a diagnosis card with a follow-up plan. Additionally, those checklists were used in the post-interventional phase as a triangulation method to assess patient experience. Moreover, PI introduced a patient follow-up register (PFUR) which includes appointments, referrals etc. The DNO and FTC (Domoto *et al*., 2021) are responsible for entering details into PFUR. The FTC should follow the **SCOTCH** structure as mentioned below.

- **S**et up (ask whether the patient is ready to talk)
- **C**heck the patient's understanding of the hospitalization
- Ask about **O**pportunities for the medical team to improve
- Ask how the **T**ransition home went
- **C**heck the patient's understanding of recommendations for ongoing care
- Offer to **H**elp as needed

8. Results

Post-interventional comparisons are illustrated in Tables 5, 6, 7, 8 and 9.

9. Findings

The evaluation of the ICP was measured by enhancements made in process, output, and outcome variables identified according to the scope and objectives of the RP. The pre and post-interventional status of IG and CG were compared within and between the groups. Appropriate statistical tests were applied whenever required. The findings of the pre-interventional phase and post-interventional phase are detailed below.

9.1.Pre-interventional phase

Data collection of qualitative methods highlighted significant gaps in communication between healthcare providers and patients, particularly regarding discharge instructions and follow-up care. Key challenges identified were time constraints during discharge, lack of standardized discharge guidelines, lack of inter-disciplinary coordination, insufficient patient education and training needs for healthcare providers.

Data collection of quantitative methods revealed similar challenges found in qualitative methods. A significant portion (59%) of patients stated bad experience while only 9.5% had good experience with DPFP. Furthermore, 41.8% of HCPs rated as unsatisfied with the current DPFP. Checklists indicated that follow-up appointments were often not scheduled before discharge, leading to gaps in continuity of care. Moreover, It was found that RR and BOR were high while MRR, FUR and TDR were not calculated even not practised in both IG and CG. Both quantitative and qualitative methods

suggested following to enhance DPFP. They were need of guidelines for DPFP, practising discharge checklist or PODS, enhancing patient education and awareness, enhancement of interdisciplinary coordination and training for HCPs.

9.2.Post-interventional phase

In the post-interventional phase of the RP, the effectiveness of interventions was evaluated. This phase demonstrated a significant enhancement in DPFP. Furthermore, interventions led to enhanced outcome indicators. All outcome indicators were enhanced in IG. Moreover, a trivial enhancement of some indicators was observed in CG symbolizing contamination bias. T-test analysis revealed all variables within IG compared with pre and postintervention phases statistically significant ($P<0.05$; 95% CI). Mann Whitney U test showed all variables reached statistical significance ($P<0.0$; 95% CI) within IG and between IG and CG except ALOS compared with pre and postinterventional phases.

10. Discussion

10.1. Discussion on methods

Quasi-experimental research design (QERD) which includes pre-interventional, interventional, and post-interventional phases, is a common approach in healthcare research. Methodology of a QERD allows evaluation of interventions in real-world settings where random assignment may be impractical or unethical (Harris *et al.*,2006). Conducting a RP in multiple settings enhances the representativeness of the findings across different districts within a province. This diversity could enhance the generalizability of results to similar healthcare settings (Abel *et al*., 2023).

Selecting medical wards as sampling units offers several advantages, including contextual relevance and streamlined data collection processes. Nevertheless, researchers must also be aware of the limitations regarding generalizability and potential biases inherent in this approach (Suresh *et al*., 2011).

Randomly selecting hospitals as IG and CG provides considerable advantages in terms of minimizing bias, enhancing comparability, and enabling strong statistical analyses. However, researchers must remain vigilant about potential confounding variables related to hospital characteristics, ethical considerations regarding patient care, and risks associated with contamination between groups. A trivial enhancement of some indicators was observed in CG symbolizing contamination bias. (Thiese, 2014).

Active participation of multiple stakeholders in RPs is essential for producing meaningful, impactful results that address real-world challenges. By leveraging diverse perspectives, fostering collaboration, and ensuring relevance, stakeholder engagement enhances both quality of research and potential for positive changes in health systems as well as in communities (Boaz *et al*., 2018).

Table 5: Comparison of patient-related factors in discharge planning and follow-up process at medical wards of base hospitals in pre and post-interventional phases of the interventional and the control groups using *Mann-Whitney U test*

Variable	Mean score		Change*	Statistical
	Interventional Group	Control Group	Between Groups	Significance#
Overall Experience				
Pre-Interventional	2.25	2.39	-0.14	U=1162 P<0.001
Post-Interventional	3.48	2.61	0.87	U=941 P<0.001
Change within the group	1.23	0.22	-	-
Statistical significance#	U=1096 P<0.001	U=1125 P<0.001	-	-
Length of Stay				
Pre-Interventional	2.10	2.09	0.01	U=972 P=0.064
Post-Interventional	2.00	2.06	-0.06	U=759 P=0.158
Change within the group	-0.10	-0.03	-	-
Statistical significance#	U=799 P=0.046	U=907 P=0.248	-	-
Patient involved in DPFP.				
Pre-Interventional	2.16	2.01	0.15	U=1286 P<0.001
Post-Interventional	1.84	1.98	-0.14	U=1098 P<0.001
Change within the group	-0.32	-0.03	-	-
Statistical significance#	U=1080 P<0.001	U=1091 P<0.001	-	-
Caregivers involved in DPFP				
Pre-Interventional	2.20	2.15	0.05	U=1203 P<0.001
Post-Interventional	1.97	2.08	-0.11	U=971 P<0.001
Change within the group	-0.23	-0.07	-	-
Statistical significance#	U=1117 P<0.001	U=1139 P<0.001	-	-
Explanation of Post-Discharge Care				

Table 5 displays Mann-Whitney U test results. There were enhancements in various patient-related factors following interventions in IG compared to CG. Furthermore, all variables except ALOS reached statistical significance (P< 0.05; 95% CI). This proved that the interventions had a positive effect on DPFP.

Overall experience scores indicated that while both groups enhanced post-intervention, IG showed a more substantial increase in mean scores compared to CG. The ALOS did not show significant differences between groups, though both groups reported slight reductions in post-intervention.

Table 6: Comparison of knowledge, perception, and attitudes of doctors in discharge planning and followup processes at medical wards of base hospitals in the central province in pre and post-interventional phases of the interventional and the control groups using *Mann-Whitney U test*

Variable	Mean score		Change* Between Groups	Statistical Significance#
	Interventional Group	Control Group		
Importance of DPFP				
Pre-Interventional	4.29	4.06	0.23	U=16.00 P<0.001
Post-Interventional	4.50	4.31	0.19	U=26.00 P<0.001
Change within the group	0.21	0.25	-	-
Statistical significance#	U=7.000 P<0.001	U=31.00 P<0.001	-	-
Participation in DPFP				
Pre-Interventional	3.71	3.75	-0.04	U=2.00 P<0.001
Post-Interventional	4.14	4.00	0.14	U=32.00 P<0.001
Change within the group	0.43	0.25	-	-
Statistical significance#	U=7.000 P<0.001	U=28.50 P<0.001	-	-
Method of ensuring patients are involved				
Pre-Interventional	4.00	4.19	-0.19	U=9.000 P<0.001
Post-Interventional	4.79	4.19	0.60	U=7.000 P<0.001
Change within the group	0.79	0.00	-	-
Statistical significance#	U=7.500 P<0.001	U=7.00 P<0.001	-	-
Challenges faced by patients				
Pre-Interventional	4.00	4.19	-0.19	U=8.000 P<0.001
Post-Interventional	4.00	4.19	-0.19	U=7.000 P<0.001
Change within the group			-	-
Statistical significance#	U=0.000 P<0.001	U=7.00 P<0.001	-	-
Satisfaction on DPFP				

Table 6 reveals that IG had a significant increase in participation in DPFP compared to CG post-intervention. IG also exhibited a notable increase in satisfaction. Furthermore, the Mann-Whitney U test denoted that all variables attained statistical significance (P< 0.05; 95% CI).

Table 7: Comparison of knowledge, perception, and attitudes of nurses in discharge planning and follow-up processes at medical wards of base hospitals in the central province in pre and post-interventional phases of the interventional and the control groups using *Mann-Whitney U test*

Variable	Mean score		Change* Between Groups	Statistical Significance#
	Interventional Group	Control Group		
Importance of DPFP				
Pre-Interventional	3.33	3.34	-0.01	U=34.00 P<0.001
Post-Interventional	3.98	3.52	0.46	U=253.5 P<0.001
Change within the group	0.65	0.18	-	-
Statistical significance#	U=15.00 P<0.001	U=242 P<0.001	-	-
Participation in DPFP				
Pre-Interventional	3.48	3.50	-0.02	U=34.00 P<0.001
Post-Interventional	3.85	3.60	0.25	U=255.5 P<0.001
Change within the group	0.37	0.10	-	-
Statistical significance#	U=18.00 P<0.001	U=235 P<0.001	-	-
Method of ensuring patients are involved				
Pre-Interventional	4.11	4.21	-0.10	U=18.00 P<0.001
Post-Interventional	4.11	4.21	-0.10	U=244.0 P<0.001
Change within the group	0.00	0.00	-	-
Statistical significance#	U=18.00 P<0.001	U=244 P<0.001	-	-
Challenges faced by patients				
Pre-Interventional	4.11	4.21	-0.10	U=18.00 P<0.001
Post-Interventional	4.11	4.21	-0.10	U=244.0 P<0.001
Change within the group	0.00	0.00	-	-
Statistical significance#	U=18.00 P<0.001	U=244.0 P<0.001	-	-
Satisfaction on DPFP				

Table 7 indicates enhancements in knowledge, perception, and attitudes towards DPFP among nurses in IG compared to CG. Furthermore, Mann Whitney U test results denote that all variables attained statistical significance (P<0.05; 95% CI).

This portrayed that interventions had a positive effect on various aspects of DPFP among nurses. IG experienced a notable increase in satisfaction levels in post-intervention compared to CG.

Table 8: Outcome indicators at medical wards of base hospitals in the central province in the pre and post interventional phases

Outcome Indicator	Control group				Interventional Group			
	BH Dambulla		BH Dickoya		BH Teldeniya		BH Rikillagaskada	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Readmission Rate [RR] (%)	40	38	32	30	34	20	39	22
Average Length of Stay [ALOS] (Days)	3.8	3.4	4.2	4.0	5.7	4.8	4.8	4.6
Bed Occupancy Rate [BOR] (%)	140	130	108	98	120	86	108	68
Patients experience [PE] (%)	55	58	48	52	52	72	61	84
HCPs' Satisfaction [HCPS] (%)	70	72	76	78	64	85	58	95
Timeliness of Discharge Rate [TDR] (%)	0.0	0.0	0.0	0.0	0.0	61	0.0	73
Follow-Up Rate [FUR] (%)	0.0	0.0	0.0	0.0	0.0	84	0.0	93
Medication Reconciliation Rate[MRR](%)	0.0	0.0	0.0	0.0	0.0	64	0.0	78
HCP Knowledge of DPFP (Mean score)	4.06	4.31	3.34	3.52	4.29	4.50	4.30	4.51
Patient Knowledge of DPFP (Mean score)	2.08	2.01	2.06	2.00	1.90	2.30	1.91	2.29

Table 8 shows IG had a positive outcome on outcome indicators. RR for IG displayed a marked decrease across all hospitals. For example, BH Rikillagaskada dropped RR from 39% pre-intervention to 22% post-intervention. In contrast, CG exhibited minimal changes, indicating that interventions had a more pronounced influence on IG. ALOS decreased in both groups, but reductions were more significant in IG. For instance, BH Teldeniya reduced from 5.7 days to 4.8 days. BOR decreased for both groups post-interventions, with notable reductions in IG. BH Rikillagaskada fell BOR from 108% to 68% following the interventions. PE enhanced significantly in IG, particularly at BH Rikillagaskada where experience rose from 61% to 84%. HCPS also demonstrated enhancements in IG, with BH Rikillagaskada experiencing a rise from 58% to 95%. In terms of TDR, IG made significant strides, with BH Teldeniya achieving a rate of 61% post-interventions compared to 0% pre-intervention. FUR showed dramatic enhancements in IG, particularly at BH Teldeniya where it increased from 0% to 93%. MRR enhanced significantly in IG, rising from 0% to 78% at BH Rikillagaskada. The mean scores for HCP knowledge were enhanced across both groups but were consistently higher in the interventional group, particularly in BH Rikillagaskada (From 4.30 to 4.51). The mean scores for patient knowledge showed slight changes in both groups, with the interventional group demonstrating better scores, particularly in BH Rikillagaskada (From 1.91 to 2.29).

Charan and Biswas (2013) provide a robust framework for sample size calculation that is essential for QERD. This approach ensures that researchers can accurately determine the necessary sample sizes to achieve valid and reliable results, ultimately contributing to the advancement of evidence-based practice in healthcare. Employing multiple study instruments is vital for augmenting data richness, validity and reliability. This multifaceted approach enables researchers to draw more comprehensive conclusions and develop interventions that are better suited to address the needs identified through various views and methodologies (Wasti *et al.,*2022).

10.2. Discussion on pre-interventional phase

Extensive actions were taken to ensure data quality in this RP. By focusing on pretesting, validity assessments, reliability testing, training, supervision, immediate editing, PI availability, and robust statistical analyses, researchers can significantly enhance the quality of their data. High-quality data not only supports accurate conclusions but also strengthens the overall effect (Wang *et al*.,2023).

10.2.1 Results of quantitative data analysis

Both service availability gaps and performance disparities were crucial for enhancing healthcare delivery and achieving better patient outcomes (Wynia & Osborn, 2010). Patients in both CG and IG exhibited generally negative perceptions regarding DPFP, highlighting critical areas for enhancement to

enhance patient experiences and outcomes (Kripalani & Weiss, 2006). Patients suggested several ways to enhance DPFP, viz., timely follow-up appointments (N=105; 37.1% CG; 36.2% IG), clear communication (N=105; 19% CG; 27.6% IG) and increased patient involvement in DPFP (N=105; 22.9% CG; 21% IG). Doctors' mean satisfaction score for CG is 1.91, while IG reports a slightly higher mean score of 2.04, indicating marginally greater satisfaction. Both groups reflected a pervasive sense of dissatisfaction regarding DPFP. Many nurses were involved in DPFP, a significant number remain uncertain or only occasionally participate, which could hinder effective DPFP. Addressing challenges through enhanced communication strategies, standardized protocols, and enhanced education could significantly enhance DPFP. Higher satisfaction scores among nurses in IG suggest that recent initiatives may be positively perceived and could lead to better engagement and outcomes moving forward. Nurses' mean satisfaction score for CG is 1.69, while IG reports a higher mean score of 2.00, suggesting greater satisfaction. Variance in satisfaction scores (1.163 for CG, 1.231 for IG), indicated comparable levels of variability in both groups (Wynia & Osborn, 2010).

10.2.2.Results of qualitative data analysis

The qualitative analysis divulged multiple systemic barriers that hinder effective DPFP across various dimensions, viz., governance, service delivery, information management, financing, health workforce dynamics, and medical production infrastructure. Addressing these issues through comprehensive strategies could significantly enhance patient outcomes and enhance the DPFP (Wong *et al*., 2011).

Table 9: Detailed Completed Logical Framework Analysis for the Research Project after the Interventions in the IG

Narrative Summary **Level and Results**		**Objectively Verifiable Indicator [OVI]**	**Baseline Value [Pre-intervention]**		**Target**	**Means of Verification [MOV]**	**Achievement [Post-intervention]**	
			BHTD	**BHRD**			**BHTD**	**BHRD**
Outcome 1	Enhanced discharge planning and follow up process (DPFP) at medical wards of base hospitals in the central province	Readmission Rate	34%	39%	Reduce to 20%	■CLOI	Reduced to 20%	Reduced to 22%
		Bed Occupancy Rate	120%	108%	Reduce to 85%	■CLOI	Reduced to 86%	Reduced to 68%
		Overall Patient Experience	52%	61%	Increase to 60%	■CLOI ■IAQDPFP	Increased to 72%	Increased to 84%
			Mean score of 2.25		Significant level at a P<0.05	■Mann-Whitney U test ■IAQDPFP	Significant change, Mean score of 3.48, U=1096, P<0.001	
		Healthcare Provider Satisfaction	64%	58%	Increase to 80%	■SAQD ■SAQN	Increased to 85%	Increased to 95%
		■Doctors' Satisfaction	Mean score of 2.00		Significant level at a P<0.05	■Mann-Whitney U test ■SAQD	Significant change, Mean score of 3.79, U=18.50, P<0.001	
		■Nurses' Satisfaction	Mean score of 2.04		Significant level at a P<0.05	■Mann-Whitney U test ■SAQN	Significant change, Mean score of 3.48, U=34.50, P<0.001	
		Timeliness of Discharged Rate	0.0%	0.0%	Increase to 60%	■CLOI	Increased to 61%	Increased to 73%
		Follow Up Rate	0.0%	0.0%	Increase to 80%	■CLOI ■PFUR	Increased to 84%	Increased to 93%
		Medication Reconciliation Rate	0.0%	0.0%	Increase to 60%	■CLOI ■PODS	Increased to 64%	Increased to 78%
		Average Length of Stay	5.7 days	4.8 days	Increase to 6 days	■CLOI	4.8 days No achievement	4.6 days No achievement

Outcome 2	**A.** Enhanced HCPs' knowledge of DPFP	Knowledge assessment score	Mean score of 59.68%	Significant level at a P<0.05	■Kirkpatrick's Tool ■ T-test ■Observations	Significant change, Mean score 94.68%, t=18.0, P=0.000
	B. Enhanced Doctors' knowledge of DPFP	Knowledge assessment score	Mean score of 4.29	Significant level at a P<0.05	■Mann-Whitney U test ■SAQD	Significant change, Mean score of 4.50, U=7.000, P<0.001
	C. Enhanced Nurses' knowledge of DPFP	Knowledge assessment score	Mean score of 3.33	Significant level at a P<0.05	Mann-Whitney U test ■SAQN	Significant change, Mean score of 3.98, U=15.00, P<0.001
	D. Enhanced Patients' knowledge of DPFP	Knowledge assessment score	Mean score of 1.90	Significant level at a P<0.05	■Mann-Whitney U test ■IAQDPFP	Significant change, Mean score of 2.30, U=1060, P<0.001
Output 1	New DPFP guidelines developed	Availability of developed new guidelines for medical wards	Not available	Availability in all medical wards throughout the intervention period (100%)	■Observations	Available in all medical wards Achievement = 100%
Output 2	Discharge checklists or PODS developed	Availability of developed Checklists or PODS for medical wards	Not available	Availability in all medical wards throughout the intervention period (100%)	■Observations	Available in all medical wards Achievement = 100%
Output 3	HCPs trained on new DPFP guidelines & Checklists	Number of HCPs trained	None	To train all HCPs (100%)	■Training log books ■Attendance sheets ■Kirkpatrick's Tool	Achievement = 79%
Output 4	Patients Educated	Number of patients educated	Not available	To educate all medical wards and clinic patients (100%)	■Discharge Register ■PODS ■IAQDPFP ■Clinic Attendance Register	Achievement = 83%
Output 5	HE Leaflets pasted on clinic books or diagnosis cards of discharged patients	Number of HE leaflets pasted on clinic books or diagnosis cards	None	HE leaflets pasted on all discharged patients' diagnosis cards (100%)	■PODS ■IAQDPFP ■Discharge Register	Achievement = 81%

Output 6	HE Posters displayed in medical wards, OPD, Clinics & Canteen	HE Posters displayed in medical wards, OPD, Clinics& Canteen	None	HE Posters displayed throughout the intervention period (100%)	■Observations ■IAQDPFP ■KIIs ■FGDs	Achievement = 80%
Output7	HE video clips played at medical wards and clinics	Number of video clips on DPFP played at medical wards and clinics	None	Played Six times per day throughout the intervention period (100%)	■Observations ■IAQDPFP ■KIIs ■FGDs	Achievement = 83%
Output 8	Practising of discharge checklists or PODS	Number of PODS attached to patients' BHTs	None	PODS attached to every discharged patient's BHT throughout the intervention period (100%)	■Observations ■PODS	Achievement = 94%
Process 1	Development process of DPFP guidelines	Availability of New DPFP guidelines document	None	New DPFP Guidelines	■Observations	New DPFP Guidelines were developed and introduced. Achievement = 100%
Process 2	Development process of discharge checklists or PODS	Availability of New discharge checklists or PODS	None	New discharge checklists or PODS	■Observations	New discharge checklists or PODS developed and introduced. Achievement = 100%
Process 3	Health Education talks & sessions for patients conducted	Number of education sessions conducted	Not available	One to one HE talk for each discharged patient and one session for each clinic day	■Observations ■PODS ■IAQDPFP ■FGDs	Achievement = 92%
Process 4	Training sessions for HCPs on DPFP guidelines & discharge checklists or PODS	Number of training sessions conducted	None	Weekly for three weeks	■Training log books ■Attendance sheets	Achievement = 100%
		Knowledge assessment score	Mean score of Pretest: 26.60%	Significant level at a P<0.05	■Kirkpatrick's Tool ■T-test	Significant change, Mean score Pre:26.60%, Post: 59.68%, t=14.0, P=0.000
Process 5	Design & print HE leaflets & posters, Produce HE video	Availability of HE leaflets, HE posters and video clips on DPFP	None	Available throughout the intervention period (100%)	■Observations ■FGDs	Available throughout the intervention period. Achievement = 100%

	clips					
Inputs	"Interventional care package" with all activities and action plan given in detail		Not available	Available	■Observations ■FGDs	Available throughout the intervention period. Achievement = 100%

(BHTD-Base Hospital Teldeniya, BHRD-Base Hospital Rikillagaskada, BHT-Bed Head Ticket, CLOI-Checklist for outcome indicators, FGD-Focus group discussion, HE-Health education, IAQDPFP-Interviewer administere questionnaire for patients, KII-Key informant interview, PFUR-Patients follow up register, PODS-Patient oriented discharged summary, SAQD-Self-administered questionnaire for doctors, SAQN-Self-administered questionnaire for nurses)

Table 9 presents outcomes, outputs, processes, and inputs with specific baseline values, targets, MOV, and levels of achievement in the IG. The research project demonstrated significant enhancements in DPFP. An interventional care package with a detailed action plan was provided and fully implemented (100%). HE materials were successfully designed, printed, and distributed throughout the intervention period achieving 100%. Health education talks and training sessions for healthcare providers were conducted, achieving over 90% participation. New guidelines and checklists for DPFP were developed, made available in all medical wards and introduced, achieving 100%. Leaflets, posters, and video clips were developed and disseminated, with achievements ranging from 80% to 94%. The 79% of healthcare providers were trained on DPFP guidelines and checklists and it was slightly below the 100% target. The 83% of patients were educated, meeting high achievement levels.

Knowledge among healthcare providers, doctors, nurses, and patients showed significant enhancement as indicated by knowledge assessment scores using validated tools. Checklists were attached to nearly all discharged patients' records (94% achievement). Overall patient experience surpassed the target of 60%, achieving 72% (BHTD) and 84% (BHRD). HCPS increased from 64% (doctors) and 58% (nurses) to exceed the target of 80%. TDR, FUR, and MRR Significantly enhanced, with results surpassing targets. ALOS aimed to increase to six days but decreased slightly (no achievement). RR reduced from 34% (BHTD) and 39% (BHRD) to 20% as targeted. BOR Dropped significantly from 120% (BHTD) and 108% (BHRD) to below the target of 85%, achieving 86% (BHTD) and 68% (BHRD). The ALOS aimed to increase to six days but decreased slightly (no achievement). The research project achieved substantial success in most areas.

10.3. Discussion on the interventional phase

Executed ICP could address general barriers in healthcare delivery. By focusing on structured approaches that involve both healthcare providers and patients in DPFP, hospitals could significantly enhance patient outcomes by enhancing healthcare outcome indicators, especially by reducing RR. Addressing these areas through comprehensive strategies is crucial for fostering a patient-centred approach to DPFP (Schwarz *et al.,* 2024).

10.4. Discussion on the post-interventional phase

10.4.1.Results of quantitative data analysis

Interventions significantly influenced patient engagement and experience with DPFP. Many enhancements were statistically significant (T-tests & Mann Whitney U tests). Overall, these interventions appeared to enhance patient preparedness for post-discharge care and adherence to follow-up appointments, which were vital for reducing readmission rates and outcomes. IG experienced substantial enhancements in various patient-related factors concerning DPFP compared to CG. These enhancements indicated that targeted interventions led to better patient engagement and understanding of DPFP. These enhancements are essential not only for individual patient outcomes but also for broader public health goals such as reducing RR and enhancing outcomes (Carroll & Dowling, 2007). The enhancements observed not only enhance HCPs' understanding but also contribute to better patient transitions. RP provided a broader context for understanding how interventions could enhance HCPs' engagement and enhance patient DPFP (Goncalves *et al*., 2022). The positive effect of interventions on nurses' satisfaction and engagement with DPFP was well-supported by existing literature, although some findings indicated areas for further exploration and enhancement. It was clear that while significant strides have been made, additional efforts are necessary to ensure sustained enhancements in knowledge and engagement among nurses involved in DPFP (Hayajneh *et al.*, 2020).

Interventions implemented at IG had a positive influence on various outcome indicators. These findings were consistent with existing literature that emphasized the effectiveness of DPFP (McWilliams *et al.*, 2019).

10.4.2. Results of qualitative data analysis

Thematic analysis from KIIs and FGDs provided valuable perceptions into the success of interventions aimed at enhancing DPFP. The findings aligned with existing literature that emphasizes the importance of systematic approaches, effective communication, patient involvement, and adequate resources in enhancing healthcare delivery. While significant enhancements have been noted, ongoing research is necessary to address identified challenges and validate these findings across diverse healthcare settings. By integrating best practices from the literature into clinical workflows, hospitals could enhance DPFP (Jones *et al*., 2023).

10.5. Limitations

1) The effectiveness of interventions varies significantly based on how they were implemented across different wards or hospitals.
2) Communication barriers among HCPs hinder effective DPFP.
3) Limited resources might impede implementation of effective DPFP.
4) RP measures immediate and intermediate outcomes. It might not be able to measure long-term outcomes or the impact due to the time constraints of the RP. Longitudinal studies that track patients over time will be necessary to evaluate the impact of enhanced DPFP.
5) Participants might have altered their behaviour simply because they were being observed as part of RP. This "Hawthorne effect" could lead to artificially exaggerated results.
6) PI did not have control over the exposure or interventions in CG, contamination bias may occur. This minimizes the difference in observed outcomes between IG and CG.

11. Conclusions

As per the specific objectives, the following conclusions were drawn.

1) A QERP was conducted through three phases, viz., pre-interventional, interventional and post-interventional phases. The IG exhibited enhanced outcome indicators compared within IG and with CG. The ICP was effective in enhancing DPFP at medical wards of BHs in the CP.
2) In pre-interventional phase, six RP instruments were used, viz., IAQDPFP, SAQD, SAQN, SSQ, CLSA and CLOI. The largest proportion of patients falls in the 56-65-year age group, with 29.5% in CG and 23.8% in IG with a majority of females, viz., 67.6% in CG and 61.9% in IG. Furthermore, data revealed that a significant portion of patients (59%) reported a bad experience with DPFP, while only 9.5% had a good experience. IG had a mean overall patient experience score of 2.25. HCPs were unsatisfied with the existing DPFP in both IG and CG.
3) Gaps identified were unsuccessful values of outcome indicators, absence of DPFP guidelines and checklists, deficiency in HCPs training, patient awareness and education, resource constraints, communication issues, nonexistence of an integrated system to track patients, workload constraints and challenges in coordination etc.
4) Applying SWOT and TOWS matrixes, an ICP was developed. Next, LFA and TOC were carried out. Finally, ICP was prioritized considering feasibility and impact of interventions. It consisted of introduction of new DPFP guidelines and checklists, training of HCPs, health education of patients and caregivers. IAP involved in this endeavour.
5) In interventional phase, ICP was implemented and executed in IG with the help of an IMC. An intervention monitoring framework was used during this phase. ICP was executed for two months duration and waited for four months to embed the interventions.
6) In post-interventional phase, the same RP instruments were used. IG patients exhibited significant enhancements in various factors including overall experience with DPFP compared within IG and with CG. All variables analyzed with t-test and Mann Whitney U test showed statistical significance ($P<0.05$; 95% CI) except ALOS.
7) Doctors in IG developed a stronger satisfaction level with those reporting "Unsatisfied" dropping from 42.9% to 0%, and "Fully Satisfied" elevated to 21.4%. This reflected a marked enhancement in satisfaction among doctors in IG regarding DPFP. Moreover, there were significant enhancements in various aspects of doctors' knowledge, perception, and attitudes towards DPFP. All variables analysed with t-test and Mann Whitney U test disclosed differences observed between pre and post interventional phases were statistically significant ($P<0.05$;CI;95%).
8) Nurses in IG experienced a dramatic increase in satisfaction levels in post-interventions, with a complete drop in unsatisfied responses and a significant rise in those reporting satisfaction. Furthermore, it was indicated that interventions had a positive effect on nurses' knowledge, perception, and attitudes towards DPFP compared within IG and with CG. Additionally, all variables relevant to nurses analyzed with t-test and Mann Whitney U test exhibited statistical significance ($P<0.05$; 95% CI). All outcome indicators were enhanced in IG especially RR displayed a marked decrease. Moreover, a trivial enhancement of some indicators was observed in CG symbolizing contamination bias.
9) In summary, t-test analysis revealed all variables within IG compared with pre and post-intervention phases statistically significant ($P<0.05$; 95% CI). Mann Whitney U test uncovered almost all variables reached statistical significance ($P<0.05$; 95% CI) within IG and between IG and CG compared with pre and post interventional phases. Furthermore, there were significant enhancements in knowledge of DPFP both HCPs and patients. Moreover, Post-interventional qualitative data from FGDs and KIIs concluded that interdisciplinary communication, inter and intra-sectional collaboration are necessary for an effective DPFP.
10) The ICP was evaluated using criteria, viz., relevance, coherence, efficiency, effectiveness and sustainability with the help of PET. It was concluded that while significant enhancements were observed in post-interventional phase, a continuous monitoring and evaluation system is needed to sustain over time and continuous feedback mechanisms should be established to ensure an effective DPFP.

12. Recommendations

Grounded on findings and conclusions, the following recommendations are professed.

1) Standardized DPFP guidelines should be established to outline the roles and responsibilities of HCPs. This emphasizes the importance of having structured protocols to enhance DPFP.

2) Discharge checklists or PODS should be introduced to HCPs to ensure all critical components of DPFP are addressed before a patient leaves the hospital. The goal of PODS is to make the transition from hospital to home smoother.

3) Educational and awareness programs using IEC materials should be implemented for patients and caregivers focusing on their specific health conditions, medication management, and post-discharge care.

4) Continuous training programs for HCPs should be provided directing on effective DPFP practices, including the importance of patient-centred care.

5) Intersectoral and intrasectoral collaboration should be promoted among different healthcare and non-healthcare disciplines who involved in DPFP.

6) A continuous monitoring and evaluation system should be established with an IMC to evaluate the effectiveness and sustainability of implemented interventions. This should include collecting feedback from patients and HCPs regarding DPFP.

7) Further research projects should be carried out to address identified challenges and validate findings across diverse healthcare settings. Furthermore, contamination bias in CGs should be minimized by exhausting strict control measures to ensure the validity of comparative data.

8) The ICP should be promoted at medical wards and other major specialities of base hospitals in the CP as well as other provinces with some adjustments in Sri Lanka to sustain effective DPFP.

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References

Abel, K.M., Radojčić, M.R., Rayner, A. et al. Representativeness in health research studies: an audit of Greater Manchester Clinical Research Network studies between 2016 and 2021. BMC Med 21, 471 (2023). https://doi.org/10.1186/s12916-023-03170-5

Abramson, J.H., Abramson, Z.H. (2008). Research Methods in Community Medicine: Surveys, Epidemiological Research, Programme Evaluation, Clinical Trials, Print ISBN:9780470986615, Online ISBN:9780470987230, DOI:10.1002/9780470987230. https://onlinelibrary.wiley.com/doi/book/10.1002/9780470987230

Alghamdi, D., Alhrasen, M., Kassem, A., Alwagdani, A., Tourkmani, A. M., Alnowaiser, N., Barakah, Y. A., & Alotaibi, Y. K. (2023). Implementation of medication reconciliation at admission and discharge in Ministry of Defense Health Services hospitals: A multicentre study. BMJ Open Quality, 12(2). https://doi.org/10.1136/bmjoq-2022-002121.

Almanasreh, E., Moles, R., & Chen, T. F. (2019). Evaluation of methods used for estimating content validity. Research in Social and Administrative Pharmacy, 15(2), 214-221. https://doi.org/10.1016/j.sapharm.2018.03.066

Annual Health Bulletin, 2022: Department of Health Services Central Province, https://www.healthdept.cp.gov.lk/downloads/annual_health_bulletin_2018.pdf

Annual Health Bulletin,2020:Ministry of Health, Nutrition and Indigenous Medicine, Sri Lanka. https://www.health.gov.lk/wp-content/uploads/2023/09/Annual-Health-Bulletin-2020Updated-on-2023.02.02.pdf

Auger, K. A., Shah, S. S., Tubbs-Cooley, H. L., Sucharew, H. J., Gold, J. M., Wade-Murphy, S., Statile, A. M., Bell, K. D., Khoury, J. C., Mangeot, C., & Simmons, J. M. (2018). Effects of a 1-Time Nurse-Led Telephone Call After Pediatric Discharge: The H2O II Randomized Clinical Trial. JAMA Pediatrics, 172(9). https://doi.org/10.1001/jamapediatrics.2018.1482

Bagyawantha, N.M.Y., Coombes, I.D., Gawarammana, I.,et al.(2021). Impact of a clinical pharmacist on optimising the quality use of medicines according to the acute coronary syndrome (ACS) secondary prevention guidelines and medication adherence following discharge in patients with ACS in Sri Lanka: a prospective non-randomized controlled trial study protocol. BMJ Open2023;13:e059413. https://www.researchgate.net/publication/368390855_Impact_of_a_clinical_pharmacist_on_optimising_the_quality_use_of_medicines_according_to_the_acute_coronary_syndrome_ACS_secondary_prevention_guidelines_and_medication_adherence_following_discharge_in_

Becker, C., Zumbrunn, S., Beck, K., Vincent, A., Loretz, N., Müller, J., Amacher, S. A., Schaefert, R., & Hunziker, S. (2021). Interventions to Improve Communication at Hospital Discharge and Rates of Readmission: A Systematic Review and Meta-analysis. JAMA Network Open, 4(8), e2119346. https://doi.org/10.1001/jamanetworkopen.2021.19346

Boaz, A., Hanney, S., Borst, R. et al. How to engage stakeholders in research: design principles to support improvement. Health Res Policy Sys 16, 60 (2018). https://doi.org/10.1186/s12961-018-0337-6

Brewster, A. L., Cherlin, E. J., Ndumele, C. D., Collins, D., Burgess, J. F., Charns, M. P., Bradley, E. H., & Curry, L. A. (2016). What Works in Readmissions Reduction: How Hospitals Improve Performance. Medical care, 54(6), 600–607. https://doi.org/10.1097/MLR.0000000000000530

Care Transitions from Hospital to Home: IDEAL Discharge Planning, Handbook.(2023).https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/systems/hospital/engagingfamilies/strategy4/Strat4_Implement_Hndbook_508_v2.pdf

Carroll, A., & Dowling, M. (2007). Discharge planning: communication, education and patient participation. British journal of nursing (Mark Allen Publishing), 16(14), 882–886. https://doi.org/10.12968/bjon.2007.16.14.24328

Charan, J. and Biswas, T. (2013) 'Review Article How to Calculate Sample Size for Different Study Designs in Medical Research ?', 35(2). Available at: https://doi.org/10.4103/0253-7176.116232.

Clare, J., & Hofmeyer, A. (1998). Discharge planning and continuity of care for aged people: indicators of satisfaction and implications for practice. The Australian journal of advanced nursing: a quarterly publication of the Royal Australian Nursing Federation, 16(1), 7–13 PMID: 9807277. https://pubmed.ncbi.nlm.nih.gov/9807277/

Coffey, A., Leahy-Warren, P., Savage, E., Hegarty, J., Cornally, N., Day, M. R., Sahm, L., O'Connor, K., O'Doherty, J., Liew, A., Sezgin, D., & O'Caoimh, R. (2019). Interventions to Promote Early Discharge and Avoid Inappropriate Hospital (Re)Admission: A Systematic Review. International journal of environmental research and public health, 16(14), 2457. https://doi.org/10.3390/ijerph16142457

Coleman, E. A., Mahoney, E., & Parry, C. (2005). Assessing the quality of preparation for posthospital care from the patient's perspective: the care transitions measure. Medical care, 43(3), 246–255. https://doi.org/10.1097/00005650-200503000-00007

Coppa, K., Kim, E. J., Oppenheim, M. I., Bock, K. R., Conigliaro, J., & Hirsch, J. S. (2021). Examination of Post-discharge Follow-up Appointment Status and 30-Day Readmission. Journal of General Internal Medicine, 36(5), 1214-1221. https://doi.org/10.1007/s11606-020-06569-5

Damayanthi, L.C., Marasinghe, R.B. and Amarasekara, A.A.T.D.(2021)."Post-discharge plan and follow up care intervention in improving quality of life among elderly patients discharged from a Sri Lankan hospital setting: A randomized controlled trial", Proceedings of the Research Conference in Health Sciences 2021 - FAHS, USJ. http://dr.lib.sjp.ac.lk/handle/123456789/10239

Daniel, L.S., Frederick,L.C.(2018). In book: SAGE Encyclopedia of Lifespan Human Development, Chapter: Reliability, Publisher: SAGE Publications.https://sk.sagepub.com/reference/the-sage-encyclopedia-of-lifespan-human-development/i21155.xml

Dehnabi, A., Radsepehr, H., Navipour, H., Evaluating the Effect of Discharge Planning on Glycosylated Hemoglobin Level in Type 2 Diabetic Patients Who Referred to the Vasei Hospital in Sabzevar, Iran: An Interventional Study. Med Surg Nurs J. 2018;7(3):e87197. https://doi.org/10.5812/msnj.87197.

Domoto, T., Matsumura, Y. and Fukada, M. (2021) 'Effects of Telephone Follow-Ups after Hospital Discharge on Patients ' Home Care : A Randomized Controlled Trial', 11. https://www.longdom.org/open-access/effects-of-telephone-followups-after-hospital-discharge-on-patients-home-care-a-randomized-controlled-trial-87075.html

Drost, E.A. (2011) Validity and Reliability in Social Science Research. Education Research and Perspectives, 38, 105- 123. https://www.scirp.org/reference/referencespapers?referenceid=1664827

Elfil, M., & Negida, A. (2017). Sampling methods in Clinical Research; an Educational Review. Emergency, 5(1). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5325924/

Elysee, G. et al. (2021) 'Association between 30-day readmission rates and health information technology capabilities in US hospitals', Medicine, 100(8), p. e24755. Available at: https://doi.org/10.1097/MD.0000000000024755.

Eric Alper, M., Terrence A O'Malley, M. and Jeffrey Greenwald, M. (2017) 'Hospital discharge and readmission', UpToDate [Preprint]. https://swanvalleymedical.com/wp-content/uploads/2022/03/56-Hospital-discharge-and-readmission-UpToDate.pdf

Forero, R., Nahidi, S., De Costa, J. et al. Application of four-dimension criteria to assess the rigour of qualitative research in emergency medicine. BMC Health Serv Res 18, 120 (2018). https://doi.org/10.1186/s12913-018-2915-2

Gallagher, T. (2019) 'Developing an Evidence-Based Discharge Process for Patients on a Cardiac / Renal Acuity-Adaptable Inpatient Unit', Master's Projects. 21 [Preprint] https://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1019&context=kcon_projects.

General circular 01-38/2016, dated 13-06-2016; Implementation of Adverse Event Reporting & Readmission Forms, Ministry of Health, Nutrition &Indigenous Medicine, Sri Lanka. http://www.previousmoh.health.gov.lk/CMS/cmsmoh1/

Gholizadeh,M.,Delgoshaei,B.,Gorji,H.A.,Torani,T.,Janati,A. (2016) Challenges in Patient Discharge Planning in the Health System of Iran: A Qualitative Study', Global journal of health science, 8(6), p. 47426. Available at: https://doi.org/10.5539/gjhs.v8n6p168

Gholizadeh, M., Janati,A., Delgoshaei,B.,Gorji, H.A., Tourani, S. Implementation Requirements for Patient Discharge Planning in Health System: A qualitative study in Iran. Ethiop J Sci.(2018);28(2):157. doi http://dx.doi.org/10.4314/ejhs.v28i2.7

Gonçalves-Bradley, D. C., Lannin, N. A., Clemson, L., Cameron, I. D., & Shepperd, S. (2022). Discharge planning from hospital. The Cochrane database of systematic reviews, 2(2), CD000313. https://doi.org/10.1002/14651858.CD000313.pub6

Goula, A., Rizopoulos, T., Stamouli, A., Kelesi, M., Kaba, E., & Soulis, S. (2022). Internal Quality and Job Satisfaction in Health Care Services. International Journal of Environmental Research and Public Health, 19(3). https://doi.org/10.3390/ijerph19031496

Grudniewicz, A., Gray, C. S., Boeckxstaens, P., Maeseneer, J. D., & Mold, J. (2023). Operationalizing the Chronic Care Model with Goal-Oriented Care. The Patient, 16(6), 569-578. https://doi.org/10.1007/s40271-023-00645-8

Guan, G., Mei, L., Yu, C. et al. Patient-centred care attitudes and knowledge: a national study of BDS students in New Zealand. BMC Med Educ 23, 516 (2023). https://doi.org/10.1186/s12909-023-04496-7

Hager, Julia Sara. (2010). Effects of a Discharge Planning Intervention on Perceived Readiness for Discharge. Retrieved from Sophia, the St. Catherine University repository website: https://sophia.stkate.edu/dnp_projects/2

Hahn-Goldberg, S., Huynh, T., Chaput, A. et al. Implementation, spread and impact of the Patient Oriented Discharge Summary (PODS) across Ontario hospitals: a mixed methods evaluation. BMC Health Serv Res 21, 361 (2021). https://doi.org/10.1186/s12913-021-06374-8

Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D. E., & Finkelstein, J. (2006). The Use and Interpretation of Quasi-Experimental Studies in Medical Informatics. Journal of the American Medical Informatics Association: JAMIA, 13(1), 16-23. https://doi.org/10.1197/jamia.M1749

Hayajneh, A. A., Hweidi, I. M., & Abu Dieh, M. W. (2020). Nurses' knowledge, perception and practice toward discharge planning in acute care settings: A systematic review. Nursing open, 7(5), 1313–1320. https://doi.org/10.1002/nop2.547

Hearn, K. (2020) 'The Relationship Between Early Discharge Planning and Length of The Relationship Between Early Discharge Planning and Length of Stay', MSN Capstone Projects School of Nursing Winter, pp. 12–18. Available at: http://hdl.handle.net/10950/2762.

Hedges, G., Grimmer, K., Moss, J., & Falco, J. (1999). Performance indicators for discharge planning: a focused review of the literature. The Australian journal of advanced nursing: a quarterly publication of the Royal Australian Nursing Federation, 16(4), 20–28. PMID: 10603768. https://pubmed.ncbi.nlm.nih.gov/10603768/

Hoyer, E. H., Odonkor, C. A., Bhatia, S. N., Leung, C., Deutschendorf, A., & Brotman, D. J. (2016). Association between days to complete inpatient discharge summaries with all-payer hospital readmissions in Maryland. Journal of Hospital Medicine, 11(6), 393-400. https://doi.org/10.1002/jhm.2556

Ibrahim, H. et al. (2022) 'Multi-Disciplinary Discharge Coordination Team to Overcome Discharge Barriers and Address the Risk of Delayed Discharges', Risk Management and Healthcare Policy, 15(January), pp. 141–149. Available at: https://doi.org/10.2147/RMHP.S347693.

Jack, B.W., Paasche-Orlow, M.K., Mitchell, S.M. An overview of the Re-Engineered Discharge (RED) Toolkit. (Prepared by Boston University under Contract No. HHSA290200600012i.) Rockville, MD: Agency for Healthcare Research and Quality; March 2013. AHRQ Publication No. 12(13)0084.https://www.ahrq.gov/patientsafety/settings/hospital/red/toolkit/index.html

Jones, K. C., Austad, K., Silver, S., Cordova-Ramos, E. G., Fantasia, K. L., Perez, D. C., Kremer, K., Wilson, S., Walkey, A., & Drainoni, M. L. (2023). Patient Perspectives of the Hospital Discharge Process: A Qualitative Study. Journal of patient experience, 10, 23743735231171564. https://doi.org/10.1177/23743735231171564

Kemp, K.A., Quan, H. and Santana, M.J. (2017) 'Lack of patient involvement in care decisions and not receiving written discharge instructions are associated with unplanned readmissions up to one year', Patient Experience Journal, 4(2), pp. 13–22. Available at: https://doi.org/10.35680/2372-0247.1205.

Khurma, N. (2009) 'Analysis, Modeling and Improvement of Patient Discharge Process in a Regional Hospital', Electronic Theses and Dissertations [Preprint]. https://scholar.uwindsor.ca/cgi/viewcontent.cgi?article=1154&context=etd

Kripalani, S., & Weiss, B. D. (2006). Teaching About Health Literacy and Clear Communication. Journal of General Internal Medicine, 21(8), 888-890. https://doi.org/10.1111/j.1525-1497.2006.00543.x

Krook, M., Iwarzon, M. and Siouta, E. (2020) 'The Discharge Process -From a Patient ' s Perspective'. Available at: https://doi.org/10.1177/2377960819900707.

Lange, R.T. (2011). Inter-rater Reliability. In: Kreutzer, J.S., DeLuca, J., Caplan, B. (eds) Encyclopedia of Clinical Neuropsychology. Springer, New York, NY. https://doi.org/10.1007/978-0-387-79948-3_1203.

Lewis, M. (2022) 'University of St Augustine for Health Sciences SOAR @ USA Evidence-Based Best Practice for Discharge Planning : A Policy Review'. https://doi.org/10.46409/sr.QBWH5074

Lewis, P., Braddock, K., Tolaymat, L., Haga, C., Gillis, M., Yin, M., Dawson, N. Discharge Summary Completion Timeliness and the Association of 30-Day Readmission. South Med J. 2021 May;114(5):319-321. https://doi.org/10.14423/smj.0000000000001243

Lincoln, Y.S. and Guba, E.G. (1985) Naturalistic Inquiry. https://ethnographyworkshop.wordpress.com/wp-content/uploads/2014/11/lincoln-guba-1985-establishing-trustworthiness-naturalistic-inquiry.pdf

Lin, C., Cheng, S., Shih, S., Chu, C., & Tjung, J. (2012). Discharge Planning. International Journal of Gerontology, 6(4), 237-240. https://doi.org/10.1016/j.ijge.2012.05.001

Manual on Management of Tertiary and Secondary Care Hospitals by Ministry of Health, Sri Lanka-2022. https://www.health.gov.lk/moh-page/manual-on-hospital-management/

McWilliams, A., Roberge, J., Anderson, W. E., Moore, C. G., Rossman, W., Murphy, S., McCall, S., Brown, R., Carpenter, S., Rissmiller, S., & Furney, S. (2019). Aiming to Improve Readmissions Through InteGrated Hospital Transitions (AIRTIGHT): a Pragmatic Randomized Controlled Trial. Journal of General Internal Medicine, 34(1), 58–64. https://doi.org/10.1007/s11606-018-4617-1

Medication Communication With Older Adults Experiencing Chronic Illness And Polypharmacy Licentiate Thesis, Department of Health and Caring Sciences, Linnaeus University, Kalmar, 2023.Lnu Licentiate No. 41, 2023.ISBN: 978-91-89709-82-9 (print), 978-91-89709-83-6 (pdf).DOI: https://doi.org/10.15626/LnuLic.41.2023

Meng, R., Li, J., Zhang, Y., Yu, Y., Luo, Y., Liu, X., Zhao, Y., Hao, Y., Hu, Y., & Yu, C. (2018). Evaluation of Patient and Medical Staff Satisfaction regarding Healthcare Services in Wuhan Public Hospitals. International Journal of Environmental Research and Public Health, 15(4), 769. https://doi.org/10.3390/ijerph15040769

Mennuni, M., Gulizia, M. M., Alunni, G., Francesco Amico, A., Maria Bovenzi, F., Caporale, R., Colivicchi, F., Di Lenarda, A., Di Tano, G., Egman, S., Fattirolli, F., Gabrielli, D., Geraci, G., Gregorio, G., Francesco Mureddu, G., Nardi, F., Radini, D., Riccio, C., Rigo, F., . . . Zuin, G. (2017). ANMCO Position Paper: Hospital discharge planning: Recommendations and standards. European Heart Journal Supplements, 19(suppl_D), D244-D255. https://doi.org/10.1093/eurheartj/sux011

Moore, Z., Patton, D., Nugent, L., & Avsar, P. (2021). The effect of discharge planning on length of stay and readmission rates of older adults in acute hospitals: A systematic review and meta-analysis of systematic reviews. Journal of Nursing Management, 29(8), 2697-2706. https://doi.org/10.1111/jonm.13409

Morkisch, N., Upegui-Arango, L.D., Cardona, M.I. et al. Components of the transitional care model (TCM) to reduce readmission in geriatric patients: a systematic review. BMC Geriatr 20, 345 (2020). https://doi.org/10.1186/s12877-020-01747-w

Mwachiro, D.M., Baron-lee, J. and Kates, F.R. (2019) 'Impact of Post-Discharge Follow-Up Calls on 30-Day Hospital Readmissions in Neurosurgery', pp. 46–52. Available at: https://doi.org/10.4103/JQSH.JQSH.

Nasiri, A., Akbari, A. and Jani, H. (2022) 'Challenges and Implementation Strategies of the Discharge Planning According to the Nurses' Experiences: A Qualitative Study', Modern Care Journal, 19(2). Available at: https://doi.org/10.5812/modernc-121663.

National Policy on Healthcare Quality and Safety, Ministry of Health "Suwasiripaya" 385, Rev.Baddegama Wimalawansa Thero Mawatha, Colombo 10, Sri Lanka. (2021).

NHS, 2013. The Patient Experience Book A collection of the NHS Institute for Innovation and Improvement's guidance and support.

Nowell, L.S., Norris, J.M., White, D.E., Moules, N.J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria: International Journal of Qualitative Methods, Volume 16:1–13.DOI:10.1177/1609406917733847.

OECD (2017), "Average length of stay in hospitals", in Health at a Glance 2017: OECD Indicators, OECD Publishing, Paris. https://doi.org/10.1787/health_glance-2017-en

OECD iLibrary Organization for Economic Co-operation and Development, 2024). https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm.

OECD (2010), Quality Standards for Development Evaluation, DAC Guidelines and Reference Series, OECD Publishing, Paris, https://doi.org/10.1787/9789264083905-en.

Perera, C. et al. (2009) 'Public Hospital Inpatient Discharge Survey 2005', (1). https://www.ihp.lk/publications/docs/HSR0901.pdf

Puvanendran, R. (2011) 'Discharge planning in integrated care', The Singapore Family Physician, 3(37), pp. 27–31. https://www.cfps.org.sg/publications/the-singapore-family-physician/article/238_pdf

Rajapaksa, L., Silva, P., Abeykoon, A., Somatunga, L., Sathasivam, S., Perera, S. Sri Lanka health system review. New Delhi: World Health Organization Regional Office for South-East Asia; 2021. https://apo.who.int/publications/i/item/sri-lanka-health-system-review

Richards, B.G. et al. (2020) 'Patient-Reported Quality of Hospital Discharge Transitions: Results from the SILVER-AMI Study', Journal of General Internal Medicine, 35(3), pp. 808–814. Available at: https://doi.org/10.1007/s11606-019-05414-8.

Service Availability and Readiness Assessment (SARA) 2017 Sri Lanka. Ministry of Health, Nutrition and Indigenous Medicine and Department of Census.

Subasinghe, K.J. and Pathiranage, A.M.S.D. (2021) 'The Role Of The Pediatric Nurse In Discharge Planning; Identifying Gaps In Sri Lanka', IJNP (Indonesian Journal of Nursing Practices), 5(1), pp. 36–50. Available at: https://doi.org/10.18196/ijnp.v5i1.10748.

Thiese, M. S. (2014). Observational and interventional study design types; an overview. Biochemia Medica, 24(2), 199-210. https://doi.org/10.11613/BM.2014.022

Wang, C., Yu, T., Luo, X., Zhou, C., You, C., Duan, L., Liu, S., Chen, Y., Jiang, Y., & Zhu, H. (2022). Protocol for the development of a clinical practice guideline for discharge planning of stroke patients. Annals of translational medicine, 10(17), 937. https://doi.org/10.21037/atm-22-3151.

Wang, J., Liu, Y., Li, P., Lin, Z., Sindakis, S., & Aggarwal, S. (2023). Overview of Data Quality: Examining the Dimensions, Antecedents, and Impacts of Data Quality. Journal of the Knowledge Economy, 1–20. Advanced online publication. https://doi.org/10.1007/s13132-022-01096-6

Wasti, S. P., Simkhada, P., Sathian, B., & Banerjee, I. (2022). The Growing Importance of Mixed-Methods Research in Health. Nepal Journal of Epidemiology, 12(1), 1175-1178. https://doi.org/10.3126/nje.v12i1.43633

Weiss, M. E., Bobay, K. L., Bahr, S. J., Costa, L., Hughes, R. G., & Holland, D. E. (2015). A Model for Hospital Discharge Preparation:

From Case Management to Care Transition. The Journal of nursing administration, 45(12), 606–614. https://doi.org/10.1097/NNA.0000000000000273

Wong, E.L., Yam, C.H., Cheung, A.W. et al. Barriers to effective discharge planning: a qualitative study investigating the perspectives of frontline healthcare professionals. BMC Health Serv Res 11, 242 (2011). https://doi.org/10.1186/1472-6963-11-242

World Health Organization's reports; 2018, 2019 and 2022. https://www.who.int/health-topics/#F

Wynia, M. K., & Osborn, C. Y. (2010). Health Literacy and Communication Quality in Health Care Organizations. Journal of Health Communication, 15(Suppl 2), 102. https://doi.org/10.1080/10810730.2010.499981

Xiang, X., Robinson-Lane, S. G., Rosenberg, W., & Alvarez, R. (2018). Implementing and sustaining evidence-based practice in health care: The Bridge Model experience. Journal of Gerontological Social Work, 61(3), 280. https://doi.org/10.1080/01634372.2018.1445154

Yam, C.H.K. et al. (2012) 'Framework and components for effective discharge planning system : a Delphi methodology'. https://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-12-396

Zakaria, A., Faint, C.A. and Kazkaz, S. (2021) 'Readmission rate reduction strategies in general hospital setting', Aging Male, 23(5), pp. 1237–1240. Available at: https://doi.org/10.1080/13685538.2020.1753694.

Zakaria, A. (2020) 'Hospital Discharge Strategy at a Governmental Hospital in Qatar', Archives of Clinical Case Studies, 2(4), pp. 4–6. Available at: https://doi.org/10.33552/accs.2020.02.000541.

Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication. Journal of Caring Sciences, 4(2), 165–178. https://doi.org/10.15171/jcs.2015.017

Ziaie, S., Mehralian, G., Talebi, Z. Evaluation of medication reconciliation process in internal medicine wards of an academic medical centre by a pharmacist: errors and risk factors. Intern Emerg Med. 2022 Mar;17(2):377-386. doi: 10.1007/s11739-021-02811-y. PMID: 34342787.