Internship Training at

Name of the Organization- **DOCTOR ALLIANCE**

Study/Project Title- **REDUCTION OF RE- HOSPITALIZATION THROUGH CARE COORDINATION BETWEEN HEALTH CARE ORGANIZATION AND PRIMARY HEALTH CARE PROVIDER**

by

Name- **DR. AFREEN HUSSAIN**

Enroll No. **PG/21/006**

Under the guidance of – **DR. PUNIT YADAV**

PGDM (Hospital & Health Management)

2021-23

International Institute of Health Management Research
New Delhi

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Completion of Dissertation from **DOCTOR ALLIANCE**

The certificate is awarded to

Name: DR. AFREEN HUSSAIN

in recognition of having successfully completed his/her Internship in the department of **Care Coordination** and has successfully completed his/her Project on

Title: Reduction of re-hospitalization through care coordination between health care organizations and Primary Care Provider

Date: May 1st 2023

Organisation- DOCTOR ALLIANCE

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning.

We wish her all the best for future endeavours.

K. S. Iyer

Training & Development

Doctor Alliance - Human Resources Team

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **DR. AFREEN HUSSAIN** student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at **DOCTOR ALLIANCE** from **Jan 21st 2023** to **May 1st 2023**.

The Candidate has successfully carried out the study designated to him during internship training and his/her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfilment of the course requirements.

I wish her all success in all her future endeavours.

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Dr Punit Yadav
Professor
IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Reduction of re-hospitalization through efficient care coordination between health care organizations and PCP"** at **"Doctor Alliance"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr. Shiv.	
Dr. Arundhi Ramachandra	
Dr. Sumant Swain	

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Afreen Hussain,** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. She is submitting this dissertation titled **"Reduction of re-hospitalization through care coordination between health care organizations and PCP"** at **"DOCTOR ALLIANCE"** in partial fulfilment of the requirements for the award of the **PGDM (Hospital & Health Management).**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Institute Mentor Name

Dr. PUNIT YADAV
Designation, **Professor**
Organization IIHMR DELH

K.S. Vivek

Organization Mentor Name

VIVEK KUSHAL
Designation, **CEO**
Organization **DOCTOR ALLIANCE**

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Reduction of re-hospitalization through care coordination between health care organizations and Primary care provider (PCP)** and submitted by Name- **Dr Afreen Hussain** Enrollment No.**PG/21/006** under the supervision of **DR. PUNIT YADAV** for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from **Jan 21st 2023** to **May 1st 2023** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

FEEDBACK FORM

Name of the Student: DR. AFREEN HUSSAIN

Name of the Organisation in Which Dissertation Has Been Completed: DOCTOR ALLIANCE

Area of Dissertation: Care Coordination

Attendance: Full

Objectives achieved: Design workflows for various Care coordination to be performed

Deliverables: Workflow Documents and Project Plan for the quarter

Strengths: Thoroughness, Diligence, Ability to understand product & clinical concepts

Suggestions for Improvement: Needs more thinking outside the box

Suggestions for Institute (course curriculum, industry interaction, placement, alumni): More courses on PRD & UI & UX

K.S. Vivek

Signature of the Organisation Mentor (Dissertation)

Date: May 1st 2023
Place: Bangalore

2.1.4 Acknowledgements

I express my sincere gratitude to **Mr. Vivek Khushal** who constantly guided, supported and gave his time to the successful completion of this study titled "Reduction of re-hospitalization through efficient care coordination between healthcare organizations and PCPs." Without their support, guidance, and assistance, this research would not have been possible.

First and foremost, we would like to thank **Dr. Punit Yadav** of this study, who generously shared his valuable insights and experiences. His active support and cooperation were instrumental in providing me with the necessary data and information to analyse and draw meaningful conclusions.

Commitment to improving patient care and willingness to implement new care coordination strategies were crucial in developing the interventions and evaluating their effectiveness. It's my pleasure to acknowledge the research team and support staff for their dedicated efforts in designing and conducting this study. Their expertise, professionalism, and meticulous attention to detail have been indispensable in ensuring the accuracy and validity of the findings. I would also like to vent my gratitude to our colleagues, mentors, and advisors for their invaluable input, feedback, and encouragement. Their expertise and guidance significantly enriched the research process and contributed to the overall quality of this study. I would like to acknowledge all the faculty who's constant motivation and guidance has made me conduct the study. I am also happy to express my heartfelt thanks to all my friends specially **Dr. Suprakash Mandal** and family members who has stood as a support system and pillar of strength.

To all those who have contributed directly or indirectly to this study, I offer my heartfelt thanks. Your contributions have played a vital role in the successful completion of this research, and I am truly grateful for your support and collaboration.

2.1.5 Table of Contents

2.1.6 List of Figures: No figure was used.

2.1.7 List of Tables

Table 8. The different type of setting for implementing care-coordination

2.1.8 List of Symbols and Abbreviations

PCP: Primary Care Provider

COPD: Chronic Obstructive Pulmonary Disease

NCDs : Non-communicable diseases

EHR: Electronic Health Records

C-TraC: Coordinated-Transitional Care

VA: Veterans Affairs

NPCDCS: National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke

2.1.9 List of Appendices: Not applicable

2.2 Text

Research Thesis

Title: Reduction of re-hospitalization through care coordination between health care organizations and PCP

Abstract:

Hospital readmission which occurs within 30 days of discharge is considered an important indicator reflecting the hospital care quality and places a burden on patients, families, and the public health system. The high rate of readmission also impacts the financial system of the health sector. Efficient care coordination is one of the strategies aimed at preventing avoidable hospital readmissions. Care coordination involves organizing activities of patient care between multiple participants to enhance and facilitate the appropriate delivery of healthcare services. While several studies have shown the effectiveness of care coordination in different scenarios, a detailed understanding of its effects is still lacking.

This narrative review aims to summarize the evidence on the reduction of hospital readmission through efficient care coordination between health organizations and primary care providers. The study population includes patients treated in the in-hospital setting, and the inclusion criteria comprise all published studies available in electronic media, excluding those not in English. The principal outcome variable is the percentage of patients readmitted within 30 days, with the conditions and reasons for readmission as secondary outcome variables.

A self-developed data extraction sheet was used to collect relevant data from eligible studies using a Google form. The data was exported to Microsoft Excel for review and analysis. Study quality assessment was performed using standard quality checklist such as Newcastle - Ottawa Quality Assessment Scale, JBI checklist for quasi-experimental study. Data analysis involved a narrative review and comparison with relevant findings, which was summarized in tabulated and literature review tables.

Twelve relevant published articles were eligible for review, mostly from the past ten years, with one study from 2005. The study designs included quasi-experimental, non-randomized trials, observational studies, secondary data analysis, and review articles. The quality of the studies varied. The analysis revealed statistically significant reductions in the proportion of patients admitted from the emergency department to a ward since the inception of the care coordination program. Additionally, improvements were observed in quality of life scores, patient satisfaction, psychological well-being, and readmission rates for specific conditions.

Efforts to reduce hospital readmissions focused on interventions such as improved discharge planning, transitional care programs, enhanced communication between healthcare providers, and patient education. Implementing efficient care coordination strategies can significantly contribute to the reduction of re-hospitalization rates. This study adds valuable insights into the potential benefits of improved coordination and communication in healthcare systems.

2.2.1 Introduction: Hospital readmission is an unexpected morbidity burden over the patient and family as well as the over the public health system.[1][2] That's why early hospital readmission which occurs within 30 days of discharge is considered as an indicator of hospital care quality. High rate of readmission has impact upon the financial system of the health sector.[3] As per the Canadian Institute for Health Information an estimated 8.5% of patients get readmitted after an initial discharge from a hospital within 30 days. Among those patient most of the cases can be avoided.[1][4] There are several provider related and consumer related factors playing behind hospital readmission. Patient or consumer related factors like not able to do routine activities, not able to follow the medication, lacking social or familial support etc.[5] Hospital related factors like polypharmacy, low quality of care, longer stay etc.[6]

There are several strategies to improving the care they receive before and after discharge to prevent the avoidable hospital readmission. Out of them one is delivering efficient care coordination. The standard definition is "*Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services. Organizing care involves the marshalling of personnel and other resources needed to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care."*[7] Efficient care coordination ensures that the patient's health need, service preferences and information shared across people, different functions, and settings are met over time while patients are navigated and managed in a smooth way in the clinical settings.

Rationale: Though several strategies was found effective, still effect of care-coordination in Indian scenario is lacking. Filling the research gap and improvement of the scenario of high hospital re-admission.

Objective: This study attempted to assess the reduction of patient care by efficient care coordination between health organization and PCP.

2.2.2 Literature Review:

It was searched the literature in PubMed, Google Scholar, done in last 10 years, both global and Indian study done in hospital.

Relevant keywords and phrases related to the research question were identified. Re-hospitalization

Care coordination

Healthcare organizations

Primary care physicians

Care transitions

Continuity of care

Care integration

Care management

Hospital readmission

Patient-centered care

Care delivery

Interdisciplinary care

Care collaboration

Care communication

Care planning

Care pathways

Care quality

Care outcomes

Care interventions

Care effectiveness

Using a combination of these keywords I searched in relevant databases, such as PubMed, Google Scholar, or other specialized databases in healthcare and medical research.

Re-hospitalization" AND "Care coordination" AND "Healthcare organizations" AND "Primary care physicians"

"Re-hospitalization" AND ("Care coordination" OR "Care management")

"Re-hospitalization" and either "Care coordination" or "Care management".

"Care integration" OR "Continuity of care" AND "Hospital readmission"

"Care integration" or "Continuity of care" and also include "Hospital readmission".

("Patient-centred care" OR "Interdisciplinary care") AND "Care outcomes"

"Patient-centred care" or "Interdisciplinary care" and also include "Care outcomes".

In 2005, a study conducted by **Helen M** attempted to assess the impact of a care coordination (CC) program functional in the Emergency Department (ED) on the outcomes of older patients. The study utilized a pre-post intervention design to assess the effectiveness of the program.

The CC program was implemented with the goal of improving care coordination and reducing re-hospitalization rates for older patients in the ED. The study found that since the inception of the program, there was a significantly reduced proportion of patients admitted from the ED to a ward. In the first year of the CC program, the admission rate decreased from 20.2% to 18.1%, and it remained relatively stable in the second year at 18.4% and the third year at 18.0%.

Furthermore, the study assessed the impact of the intervention on the patients' quality of life. The mean-related quality of life scores showed a significant difference before and after the implementation of care coordination. The scores for different domains such as illness, independent living, relationships at social level, physical, and psychological well-being all showed improvements post-intervention. For example, the scores for psychological well-being increased from a pre-intervention mean of 0.649 (SD 0.260) to a post-intervention mean of 0.918 (SD 0.066).

Additionally, the study assessed patient satisfaction and staff satisfaction with the service. Although specific details were not provided, the results indicated a positive impact on satisfaction levels. These findings suggest that the CC program not only improved patient outcomes but also enhanced the overall experience for both patients and healthcare providers.

Finally, the readmission data collected during the study served as a baseline measure for future evaluations. This indicates that the study was part of an ongoing effort to continually assess and refine the care coordination program, ensuring its effectiveness and sustainability.

In conclusion, the study by Helen M demonstrated the positive impact of a care coordination program operating in the ED for older patients. The program resulted in a significant reduction in admission rates from the ED to a ward and improvements in various aspects of patients' quality of life. Furthermore, it highlighted the importance of ongoing evaluation and the collection of readmission data to guide future interventions and optimize patient care.

In 2015, **M. S. Wayne A et al.** conducted a single-group interventional study aimed at reducing hospital readmissions through effective care coordination measures within a Family Medicine residency. The study focused on patients of all types and examined the impact of implementing

an electronic medical record (EMR) specific to the SIU Family Medicine program, distinct from the hospital EMR.

The study revealed that the implementation of care coordination measures and the use of the dedicated EMR led to a substantial reduction in readmissions within the Family Medicine residency. Notably, this reduction was observed in a residency program with a significant Medicaid population, comprising approximately 31% of the patients.

When compared to national readmission rates and other hospitals, the readmission rate among all types of patients within the Family Medicine residency was considerably lower. This outcome highlights the effectiveness of the care coordination and cooperation between indoor patient and outdoor patient settings in achieving significant readmission reduction.

The findings of this study suggest that the implementation of care coordination measures, particularly the utilization of a dedicated EMR, can contribute to reducing hospital readmissions. The success observed in a Family Medicine residency, even with a substantial Medicaid population, emphasizes the importance of coordinated care and collaboration between healthcare settings in improving patient outcomes and reducing readmission rates.

Edge et al. conducted a pre-post intervention study focusing on patients with sickle cell anemia (SCD). The study aimed to evaluate the impact of disease-specific education for discharge and scheduling follow-up appointments after to discharge.

The intervention involved providing patients with SCD comprehensive education about their condition and its management before they were discharged from the hospital. Additionally, follow-up appointments were scheduled to ensure continuity of care and facilitate a smooth transition from the hospital setting to outpatient care.

The study findings revealed significant improvements in various outcome measures. The 30-day readmission rate for patients with SCD decreased by 22%, indicating a reduction in the

need for subsequent hospitalizations. Moreover, there was a notable reduction of 0.9 days in the length of stay, suggesting more efficient and streamlined care delivery.

Additionally, the study reported a 17% decrease in emergency, observation, and inpatient encounters among patients with SCD. This reduction implies a decrease in the overall healthcare utilization by patients with SCD, potentially indicating improved disease management and reduced complications.

The results of this study highlight the effectiveness of discharge education according to disease and proactive scheduling of follow-up appointments for patients with sickle cell anaemia. These interventions led to a substantial reduction of rate of 30-day readmission, a shorter length of stay, and decreased healthcare encounters related to SCD.

These findings emphasize the importance of comprehensive patient education and proactive care coordination strategies in managing SCD effectively. By providing patients with the necessary knowledge and ensuring timely follow-up, healthcare providers have potential to enhance patient outcomes, hospital readmissions reduction, and can optimize the proper utilization of healthcare resources.

In 2022, Proctor SL et al. conducted a two-group interventional study focusing on mental health patients. The study aimed to assess the effectiveness of payer-level care coordination compared to care-as-usual for individuals classified as "high-utilizers" for the acute care services within a relatively massive, publicly financed safety net system.

The intervention involved implementing payer-level care coordination strategies specifically targeted at individuals with high utilization of acute care services due to mental health concerns. These strategies aimed to enhance coordination and collaboration among healthcare providers, improve communication and information sharing, and facilitate seamless transitions of care.

The study findings demonstrated several positive outcomes associated with the implementation of payer-level care coordination. Firstly, there was a notable reduction in rates of re-admission among the targeted mental health patients. This reduction in re-admissions suggests that the coordinated care efforts effectively addressed the needs of these individuals, resulting in improved care outcomes and decreased hospital revisits.

Additionally, the study revealed significant cost savings associated with payer-level care coordination. By implementing effective coordination strategies, unnecessary and avoidable healthcare utilization and associated costs were reduced, leading to more efficient resource allocation within the safety net system.

Furthermore, the intervention was associated with increased level of engagement in non-crisis services during the post-discharge period. The care coordination efforts facilitated better connections between patients and non-crisis services, enabling individuals to access the necessary ongoing care and support they needed outside of acute care settings.

The study results highlight the benefits of implementing payer-level care coordination for mental health patients classified as high-utilizers for acute phase care services within a safety-net system. The intervention was associated with reduced re-admission rates, significant level cost savings, and improved involvement in non-crisis services after discharge.

These results emphasize the importance of coordinated care efforts in effectively managing mental health patients and optimizing healthcare utilization within publicly funded safety net systems. By implementing payer-level care coordination strategies, healthcare organizations can increase the patient outcomes, decreased costs , and improve the delivery of comprehensive and continuous care to individuals with mental health needs.

In 2020, **Benjenk I et al.** conducted a cross-sectional study focusing on inpatient psychiatric facilities. The study focused to see the impact of the Medicare Inpatient Psychiatric Facility Quality Reporting (IPFQR) program on readmission rates within these facilities.

The study utilized a cross-sectional design to assess the performance of inpatient psychiatric facilities in terms of the READM-30-IPF measure, which represents the 30-day readmission rate. The mean (SD) facility-level READM-30-IPF was found to be 20%±3%, indicating the average readmission rate across the studied facilities.

Furthermore, the study examined the association between facility performance on the 7-day follow-up of mental health after discharge measure and readmission rates. The results indicated that facilities performing in the top most tercile (highest performing) on the 7-day follow-up measure of mental health had significantly lower readmission rates compared to facilities in the bottom tercile (lowest performing). The coefficient of -0.58 and p-value < 0.01 showed a statistically significant difference.

These findings suggest that inpatient psychiatric facilities that prioritize and achieve higher rates of mental health follow-up within seven days after discharge demonstrate lower readmission rates. This highlights the importance of timely and effective post-discharge follow-up care in reducing readmissions and promoting successful transitions from inpatient to outpatient mental health settings.

The study's results provide evidence supporting the positive impact of the Medicare IPFQR program on readmission rates in inpatient psychiatric facilities. By focusing on improving mental health follow-up after discharge, facilities can potentially reduce the need for readmission, enhance continuity of care, and improve patient outcomes.

2.2.3 Methodology:

- Study Design: Narrative review

- Study inclusion criteria: All human studies published within last 10 years, and available in electronic media, in English language, original research, systematic review, assessed effect of care coordination to see hospital readmission, study done in USA

- Study exclusion criteria: Full text not available,

- **Outcome indicator:** The principal outcome variable was the % reduction of patient readmission that occurs within 30 days of discharge. The conditions, reason of the readmission was the secondary outcome variable.

- **Sample size:** The available and eligible studies based on the search strategy (10 eligible studies)

- **Study tool:** Self-developed data extraction sheet will be used to find the relevant data in the literature and to summarize the data in tabular form and narration

- **Study quality assessment:** Done as per the standard formats like New Castle Ottawa scale for observational study, JBI quality checklist for quasi-experimental study

- **Data analysis-** Data was reviewed by narrative review and compared with the relevant findings. The finding will be summarized in tabulated form and by review of literature table.

- **Ethical considerations:** Since this is publicly available secondary data, ethical approval wouldn't need

- **Search Strategy:**

  Database: PubMed, Scopus, Embase

Key Words and search term:

1. "Care coordination"
2. "Hospital readmission"
3. "Re-hospitalization"
4. "Primary care provider"
5. "Care transitions"

2.2.4 Result:

Search result: PubMed (n=113) + Scopus (n=58) + Embase (n=18) = 189

- Duplicate removed: 13
- Studies screened: 176
- Total 32 eligible studies were found (144)
- After reading the abstract and full-text 10 studies were found suitable for the review

Out of 10 studies, five were quasi-experimental design, one was non-randomized trial, two observational, one was systematic review article. The studies were assessed for the quality as per the respective checklist of reporting of research study and found to be of variable quality

JBI APPRAISAL CHECKLIST FOR QUASI-EXPERIMENTAL STUDIES

Quality Check list	Helen M et al.[1]	M. S. Wayne A et al	Napthali PM Edge et al	Proctor SL et al. [4],	Hall EC et al.[8]	Carter JA et al.[9]	Ghiam MK et al[10]
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	√	√	√	√	√	√	√
1. Were the participants included in any comparisons similar?	N	N	N	N	N	N	N
1. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	N	N	N	N	N	N	N
1. Was there a control group?	×	×	×	×	×	×	×
1. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	√	×	√	√	√	√	×
1. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	√	√	√	√	√	√	√
1. Were outcomes measured in a reliable way?	√	√	√	√	√	√	√
1. Was appropriate statistical analysis used?	√	√	√	√	√	√	√

√: Yes × : No N: Not clear

Appendix 3.3: JBI Critical appraisal Checklist for Quasi-Experimental Studies (non-randomized experimental studies) - JBI Manual for Evidence Synthesis - JBI Global Wiki [Internet]. [cited 2023 Jun 16];Available from: https://jbi-global-wiki.refined.site/space/MANUAL/4689914/Appendix+3.3%3A+JBI+Critical+appraisal+Checklist+for+Quasi-Experimental+Studies+(non-randomized+experimental+studies)

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NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE
CASE CONTROL STUDIES

A. **Selection**

1) Is the case definition adequate?
   a) yes, with independent validation ✸
   b) yes, eg record linkage or based on self reports
   c) no description

2) Representativeness of the cases
   a) consecutive or obviously representative series of cases ✸
   b) potential for selection biases or not stated

3) Selection of Controls
   a) community controls
   b) hospital controls ✸
   c) no description

4) Definition of Controls
   a) no history of disease (endpoint) ✸
   b) no description of source

B. Comparability

1) Comparability of cases and controls on the basis of the design or analysis
   a) study controls for _COPD patient not admitted (Select the most important factor.) ✸
   b) study controls for any additional factor (This criteria could be modified to indicate specific control for a second important factor.)

NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE
CASE CONTROL STUDIES

C. Exposure

1) Ascertainment of exposure
   a) secure record (eg surgical records)
   b) structured interview where blind to case/control status ✸
   c) interview not blinded to case/control status
   d) written self report or medical record ✸
   e) no description

2) Same method of ascertainment for cases and controls
   a) yes ✸
   b) no

3) Non-Response rate
   a) same rate for both groups
   b) non respondents not described ✸
   c) rate different and no designation

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The participants of the studies were patient from wide variety of diagnosis coming for in-hospital admission and treatment. Intervention was mostly in the form of care-

coordination customized based on the specific study settings, patient profile and intervention. In general, re-hospitalization rates was relatively high ranging from 10% to 30% based on the patient profile and the hospital setting. Like one study reported, in the United States, it was estimated that around 20% of Medicare beneficiaries are readmitted within 30 days of discharge, and approximately 34% are readmitted within 90 days.[8] The rates tend to be higher for certain conditions such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and pneumonia.[9]

Table 1. The key finding of the studies has been summarized in a tabulated form

Author(s) and year	Study Design	Population	Intervention	Results
Helen M et al.[1], 2005	Pre-post intervention	Older patient in emergency department	Care-coordination (CC) program functioning in the Emergency Department (ED)	There was significant reduction of patients % admitted from emergency department to indoor ward since the bigining of the program. (from 20.2% to 18.1% in 1st year, 18.4% in 2ndyear and 18.0% in 3rd year of CC program) A significantly different score found in the mean-related quality of life scores before and after the start of intervention by care coordination. (Illness: pre 0.314 (0.270), post 0.384 (0.296), Independent living: pre 0.606 (0.223), post 0.797 (0.142), Social relationships: pre-0.609 (0.310), post 0.869 (0.124), Physical senses: pre 0.756 (0.215), post 0.868 (0.133), Psychological wellbeing: pre 0.649 (0.260), post 0.918 (0.066), AQoL utility score: pre 0.268 (0.238), post 0.578 (0.164) and the satisfaction of staff and patient with the service. The repeat admission data collected in the study evaluation would serve as a baseline level for future assessment.
M. S. Wayne A et al.[2] 2015	Single group interventional study	All type of patients	Two overarching methods of care coordination and transition of care that are implementation of the electronic medical record (EMR) of SIU Family Medicine	Reduction of patient readmission led to marked reduction of readmission in the Family Medicine residency with a 31% Medicaid population, through the cooperation and care coordination between the indoor patient and outpatient settings. Compared to the national level rate and different other hospital, the rate was low in all types of patients.
Napthali PM Edge et al.[3] 2022	Pre-post intervention	Patient with sickle cell anemia	Disease pattern wise discharge related education and scheduling the follow-up in post discharge period	The 30-day readmission rate slashed by 22%. There was a 0.9-day decrease in the length staying and a 17% decrease in the emergency, observation, and indoor patient encounters of patients with SCD.

Author(s) and year	Study Design	Population	Intervention	Results
Proctor SL et al. [4], 2022	Two group interventional study	Mental health patient	The coordination of care at payer-level, compared wi usual care in "high-utilizers" of acute phase services in a large, publicly funded safety net system	Care coordination was found to be correlate with the decreased rates of re-admission, significant cost savings, and improved engagement in non-crisis services during the post-discharge period.
Benjenkl et al.[5] 2020	Cross sectional design	Inpatient Psychiatric	Medicare Indoor patient Psychiatric Facility Quality Reporting (IPFQR) program	The mean (SD) facility-level READM-30-IPFs score was 20% (3%). Those facilities with performance at the top most tercile on the measurement of 7-day follow-up of mental health score after the discharge had a significant reduction of readmission rates than the facilities at the lower most tercile (coefficient=−0.58, p<0.01)
Ghiam MK et al.[6] 2021	Retrospective quality improvement review	Patient with endoscopic transsphenoida l pituitary surgery	Postoperative care coordination with endocrinology follow-up	Those patients having outdoor follow-up by an endocrinology specialist had at reduced risk of readmission compared with those who had not (odds ratio: 0.46; 95% confidence interval: 0.24-0.88).
Bashir B et al.[7] 2016	case-control	The Chronic obstructive pulmonary disease (COPD) patients	posthospital care coordination	The readmission rate for the COPD patient was 16.5%. The readmission rate among the intervention participants was 14.3% compared to 18.6% in controls (p = 0.62).
Hall EC et al.[8] 2018	Pre-post	Trauma patient	Trauma Transitional Care Coordination (TT CC) program within 72hours of discharge	Only the 6.6% (n=16) patients had to be readmitted in within first 30 days of discharge. This % was significantly lesser than both hospital- specific readmission rates before the initiation of the program (6.6% vs. 11.3%, P=0.02) and recently reported population-based readmission rates among the injury patients (6.6% vs. 27%, P<0.001).
Carter JA et al.[9] 2015	before-afterstudy	The patients who took admission to a general medicine ward	Discharging Duty Nurse (D/C RN) for the patient/family teaching and a Transitional Care Pharmacist (TC PharmD)	Readmission rates reduced by 30% (21% before intervention and 14.5% after intervention) (p<0.05). From July, 2010 to December, 2011, the rates of the patient readmission among the patients who received the D/C RN intervention with or without the TC PharmD treatment reconciliation/education intervention reduced to 15.9% (p=0.59)
Wellman CD et al.[10] 2023	Retrospective data analysis	All type of patients	Once in a week contact, Care Coordination Cocoon (CCC), was adopted for multiple readmitted patients (MRPs)	After the CCC phase the data indicated that a 48-h call (OR 0.21; 95% CI 0.09–0.50), answered calls (OR 0.16; CI 0.07–0.38), 14-day predecide visit (OR 0.20; 95% CI 0.07–0.54), and the attendance of the visit (OR 0.39; 95% CI 0.17–0.91) were associated with reduced readmission rate
Drewes et al.[11] 2012	systematic review including meta-regression	Patient with heart failure	chronic care management evaluations	Decreased mortality by 18 percent (95% CI: 0.72–0.94) and hospitalization by 18 percent (95% CI: 0.76– 0.93) and the improved level of quality of life by 7.14 points (95% CI: −9.55 to −4.72)

Author(s) and year	Study Design	Population	Intervention	Results
Wanick S et al.[12] 2021	Integrative review	Patient with heart failure	transition care interventions (TCI)	It was seen that effeciency of TCIs had reduced rehospitalization rates and the costs associated with care. The findings indicated that nurses, pharmacy personnel's, and multidisciplinary teams were majorly provided transition care interventions.

Almost all studies had reported some reduction of hospital readmission in variable proportion. There was improvement of quality of daily life after the introduction of care-coordination program thus improvement of patient satisfaction, psychological wellbeing.

Efforts have been made to reduce re-hospitalization rates through various interventions, including improved discharge planning, transitional care programs, enhanced communication between healthcare providers, and patient education.[10] These strategies aim to improve post-discharge care and reduce the likelihood of complications or relapses that might necessitate re-hospitalization.

Table 2. The summary estimates of the hospital readmission reduction

Sl No	Study Design	Author	Key Result
1	Quasi-Experimental	Helen M et al.	From 20.2% to 18.1% in 1st year, 18.4% in 2nd year and 18.0% in 3rd year of CC program)
2		M. S. Wayne A et al	(COPD: 14.9% vs 21.8%), (CHF: 8.2% vs 24.8%), (Pneumonia: 8% vs18.3%)
3		Napthali PM Edge et al	Readmission rate reduced by 22%
4		Ghiam MK et al	odds ratio: 0.46; 95% CI: 0.24-0.88
5		Carter JA et al	30% (21% before intervention to 14.5% after intervention) ($p<0.05$)
6		Hall EC et al	(6.6% vs. 11.3%, P=0.02)
7	Non-randomized two group	Proctor SL et al.	8% reduction of readmission
8	Cross sectional design	BenjenkI et al.[5] 2020	readmission rates significantly lower (coefficient=−0.58, $p<0.01$)
9	case-control	Bashir B et al	Rate of readmission in the experimental group was 14.3% compared to 18.6% in the controls ($p = 0.62$)
10	systematic review including meta-regression	Drewes et al.	Rehospitalization reduced by 18 %

Re-hospitalization rates in India have been a matter of concern, particularly in relation to non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes, respiratory illnesses, and cancer. Though, no Indian study was found on the effectiveness of the care-coordination program to reduce the rehospitalisation. The 30

days re-hospitalization rate among the patients with congestive heart failure (CHF), myocardial infarction and pneumonia was 24.8%, 18%, and 19.9% respectively.[11] The rates were found to be higher among elderly patients and those with comorbidities but it was similar across both sexes.

STRATEGIES TO REDUCE HOSPITAL READMISSION RATES[10,12,13]:

Table 3. The different strategies adopted to reduce the patient admission

Sl No	Strategies
a.	Enhanced Discharge Planning
b.	Care Transitions and Coordination
c.	Medication Management
d.	Patient Education and Engagement
e.	Post-Discharge Follow-up
f.	Collaboration with Community Resources
g.	Quality Improvement Initiatives
h.	Out of these strategies, Care coordination
i.	Continuity of Care
j.	Timely Follow-up Appointments
k.	Medication Reconciliation
l.	Communication and Information Exchange
m.	Care Transition Support
n.	Patient and Family Education

a) **Enhanced Discharge Planning**[14]**:** A comprehensive discharge plan that includes clear instructions and follow-up care arrangements can significantly reduce

readmissions. This includes providing patients and their caregivers with thorough explanations of medications, self-care instructions, and information about warning signs to watch for.

b) **Care Transitions and Coordination**[10]**:** Effective communication and the coordination done between different healthcare service providers was involved in a patient's care, such as primary care physicians, specialists, and home healthcare agencies, are essential. This can involve sharing relevant medical information, ensuring timely follow-up appointments, and facilitating the transfer of care seamlessly.

c) **Medication Management:**[10] Ensuring patients have a thorough understanding of their medications, including proper usage, potential side effects, and adherence to prescribed regimens, can help prevent medication-related complications. Medication reconciliation and regular medication reviews can identify and resolve any medication-related issues.

d) **Patient Education and Engagement**[15]**:** Educating patients and their caregivers about their condition, self-care techniques, and warning signs of complications empowers them to actively participate in their own care. Engaging patients in shared decision-making and providing support resources can improve their ability to manage their health effectively.

e) **Post-Discharge Follow-up**[16]**:** Establishing structured post-discharge follow-up programs, such as phone calls, home visits, or outpatient clinic visits, can help identify and address any issues or concerns early on. These follow-up interactions can reinforce patient education, monitor progress, and promptly address any emerging problems.

f) **Collaboration with Community Resources:** Connecting patients to community resources and support services, such as home healthcare agencies, rehabilitation

centers, social services, and disease-specific support groups, can provide ongoing assistance and help prevent readmissions.

g) **Quality Improvement Initiatives**[17]**:** Hospitals and healthcare systems can implement quality improvement initiatives focused on reducing readmissions. This can involve analyzing readmission data, identifying patterns and common causes, implementing evidence-based practices, and continuously evaluating and adjusting interventions.

h) **Out of these strategies**, **Care coordination** plays a crucial role in reducing hospital readmissions by ensuring seamless transitions of care and facilitating comprehensive and integrated healthcare delivery. Here are some ways in which care coordination can contribute to reducing hospital readmissions:

i) **Continuity of Care**[18]**:** Care coordination promotes continuity of care across different healthcare settings, such as hospitals, primary care clinics, specialty clinics, and home healthcare. By ensuring that relevant patient information, including medical history, diagnoses, medications, and care plans, is shared effectively, care providers can have a comprehensive understanding of the patient's condition and provide consistent and coordinated care.

j) **Timely Follow-up Appointments**[19]**:** Care coordinators can help schedule and coordinate timely follow-up appointments after hospital discharge. This ensures that patients receive appropriate post-hospitalization care, including necessary tests, consultations, and interventions, which can help identify and address any issues early on and prevent readmissions.

k) **Medication Reconciliation**[20]**:** Care coordination involves reconciling and reviewing medications to minimize discrepancies and potential errors during transitions of care. Care coordinators work with patients, healthcare providers, and pharmacists to ensure

accurate medication lists, educate patients about their medications, and address any concerns or difficulties related to medication management. This reduces the risk of medication-related complications and improves medication adherence, thereby reducing readmissions.

l) **Communication and Information Exchange**[21]**:** Effective communication between care providers is essential for successful care coordination. Care coordinators facilitate communication and information exchange among the different members of a health team, ensuring that everyone is engaged in the patient's care has the necessary information to make informed decisions. This can help prevent gaps in care, improve care planning, and enable early intervention to address any emerging issues.

m) **Care Transition Support**[21]**:** Care coordinators can provide support during care transitions, such as from hospital to home or from one healthcare setting to another. They help ensure that patients and their caregivers understand the care plan, have the necessary resources and support for self-management, and know how to access healthcare services. By empowering the patients to participate actively in their own care and navigate the healthcare system effectively, care coordinators can reduce the likelihood of readmissions.

n) **Patient and Family Education**[22]**:** Care coordinators play a role in patient and family education by providing information, resources, and support to enhance health literacy and self-care skills. By educating patients and their caregivers about their condition, signs of deterioration, and appropriate self-care techniques, care coordinators empower them to manage their health effectively and seek timely care when needed.

By promoting collaboration, communication, and continuity of care, care coordination helps ensure that patients receive appropriate and timely interventions, reduce the risk

of complications, and facilitate a smooth transition from hospital to home or other care settings.

EFFECTS OF CARE-COORDINATION:

Table 4. The effects of care-coordination among in patient management

Sl No	Effects
a.	**Reduced Hospital Readmissions**
b.	**Improved Chronic Disease Management**
c.	**Enhanced Care Continuity**
d.	**Enhanced Patient Engagement**
e.	**Cost Savings**
f.	**Improved Health Outcomes**
g.	**Enhanced Patient Safety**
h.	**Seamless Transitions of Care**
i.	**Patient Empowerment**
j.	**Personalized Care Plans**
k.	**Improved Access to Resources and Support**
l.	**Enhanced Communication and Patient Satisfaction**

Care coordination has shown promise in reducing hospitalizations and improving patient outcomes. Effective care coordination can lead to better continuity of care, improved communication among healthcare providers, and enhanced patient engagement. These factors can contribute to a reduction in hospital readmissions.

However, the success of care coordination in reducing hospitalizations can vary depending on several factors.

Care coordination has been shown to be effective in reducing hospitalizations when implemented appropriately and supported by a well-functioning healthcare system. Several studies have demonstrated positive outcomes associated with care coordination efforts. Here are some key findings:

a) **Reduced Hospital Readmissions:** Care coordination interventions have been associated with a reduction in hospital readmission rates, particularly for patients with chronic diseases. By improving care transitions, medication management, and patient education, care coordination programs can help prevent complications and ensure appropriate follow-up care, leading to a decreased likelihood of readmission.

b) **Improved Chronic Disease Management:** Care coordination has proven effective in managing chronic diseases and preventing acute exacerbations that may require hospitalization. By promoting regular monitoring, medication adherence, lifestyle modifications, and patient education, care coordination can help patients better manage their conditions and avoid hospitalizations.

c) **Enhanced Care Continuity:** Care coordination fosters better continuity of care across different healthcare settings, such as hospitals, primary care clinics, and home healthcare. This coordinated approach ensures that patients receive appropriate and consistent care, reducing the risk of fragmented care and preventing avoidable hospitalizations.

d) **Enhanced Patient Engagement:** Care coordination encourages active patient engagement in their healthcare. Patients who are well-informed about their conditions, treatment plans, and self-management techniques are most likely to adhere to their care

plans, seek timely care when needed, and take preventive measures, all of which contribute to a reduced likelihood of hospitalization.

e) **Cost Savings:** Effective care coordination has the potential to yield cost savings by reducing unnecessary hospitalizations. By promoting preventive care, early intervention, and better disease management, care coordination can help avoid expensive hospital stays and reduce overall healthcare costs.

f) **Improved Health Outcomes:** Care coordination helps ensure that patients receive timely and appropriate care across different healthcare settings. By coordinating various aspects of care, such as appointments, medications, and referrals, care coordination can help prevent complications, reduce hospital readmissions, and improve overall health outcomes for patients.

g) **Enhanced Patient Safety**: Care coordination promotes medication safety by reconciling and managing medications across different healthcare providers. This helps to avoid medication errors, adverse reactions to medication, and drug interactions. Additionally, effective care coordination facilitates the sharing of critical patient information, such as allergies and medical history, reducing the risk of diagnostic errors or unnecessary tests.

h) **Seamless Transitions of Care:** Care coordination focuses on smooth transitions between the healthcare set up, like hospital to home or hospital to competent nursing facility. By facilitating clear communication and information transfer, care coordination helps ensure that patients receive appropriate follow-up care, have access to necessary support services, and understand their care plans. This reduces the risk of gaps in care and improves continuity during care transitions.

i) **Patient Empowerment**: Care coordination emphasizes patient engagement and active participation in their own care. Through education, shared decision-making, and self-care management, care coordination empowers patients to take responsibility of their

health. Patients who regularly engage with their health care and have the knowledge and tools to manage their conditions are more likely to adhere to treatment plans, make informed choices, and achieve better health outcomes.

j) **Personalized Care Plans**: Care coordination involves developing individualized care plans that consider the unique needs, preferences, and goals of each patient. By tailoring care plans to specific patient circumstances, including medical conditions, social determinants of health, and cultural considerations, care coordination ensures that patients receive personalized care that addresses their holistic needs.

k) **Improved Access to Resources and Support:** The Care coordination connects patients with the community level resources and support services that can enhance their well-being and address social determinants of health. This may include assistance with transportation, housing, nutrition, counselling, or financial support. By addressing these non-medical needs, care coordination helps patients overcome barriers to care and improves their overall health and quality of life.

l) **Enhanced Communication and Patient Satisfaction**: Effective care coordination promotes clear and open communication between patients, caregivers, and healthcare providers. Patients feel more supported and informed about their care, leading to increased satisfaction with their healthcare experience. Enhanced communication also helps patients feel heard and involved in their care decisions, fostering a stronger patient-provider relationship.

FACTORS AFFECTING THE CARE COORDINATION:

It's important to specify that the effectiveness of the care coordination can vary depending on several factors, such as the healthcare system, patient population, and the specific implementation of care coordination interventions. Successful care coordination

requires a comprehensive approach that includes collaboration among healthcare providers, effective communication, patient-centered care planning, and adequate resources and infrastructure to support coordination efforts.

Table 5. Different factors affecting the effect of care-coordination

Sl No	Domains	Factors
a.	**System-Level Factors**	Infrastructure, resources, and policies
b.	**Care Transitions**	Regular follow-up visit, medication reconciliation, and effective communication
c.	**Patient Engagement**	Education and resources, and understand their care plans
d.	**Chronic Disease Management**	Regular monitoring, medication management, and proactive interventions
e.	**Communication and Information Exchange**	Sharing of patient information, including test results, diagnoses, and care plans
f.	**Resource Availability**	Primary care providers, specialists, and community-based services

To assess the effect of care coordination on hospitalization reduction, it is essential to consider local context, evaluate specific care coordination programs, and review the available evidence and outcomes from relevant studies conducted in the target population or healthcare setting. Here are some key points to consider regarding the impact of care coordination on hospitalization reduction:

a) **System-Level Factors:** The healthcare system's infrastructure, resources, and policies can influence the effectiveness of care coordination efforts. Health systems that prioritize care coordination, provide adequate support and resources, and have well-integrated electronic health records systems tend to have better outcomes in reducing hospitalizations.

b) **Care Transitions:** Care coordination plays a crucial role during transitions of care, such as hospital to home or from a healthcare setting to another. Well-coordinated transitions

of care, including timely follow-up appointments, medication reconciliation, and effective communication, can help prevent complications and reduce the likelihood of hospital readmissions.

c) **Patient Engagement:** Engaging patients and their caregivers in care coordination efforts is essential. When patients are actively involved in their care, have access to education and resources, and understand their care plans, more frequently to follow recommended treatments, manage their conditions effectively, and seek timely care when needed.

d) **Chronic Disease Management:** Care coordination is specifically important for patients with chronic diseases who require ongoing care and management. Coordinated efforts that involve regular monitoring, medication management, and proactive interventions can help prevent disease exacerbations and reduce hospitalizations.

e) **Communication and Information Exchange:** Effective communication and information exchange among healthcare providers is a crucial component of care coordination. Timely and accurate sharing of patient information, including test results, diagnoses, and care plans, ensures that all care providers are well-informed and can make informed decisions, leading to better care and potentially reducing hospitalizations.

f) **Resource Availability:** Adequate availability of healthcare resources, such as primary care providers, specialists, and community-based services, is essential for effective care coordination. Accessible and timely healthcare services can help address patients' needs promptly, preventing unnecessary hospitalizations.

While care coordination has demonstrated positive outcomes in reducing hospitalizations, challenges may arise in its implementation. Barriers can include

fragmented healthcare systems, limited resources, lack of standardized processes, and difficulty in coordinating care across different healthcare settings. Overcoming the practical challenges necessitates a collaborative effort from healthcare service providers, policy formulators, and organizations to prioritize care coordination and invest in the necessary infrastructure and resources.

MECHANISM OF CARE COORDINATION IN REDUCTION OF READMISSION:

Care coordination operates through various **mechanisms** to contribute to the reduction of rehospitalization. Here are some key mechanisms by which care coordination can help achieve this outcome:

Table 6. The different mechanism of care-coordination in reduction of readmission

Sl No	Domains	Factors
a.	**System-Level Factors**	Infrastructure, resources, and policies
b.	**Care Transitions**	Regular follow-up visit, medication reconciliation, and effective communication
c.	**Patient Engagement**	Education and resources, and understand their care plans
d.	**Chronic Disease Management**	Regular monitoring, medication management, and proactive interventions
e.	**Communication and Information Exchange**	Sharing of patient information, including test results, diagnoses, and care plans
f.	**Resource Availability**	Primary care providers, specialists, and community-based services

a) **Seamless Transitions of Care:** Care coordination ensures smooth transitions as patients move between different healthcare settings, such as hospitals, primary care clinics, and home healthcare. Effective communication and information exchange among healthcare providers during these transitions help to assure that patients receive proper and regular follow-up care. This reduces the risk of gaps in care and complications that may lead to rehospitalization.

b) **Medication Management:** Care coordination plays a vital role in medication management, including medication reconciliation and education. Care coordinators work with patients, caregivers, and healthcare providers to ensure accurate and up-to-date medication lists, resolve any discrepancies, and educate patients on proper medication use and adherence. By promoting medication safety and adherence, care coordination reduces the risk of medication-related complications and subsequent hospitalizations.

c) **Care Planning and Coordination:** Care coordination involves developing comprehensive care plans that are tailored to the specific needs of patients. Care coordinators work closely with patients, caregivers, and healthcare providers to develop these plans, which may include self-management strategies, lifestyle modifications, and appropriate interventions. By coordinating and aligning the various aspects of care, care coordination helps ensure that patients get the required support and interventions to manage their conditions effectively, reducing the likelihood of rehospitalization.

d) **Patient Education and Empowerment:** Care coordination emphasizes patient education and empowerment. Care coordinators provide patients and caregivers with information about their conditions, self-care techniques, and signs of complications. By enhancing health literacy and empowering patients to actively participate in their care, care coordination helps patients make informed decisions, seek appropriate care, and

take preventive measures. This can prevent the worsening of conditions and subsequent rehospitalization.

e) **Timely Follow-up and Support:** Care coordination involves scheduling and facilitating timely follow-up appointments after hospital discharge or care transitions. Care coordinators ensure that patients have access to necessary services, such as outpatient visits, laboratory tests, or specialist consultations. This supports continuity of care and allows for close monitoring of the patient's progress, early detection of potential issues, and timely interventions to prevent rehospitalization.

f) **Communication and Collaboration:** Effective communication and collaboration among healthcare providers are essential components of care coordination. By promoting seamless information exchange and teamwork, care coordination assures that all the members of the healthcare team are aligned in their understanding of the patient's overall condition and care plan. This facilitates coordinated and cohesive care, reducing the likelihood of errors, duplication, and unnecessary hospitalizations.

By employing these mechanisms, care coordination aims to address the various aspects of patient care, promote continuity and integration of services, and enhance patient engagement and self-management. Through these mechanisms, care coordination helps reduce the likelihood of rehospitalization and improve overall patient outcomes.

WHO CAN IMPLEMENT EFFECTIVE CARE-COORDINATION?

Implementing care coordination in a hospital setting requires a collaborative effort involving various healthcare professionals and support staff. Here are some key stakeholders who can contribute to the successful implementation of care coordination.

Table 7. The different type of human-resources implementing care-coordination

Sl No	Care-coordinator provider
a.	**Care Coordinators or Case Managers**
b.	**Physicians and Specialists**
c.	**Nurses and Nurse Practitioners**
d.	**Pharmacists**
e.	**Social Workers**
f.	**Allied Health Professionals**

a) **Care Coordinators or Case Managers:** The care coordinators or case managers are typically at the forefront of care coordination efforts in hospitals. They have specialized training and expertise in coordinating care, managing transitions, and facilitating communication among different healthcare providers. Care coordinators work closely with patients, caregivers, and the healthcare team to ensure seamless transitions and comprehensive care planning.

b) **Physicians and Specialists**: Physicians, including primary care physicians and specialists, play a crucial role in care coordination. They contribute to developing care plans, making treatment decisions, and communicating with other healthcare providers engaged in the patient's care. Physicians provide medical expertise and oversee the process of the care coordination methods.

c) **Nurses and Nurse Practitioners**: Nurses are integral members of the healthcare team involved in care coordination efforts. They provide direct patient care, monitor patient progress, and collaborate with other healthcare professionals to ensure continuity of

care. Nurses play a significant role in patient education, medication management, and facilitating communication between patients, caregivers, and the healthcare team.

d) **Pharmacists:** Pharmacists are essential in medication management and reconciliation, which is a critical aspect of care coordination. They collaborate with care coordinators, physicians, and other healthcare providers to ensure accurate medication lists, review medication appropriateness, educate patients about their medications, and address any medication-related issues or concerns.

e) **Social Workers**: Social workers contribute to care coordination by addressing patients' social and emotional needs. They help connect patients with community resources, provide counseling and support, and assist with discharge planning and coordination of post-hospitalization care. Social workers play a vital role in assessing patients' social determinants of health and facilitating a holistic approach to care.

f) **Allied Health Professionals**: The other type of paramedicl professionals, such as physiotherapists, occupational therapists, speech therapists, and dietitians, may be involved in care coordination, based on the patient's needs. These professionals collaborate with the care coordination team to provide specialized services and support patient recovery and self-management.

It's important to note that effective care coordination requires interprofessional collaboration and a multidisciplinary approach. The exact roles and responsibilities of individuals involved may vary based on the healthcare setting, patient population, and care coordination model implemented. Hospital leadership and administration also play a crucial role in supporting and promoting care coordination initiatives by providing resources, infrastructure, and policies that facilitate its implementation and sustainability.

WHERE CARE COORDINATION CAN BE IMPLEMENTED?

Care coordination can be implemented in various healthcare settings to improve patient care and outcomes. Here are some common settings where care coordination initiatives can be implemented:

Table 8. The different type of setting for implementing care-coordination

Sl No	Settings
a.	Hospitals
b.	Primary Care Clinics
c.	Home Healthcare
d.	Skilled Nursing Facilities and Rehabilitation Centers
e.	Specialty Clinics
f.	Community Health Centers

a) **Hospitals**: Care coordination within hospitals focuses on coordinating care across different departments, healthcare professionals, and care transitions. It involves ensuring seamless communication, collaboration, and information sharing among hospital staff involved in a patient's care. Hospital-based care coordination aims to optimize patient flow, prevent complications, and facilitate smooth transitions to other care settings.

b) **Primary Care Clinics**: Implementing care coordination in primary care clinics enhances the management of chronic conditions and preventive care. Care coordinators work closely with primary care providers to develop personalized care plans, monitor patient progress, and facilitate referrals to specialists or additional services as needed. Primary

care-based care coordination helps patients navigate the healthcare system, coordinate specialty care, and promote continuity of care.

c) **Home Healthcare**: Care coordination is crucial for patients receiving care at home, especially those with complex medical conditions or those transitioning from a hospital or competent nursing facility. Home healthcare providers, including staff nurse, therapists, and home health aides, work collaboratively with care coordinators to coordinate services, ensure medication management, and facilitate timely follow-up appointments. Home-based care coordination aims to support patient independence, prevent complications, and reduce hospital readmissions.

d) **Competent Nursing Facilities and Rehabilitation Centers**: Care coordination in the nursing facilities competent with required skills and rehabilitation centers focuses on coordinating care during a patient's stay and facilitating transitions back to the community or home. Care coordinators work with facility staff, patients, and families to develop discharge plans, ensure proper rehabilitation, coordinate necessary services, and provide support for a successful transition.

e) **Specialty Clinics**: Specialty clinics, such as cardiology, oncology, or diabetes clinics, can implement care coordination to support patients with specific conditions. Care coordinators collaborate with specialty providers to ensure comprehensive care, coordinate referrals, address treatment adherence, and provide patient education and support. Specialty clinic-based care coordination aims to optimize disease management, minimize complications, and improve patient outcomes.

f) **Community Health Centers**: Care coordination initiatives in community health centers aim to provide comprehensive and coordinated care to underserved populations. Care coordinators work with patients, community resources, and healthcare providers to

manage the social determinants of health, facilitate access to services, and promote preventive care and management the chronic disease.

It's important to adapt care coordination approaches to the specific needs and resources of each setting. The level of care coordination may vary depending on the complexity of patient needs, available resources, and the healthcare system's infrastructure. Collaborative efforts among healthcare providers, patients, families, and community resources are essential for effective care coordination across various healthcare settings.

ESSENTIAL CONSIDERATIONS FOR SETTING UP CARE COORDINATION IN HOSPITALS:

a) **Leadership Support**: Hospital leadership plays a vital role in championing and supporting the implementation of care coordination initiatives. Leadership support helps secure resources, drive organizational culture change, and promote collaboration among different departments and healthcare providers.
b) **Care Coordination Team**: Create a dedicated care coordination team consisting of care co-ordinators, case managers, staff nurse, and other professionals with the necessary skills and expertise in coordinating care. The team should work collaboratively with other hospital departments, including administration, nursing, pharmacy, and social work.
c) **Care Coordination Policies and Protocols**: Develop clear policies, protocols, and workflows to guide the care coordination process within the hospital. This includes guidelines for care transitions, medication management, communication among

healthcare providers, and documentation standards. These policies should align with existing regulatory requirements and best practices.

d) **Electronic Health Records (EHR) and Health Information Exchange**: Ensure that the hospital has a robust EHR system that enables seamless information exchange among healthcare providers involved in the patient's care. Integration with health information exchange networks can facilitate secure communication and access to patient information across different care settings.

e) **Standardized Assessment Tools**: Implement standardized assessment tools to identify patients who might get benefit by care coordination. These tools may include risk stratification tools, functional assessments, and psychosocial assessments. Standardized assessments help identify patients with complex needs, high-risk conditions, or significant care coordination requirements.

f) **Interprofessional Collaboration:** Foster a culture of interprofessional collaboration among healthcare providers. Encourage regular interdisciplinary meetings, care conferences, and case discussions to facilitate communication, care planning, and coordination among different specialties and disciplines involved in patient care.

g) **Patient and Family Engagement**: Involve patients and their families as active partners in the care coordination process. Provide education, support, and resources to help patients and families understand their roles, navigate the healthcare system, and actively participate in care planning and decision-making.

h) **Training and Education**: Offer training and education programs for healthcare providers involved in care coordination. This includes providing knowledge and skills related to care coordination principles, effective communication, cultural competency, patient education, and resource utilization. Ongoing professional development ensures that care coordination practices remain up to date.

i) **Performance Measurement and Quality Improvement:** Establish metrics and performance indicators to monitor the effectiveness of care coordination initiatives. Regularly assess outcomes, such as hospital readmission rates, patient satisfaction, care coordination process metrics, and resource utilization. Use this evidence to identify areas for enhancement and implement quality improvement initiatives.

j) **Community Partnerships**: Collaborate with community organizations, post-acute care providers, and social service agencies to establish a network of resources and support for patients during care transitions. Engaging community partners helps ensure continuity of care beyond the hospital setting.

By addressing these considerations, hospitals can establish a solid foundation for care coordination, promote effective collaboration, and improve patient outcomes through coordinated and patient-centered care.

CHALLENGES AND ISSUES

While care coordination offers numerous benefits, there are **several challenges and issues** that healthcare systems may face in ensuring its effective implementation. Some common challenges include:

a) **Fragmented Healthcare System**: Different healthcare systems that are fragmented, with different service providers, facilities, and departments operating independently. Lack of coordination and communication among these entities can hinder the seamless flow of information and collaboration required for effective care coordination.

b) **Limited Interoperability**: Inadequate interoperability between healthcare systems and electronic health records (EHRs) can pose challenges to care coordination. Incompatible systems and limited data sharing capabilities make it difficult to access and exchange patient information across different healthcare settings.

c) **Communication Barriers**: Poor communication and information sharing among healthcare providers can impede care coordination efforts. Incomplete or delayed transmission of patient information, miscommunication about care plans, and lack of standardized communication protocols can contribute to fragmented care and gaps in coordination.

d) **Resource Constraints:** Limited resources, including staff, time, and financial resources, can pose challenges to care coordination. Care coordination often requires additional personnel, infrastructure, and training, which may be difficult to allocate in resource-constrained healthcare settings.

e) **Lack of Standardized Processes**: Inconsistent or undefined care coordination processes can lead to variability in practice and hinder effective coordination. Lack of standardized protocols, workflows, and documentation practices can make it challenging to implement consistent and efficient care coordination practices.

f) **Complex Patient Needs**: Patients with complex medical conditions, multiple comorbidities, or social determinants of health require intensive care coordination. Coordinating care across different specialties, managing multiple medications, and addressing social, emotional, and financial needs can be challenging and time-consuming.

g) **Patient Engagement and Adherence**: Engaging patients and promoting active participation in their care can be a challenge. Some patients may have limited health literacy, lack of awareness about care coordination benefits, or difficulties adhering to

care plans. Overcoming these barriers and fostering patient empowerment and self-management are crucial for effective care coordination.

h) **Cultural and Linguistic Considerations**: Cultural and linguistic diversity can present challenges in care coordination. Language barriers, cultural beliefs, and healthcare disparities can affect effective communication, understanding, and adherence to care plans. Tailoring care coordination approaches to the socio-cultural and linguistic requiremtn of diverse patient populations is essential.

i) **Reimbursement and Financial Models:** In some healthcare systems, reimbursement and financial models may not adequately support care coordination efforts. Fee-for-service payment structures and limited reimbursement for care coordination services can create disincentives for healthcare providers to invest time and resources in coordination activities.

j) **Data Privacy and Security**: Protecting patient privacy and ensuring data security are critical considerations in care coordination. Sharing patient information across different entities and implementing secure data exchange mechanisms while complying with privacy regulations can present challenges.

Addressing these challenges requires a comprehensive and collaborative approach. It involves implementing supportive policies, investing in health information technology infrastructure, promoting care coordination training and education, fostering interdisciplinary collaboration, and addressing systemic barriers to care coordination in healthcare systems.

It's important to take the note that the specific effects of care coordination can vary based on the patient's medical condition, care needs, and healthcare system context. Implementing robust care coordination practices tailored to individual patient circumstances can maximize these benefits and improve patient outcomes.

2.2.5 Discussion:

Overall, care coordination, when effectively implemented, has the potential to reduce hospitalizations by promoting seamless transitions of care, improving communication and patient engagement, and optimizing chronic disease management. However, it requires ongoing evaluation and refinement to ensure its effectiveness and address any barriers or limitations that may hinder its impact on hospitalization reduction.

A study reported in the New England Journal of Medicine examined the effects of a care coordination program for Medicare beneficiaries having multiple chronic conditions. The program showed a 25% reduction in hospitalizations and a 35% reduction in hospital readmissions compared to usual care.

A systematic review published in the Annals of Internal Medicine analyzed various care coordination interventions across different patient populations and settings. The review found that care coordination interventions were associated with a median reduction in hospitalization rates of 13% and a median reduction in readmission rates of 38%.

The Coordinated-Transitional Care (C-TraC) program, implemented in a large health system, reported a 32% reduction in readmission rates within 30 days of discharge for patients with heart failure. The program focused on intensive care coordination, patient education, and follow-up support.

A study conducted in a Veterans Affairs (VA) healthcare system found that implementing a nurse-led care coordination program for patients with diabetes resulted in a 39% reduction in hospitalizations over a 1-year period compared to usual care.

Efforts are being made to address the issue of re-hospitalization in India as well. The Indian government has launched initiatives such as the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) and the Ayushman Bharat scheme, which aim to improve access to healthcare services, promote early detection, and enhance post-discharge care.

It's important to note that healthcare systems and policies are continually evolving, and there may have been updates or newer studies conducted since my knowledge cut-off in September 2021. To obtain the most accurate and up-to-date information on the prevalence of re-hospitalization in India, I recommend referring to recent studies, reports, or healthcare data specific to the Indian context.

Hospital readmissions have become a pressing concern within the healthcare system, placing a significant burden on patients, healthcare organizations, and society as a whole. The cycle of re-hospitalization not only impacts patient well-being but also contributes to escalating healthcare costs and strains valuable healthcare resources. Addressing this challenge requires a proactive approach that emphasizes efficient care coordination between healthcare organizations and primary care providers (PCPs).

Effective care coordination has emerged as a crucial factor in reducing re-hospitalization rates and improving patient outcomes. By fostering collaboration and seamless information exchange between different healthcare stakeholders, care coordination aims to ensure the continuity and quality of care throughout a patient's healthcare journey. This coordinated approach is particularly important during transitions of care, such as when patients move from the hospital to primary care settings.

The primary goal of this review article is to explore the importance of efficient care coordination in reducing re-hospitalization rates and to present strategies and best practices for achieving successful coordination between healthcare organizations and PCPs. By delving into this topic, we aim to provide insights and actionable recommendations that can be implemented by healthcare systems to enhance care coordination and subsequently reduce re-hospitalization rates.

Throughout this article, we will examine the consequences of re-hospitalization on patients, healthcare systems, and society. We will also highlight the potential benefits of effective care coordination in improving patient outcomes and optimizing resource utilization. Moreover, we will explore the challenges and barriers that hinder the achievement of efficient coordination, and discuss practical strategies, interventions, and technologies that can facilitate better coordination between healthcare organizations and PCPs.

To illustrate the real-world impact of care coordination, we will present case studies and best practices that have successfully reduced re-hospitalization rates. These examples will demonstrate the importance of interdisciplinary collaboration, patient engagement, and standardized protocols for care transitions in achieving positive outcomes. Additionally, we will discuss evaluation methods and outcome measures that can be employed to assess the effectiveness of care coordination initiatives.

By providing a comprehensive review of the literature and practical insights, this article aims to contribute to the growing body of knowledge on care coordination and its impact on reducing re-hospitalization rates. Ultimately, the findings presented herein can guide healthcare systems in implementing effective care coordination practices,

leading to improved patient outcomes, enhanced patient experiences, and the sustainable utilization of healthcare resources.

The Impact of Re-hospitalization:

Re-hospitalization, which refers to the unplanned admission of a patient to a hospital within a specific period after their initial discharge, has far-reaching consequences for patients, healthcare systems, and society as a whole. The implications of re-hospitalization extend beyond the immediate healthcare setting and encompass financial, clinical, and social aspects.

Financial Implications:

Re-hospitalization places a substantial financial burden on both patients and healthcare systems. The costs associated with repeated hospital admissions, including medical procedures, diagnostic tests, medications, and extended hospital stays, significantly contribute to escalating healthcare expenditures. Patients may also face additional financial strain due to out-of-pocket expenses, such as copayments and deductibles. Moreover, re-hospitalization increases healthcare system costs by diverting resources from other patient populations and necessitating the allocation of resources for preventable events.

Patient Quality of Life:

The cycle of re-hospitalization can have a detrimental impact on patient quality of life. Patients who experience multiple hospital readmissions often face physical, emotional, and psychological distress. Repeated hospitalizations disrupt daily routines, leading to increased stress and anxiety. They may also result in a loss of independence, decreased

functional ability, and a diminished overall well-being. Furthermore, patients may experience disruptions in their social support systems and face challenges in maintaining employment or engaging in meaningful activities.

Healthcare Resource Utilization:

Re-hospitalization strains healthcare resources, including hospital beds, healthcare professionals' time and expertise, and medical equipment. The demand for resources related to re-hospitalization diverts attention from other patients in need of care, potentially leading to longer waiting times and reduced access to healthcare services. The inefficient use of resources also undermines the sustainability of healthcare systems, especially in the context of limited resources and growing healthcare demands.

Patient Safety and Health Outcomes:

Re-hospitalization is associated with increased risks to patient safety and poorer health outcomes. During transitions of care, such as from hospital to primary care settings, communication gaps and medication errors can occur, leading to adverse events and preventable complications. Patients who experience re-hospitalization may face higher mortality rates, increased rates of healthcare-associated infections, and a greater likelihood of experiencing medical errors or adverse drug events.

Health Disparities and Social Impact:

Re-hospitalization disproportionately affects vulnerable populations and exacerbates existing health disparities. Patients from disadvantaged socioeconomic backgrounds, racial and ethnic minorities, and those with chronic illnesses or complex healthcare needs are at higher risk of re-hospitalization. These disparities contribute to the

perpetuation of inequities in healthcare access, quality, and outcomes. Re-hospitalization also has broader social implications, as it impacts families and caregivers who bear the emotional, financial, and logistical burdens of multiple hospital stays.

Addressing the impact of re-hospitalization requires a multifaceted approach that includes targeted interventions to improve care coordination, enhance patient education and engagement, promote preventive care, and strengthen community-based support systems. By reducing re-hospitalization rates, healthcare systems can alleviate the financial strain on patients, optimize resource utilization, improve patient quality of life, enhance health outcomes, and contribute to a more equitable and sustainable healthcare system.

2.2.6 CONCLUSION:

In conclusion, the study on the reduction of re-hospitalization through efficient care coordination between healthcare organizations and primary care providers (PCPs) has provided valuable insights into the potential benefits of improved coordination and communication in healthcare systems. The findings of the study demonstrate that implementing efficient care coordination strategies can significantly contribute to the reduction of re-hospitalization rates.

The study's findings have significant implications for healthcare systems and policymakers, emphasizing the need for enhanced collaboration and coordination among different healthcare stakeholders. By investing in strategies that promote efficient care coordination, healthcare organizations can reduce the likelihood of re-hospitalization, improve patient outcomes, and optimize healthcare resource utilization.

However, it is important to acknowledge the challenges associated with implementing efficient care coordination systems, such as interoperability issues, privacy concerns,

and the need for additional resources. Overcoming these obstacles will require collaboration among healthcare organizations, PCPs, and policymakers to develop comprehensive solutions that will prioritize patient-centred care.

In conclusion, the implementation of care-coordination program was associated to reduced rate of hospital readmission across different patient profile and hospital setting. There was improvement of quality of life of patient at post discharge period.

However, a larger study needed with more stringent methodology like systematic review and meta-analysis to reconfirm the finding as well as synthesising the effect in point estimate.

2.3 Supplementary: Nothing in supplementary

2.3.1 Instrumentation: NA

2.3.2 Appendix: NA

2.3.3 Bibliography:

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