Internship Training
at
Jivi.AI

The effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches - A rapid review

by

Dr. ANUSHKA SINGH
PG/22/011

Under the guidance of
Dr. Sumant Swain

PGDM (Hospital & Health Management) 2022-24

International Institute of Health Management ResearchNew Delhi

Jivi Health Private Limited

+91-9818152187 | hello@jivi.ai
WeWork Forum, Cyber City,
Gurugram, Haryana, India 122002
GST 06AAGCJ1881K1ZB

June 28, 2024

To whomsoever it may concern

This is to certify that **Dr. Anushka Singh**, in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR, Delhi has completed her dissertation at **Jivi Health Private Limited** as an **Intern - Clinical Affairs** during **February 5, 2024** to **June 28, 2024**.

She has successfully carried out the study designed to her during internship training and her approach to the study has been sincere, scientific, and analytical.
We wish her all the best for future endeavors.

Sakshi Thapliyal
HR Manager
Jivi Health Private Limited

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr ANUSHKA SINGH** student of **PGDM (Hospital & Health Management) from the International Institute of Health Management Research**, New Delhi has undergone internship training at "**Jivi Health"** from **Feb to June 2024.** The Candidate has successfully carried out the study designated to her during the internship training and her approach to the study has been sincere, scientific, and analytical. The Internship is in fulfillment of the course requirements.

I wish her all success in all his/her future endeavors.

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

Dr. Sumant Swain
Assistant Professor
IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"The effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches- A rapid review"** at **"JIVI.AI"** 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. Anandhi	
	Ekta Saroha
	Ekta Saroha

Certificate from Dissertation Advisory Committee

This is to certify that **Dr ANUSHKA SINGH**, a graduate student of the PGDM (Hospital & Health Management) has worked under our guidance and supervision. She is submitting this dissertation titled "**The effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches- A rapid review"** at "**Jivi Health**" 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.

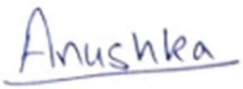
Institute Mentor
Dr Sumant Swain
Assistant Professor
IIHMR Delhi

Organization Mentor
Dr Gurukiran Babu Tumma
VP Clinical Services
Jivi Health

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **The effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches- A rapid review** and submitted by **Dr ANUSHKA SINGH** Enrolment No. **PG/22/011** under the supervision of **Dr. Sumant Swain** for the award of PGDM (Hospital & Health Management) of the Institute carried out during the period from **Feb 2024 to June 2024** 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
(Organization Supervisor)

Name of the Student: Anushka Singh.

Name of the organisation: Jivi Health Pvt. Ltd.

Area of Dissertation: Health IT

Attendance: Good attendance throughout the internship.

Objectives met: Consistently delivered high-quality results and met all the objectives.

Deliverables: All tasks were completed on time and with high degree of accuracy. Her work consistentetly met expectations.

Strengths: → Maintain a positive attitude and is friendly with colleagues.
→ Proffesional and a strong work ethics.

Suggestions for Improvement: → needs to improve ability to delegate tasks to ensure a balaced workload.
→ can enhance her analytics skills.

Rituparna

Signature of the Officer-in-Charge

(Internship)

Date: 08-07-24
Place: Gurugram

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH (IIHMR)
Plot No. 3, Sector 18A, Phase- II, Dwarka, New Delhi- 110075
Ph. +91-11-30418900, www.iihmrdelhi.edu.in

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Name of Student (in block letter)	Dr/Mr./Ms.: ANUSHKA SINGH		
Enrolment/Roll No.	PG/22/011	Batch Year	2022-2024
Course Specialization (Choose one)	Hospital Management	Health Management	Healthcare IT ✓
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Title of the Dissertation/Summer Assignment	The effectiveness of digital tool powered transition care program in reducing hospital readmissions & improving patient outcomes compared to traditional care management approaches.		
Plagiarism detects software used	"TURNITIN"		
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First and foremost, I would like to express my deepest gratitude to my college mentor, Dr Sumant Swain, for their unwavering support, invaluable guidance, and insightful feedback throughout this research journey. Their expertise and dedication have been instrumental in shaping the direction and quality of this dissertation.

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Contents

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List of Abbreviations

1. AI: Artificial Intelligence
2. EHR: Electronic Health Record
3. USD: United States dollar
4. WHO: World Health Organization
5. RCT: Randomized Control Trial
6. BMJ: British medical journal
7. JAMA: The Journal of the American Medical Association
8. NIH: National Institutes of Health
9. CDC: Centers for Disease Control and Prevention
10. EMBASE: Excerpta Medica dataBASE
11. MEDLINE: Medical Literature Analysis and Retrieval System Online
12. CINAHL: Cumulated Index to Nursing and Allied Health Literature
13. QoL: Quality of Life
14. HIE: Health Information Exchange
15. IBM: International Business Machines

Overview About the Organization

Jivi.ai is a healthcare startup company founded by Mr. Ankur Jain, the former Chief Product Officer of BharatPe. The main objective of the organization is to revolutionize primary healthcare through the utilization of artificial intelligence. Jivi AI uses massive language models, machine learning, generative AI, and digital health technologies to enhance healthcare accessibility and efficacy.

Since it was established in December 2023, the company has assembled an interdisciplinary team of experts and scholars from esteemed universities including Stanford, MIT, Harvard, and Yale. With intentions to expand its operations to the US, Jivi AI has already worked with more than 100 doctors, physicians, and hospitals, mostly in India.
The ultimate objective of Jivi AI is to enhance global healthcare outcomes for billions of people. To support its growth and development, the firm has acquired its first initial funding and is currently negotiating additional finance rounds.

Jivi's Large Language Model (LLM), Jivi MedX, achieves an average score of 91.65 across the nine benchmark categories on the leaderboard, surpassing well-known LLMs like OpenAI's GPT-4 and Google's Med-PaLM 2. Leading AI platform Hugging Face hosts the leaderboard, which rates LLMs with a focus on medicine based on how well they respond to questions about medicine from tests and studies.

Abstract

Background

This report evaluates the effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches. Traditional care management often falls short in providing timely and personalized support, leading to suboptimal outcomes. Digital tools, including electronic health records (EHRs), telehealth services, mobile health applications, remote monitoring devices, and AI-driven analytics, have emerged as promising solutions to address these challenges.

Literature Review

The literature review reveals a mixed impact of digital tools on patient outcomes and hospital readmissions. Some studies demonstrate significant benefits, including reduced readmission rates, improved medication adherence, and enhanced patient satisfaction, while others show minimal improvement compared to traditional methods. The disparity underscores the necessity for a systematic evaluation to consolidate existing evidence, identify effective strategies, and highlight areas for further research.

Methodology

The methodology employed for this study includes a comprehensive search strategy across major healthcare databases, with a focus on peer-reviewed journal articles, systematic reviews, and relevant grey literature. The inclusion criteria encompass studies involving adult patients transitioning from hospital to home, examining the effectiveness of digital tool-powered care programs, and reporting on outcomes such as hospital readmission rates and patient satisfaction.

Results

- The results indicate that digital tools, particularly those integrating AI and telehealth, significantly reduce readmission rates and improve patient outcomes.
- For instance, AI-driven analytics can predict patient risks and personalize care plans, while telehealth services facilitate continuous patient engagement and monitoring.
- However, the effectiveness of these tools is contingent on factors such as healthcare provider communication, care coordination, and patient adherence to follow-up care.

PROJECT REPORT

The effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches.

Introduction

For elderly individuals, the move from the hospital to their homes may be a delicate, taxing, and difficult time. Rehospitalizations are common and expensive because around one-fifth of older persons return within 30 days of being discharged from the hospital due to an acute medical issue that may not have been connected during their first hospital stay. Many patients have exhausted their physiological reserves during care transitions, which may impair their capacity to successfully avert health risks. Rehospitalization of a patient during this period can be caused by additional aggravating factors, such as medication errors or poor reconciliation, reduced ability to manage their health due to sleep deprivation, nutritional issues, pain and other discomfort, lack of information and resources, or information overload.

Furthermore, after leaving the hospital and returning home, older persons may need specialized care due to underlying or newly developed functional and/or cognitive impairments that may affect how well they adjust to normal life. After being hospitalized, people become more susceptible due to these several multifactorial and cumulative stressors (also known as "posthospital syndrome"). A meta-summary by Hestevik et al found that older adults had negative experiences during transitions; they described their transition experience as ‘insecure’, ‘unsafe’, as well as even ‘dangerous’[i].

The world's population is aging, which means that as more and more older persons move from hospitals to their homes, it will become increasingly crucial to make these transitions better.

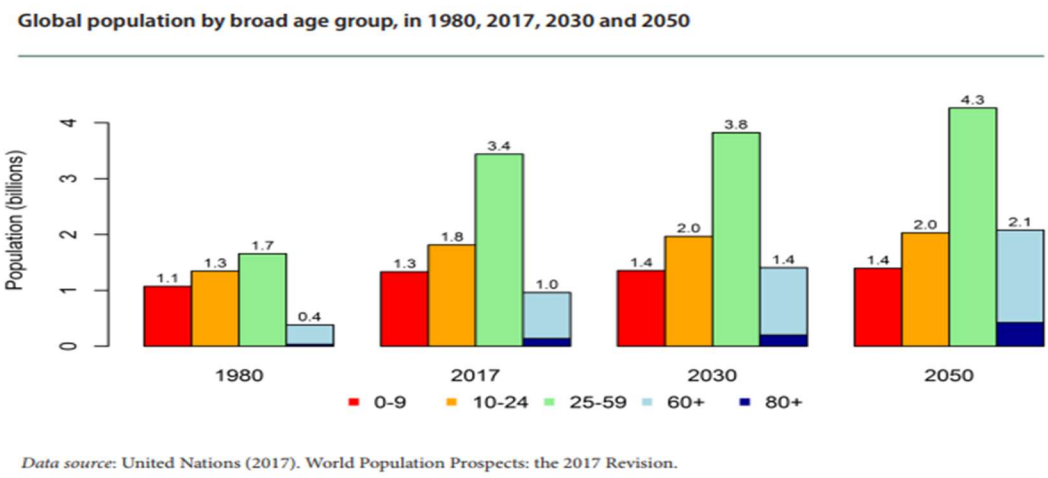

Figure 1 World population

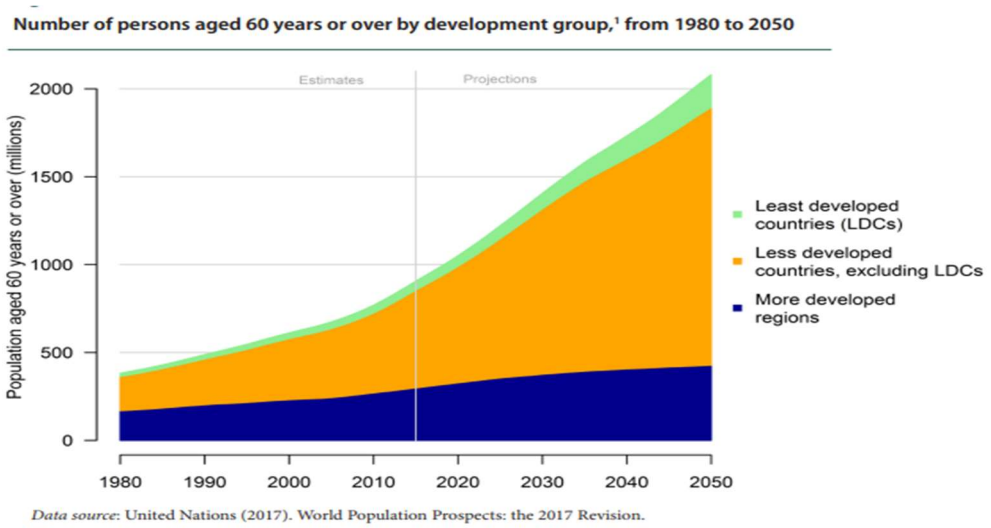

Figure 2 World population

"A series of actions intended to ensure the coordination and continuity of healthcare as patients transfer between different locations or different levels of care within the same location" is the definition of a transition of care. More precisely, activities that cross organizational lines and involve numerous interprofessional groups are part of the shift in care from the hospital to "independent community living" (or the home).

The discharge process from the hospital needs to be tailored to each patient's needs and circumstances. For some patients, this means a stressful diversion filled with early starts

(e.g., patients being released from the hospital before they are ready for discharge), delays (e.g., equipment and community services not set up in time, or information not given promptly during a handoff), and repeated steps (e.g., repeated patient assessments). Smooth transitions are a top issue in healthcare because they represent a "problematic junction in a patient's care management."

Carefully thought out and executed hospital to home transfers reduce medical expenses, readmission rates to hospitals, accidents or injury risk (such as falls), and prescription errors. On the other hand, poorly managed hospital to home transitions—resulting from process failures and inefficient information transfer between healthcare providers—may cause incomplete care, duplicate testing, medication errors, unsatisfactory patient experiences, and missed physician follow-up appointments. Inadequately managed hospital to home transfers can also lead to higher healthcare costs and worse patient outcomes. As a matter of fact, proactive corrective action may have prevented or at least lessened the severity of up to half of the unfavorable events that happen during hospital to home transitions. These could involve educating patients enough about their health and course of treatment as well as putting strategies into place to successfully convey information to the patient and community physician (such as posthospital follow-up and warning signs they should look out for).

Digital health technologies are a viable approach to facilitate person-centered communication across interprofessional teams operating both inside and outside of healthcare institutions. Information systems and multiprofessional care coordination improve older individuals' higher satisfaction and subjective quality of life, according to a systematic evaluation of interprofessional communication in transitional care models. The potential for digital technologies to promote shared situational awareness to enhance clinical decision making within care teams and interprofessional teams is one of its main advantages. Shared situational awareness, or the capacity for a group or team to see the broad picture and collaborate towards a common objective, such as transferring a patient from the hospital to their home, is a crucial element of interdisciplinary communication. Digital solutions can facilitate information sharing about a team's shared objective both synchronously and asynchronously.

By 2040, it is predicted that global health spending will rise from USD 21 trillion to USD 24 trillion[ii], mostly because of increases in government health spending brought on by ageing and multimorbidity[iii]. It is expected that private health funding via prepaid plans and out-of-pocket expenses will increase, but more slowly than government spending growth. Even though they can be avoided by changing important lifestyle risk factors, non-communicable illnesses remain the world's largest cause of death (74% of all deaths), and they pose a serious threat to public health (World Health Organization, 2022). planning and decision-making about safe and affordable healthcare across health systems, regions, illness combinations, and with various demographic characteristics (e.g., age and social poverty) necessitating economic evaluations.

Digital services have been suggested as one way to solve issues with accessibility, availability, and prices in healthcare. Examples of these services include telemedicine

interventions, mobile health applications, and remote monitoring devices. Digital services may provide comparable or superior outcomes than standard care for a variety of medical specializations, including the treatment of chronic non-communicable diseases and mental health issues, according to prior research. Digital services have the potential to impact service utilization and be cost-efficient in addition to being effective; yet, because of variable reporting practices and varied treatment effects, the results' generalizability is restricted.

As populations age worldwide, there is a pressing need to address the challenges associated with providing effective healthcare for the elderly. In many countries, including India, the proportion of elderly individuals is steadily increasing due to advancements in healthcare, improved living conditions, and declining birth rates. This demographic shift presents unique challenges for healthcare systems, particularly in managing the transition of elderly patients from hospital to home or other care settings.

Traditional transition care management typically involves coordination among healthcare providers, discharge planners, and family caregivers to ensure a smooth transition for patients leaving the hospital. However, despite these efforts, hospital readmissions among the elderly remain a significant concern. Factors such as medication errors, lack of follow-up care, social isolation, and inadequate support systems contribute to the high rates of hospital readmissions observed in this population.

One of the key gaps in traditional transition care management is the limited ability to provide timely and personalized support to patients after discharge. This often results in suboptimal outcomes and increased healthcare utilization. Digital tools have emerged as promising solutions to address these challenges by leveraging technology to improve communication, coordination, and monitoring of patients during the transition period.

Digital tool-powered transition care programs offer several advantages over traditional approaches. These tools can facilitate real-time communication between patients and healthcare providers, enable remote monitoring of vital signs and symptoms, provide medication reminders, and offer educational resources tailored to individual patient needs. By empowering patients to take a more active role in their care and by enhancing the continuity of care across different settings, digital tools have the potential to reduce hospital readmissions and improve patient outcomes.

Transition care management plays a crucial role in preventing unnecessary hospital readmissions among the elderly. By ensuring that patients receive appropriate support and follow-up care after discharge, healthcare providers can mitigate the risk of complications and improve the overall quality of life for elderly individuals. Given the increasing importance of addressing the healthcare needs of aging populations, investing in digital tool-powered transition care programs represents a promising strategy to enhance the efficiency and effectiveness of healthcare delivery for the elderly.

Literature Review

Recently, there has been a lot of interest in the use of digital tools in transition care programmes. Research has turned its attention to comparing the effectiveness of these technologies to more conventional care management techniques to better patient outcomes and lower hospital readmission rates. The influence of digital tool-powered transition care programmes on patient outcomes and hospital readmissions is examined in this review of the literature.

A range of technologies are employed in transition care programmes as digital tools, including mobile health applications, telehealth, electronic health records (EHRs), remote monitoring devices, and artificial intelligence (AI) analytics.

Electronic Health Records (EHRs): By enabling smooth information sharing between medical professionals, EHRs guarantee continuity of treatment and lower the risk of mistakes during care transitions.

Telehealth: Post-discharge patient involvement and monitoring are made possible by telehealth services including virtual consultations and remote patient monitoring.

Applications for Mobile Health: Apps for mobile health provide patients with simple access to symptom monitoring, medication reminders, and health information.

Devices for Remote Monitoring: With the use of these devices, patients' vital signs and health conditions can be tracked in real time.

AI-Driven Analytics: To forecast patient risks and customise treatment regimens, AI systems can evaluate enormous datasets.

Existing literature suggests that hospital readmissions impose significant burdens on healthcare systems and patients alike, indicating the need for more effective transition care strategies. Several studies have examined the potential benefits of digital tool-powered transition care programs, highlighting their ability to facilitate timely interventions, provide continuous support, and empower patients in self-management.

Rationale

Despite the promising capabilities of digital tools, there is a critical need to evaluate their effectiveness systematically. Current literature presents mixed results regarding the impact of digital tools on reducing hospital readmissions and improving patient outcomes. Some studies suggest significant benefits, while others indicate minimal, or no improvement compared to traditional methods. This discrepancy underscores the necessity for a rapid review to consolidate existing evidence, identify effective strategies, and highlight areas where further research is required.

Study Objective:

General Objective:

- To evaluate the effectiveness of digital tool-powered transition care programs in reducing hospital readmissions and improving patient outcomes compared to traditional care management approaches.

Specific Objectives:

- To assess the impact of digital tool-powered transition care programs on the rate of hospital readmissions.
- To assess the impact of digital interventions on patient satisfaction.
- To assess the impact of medication adherence.
- To identify gaps in the Transition care management.
- To identify the gaps in the digital tool powered technology related challenges.

Methodology

Eligibility criteria

Inclusion Criteria

1. **Population:**
    - Studies involving patients transitioning from hospital to home or other care settings.
    - Studies including adults (aged 18 and above) from diverse clinical settings (e.g., chronic disease patients, post-surgical patients).
2. **Intervention:**
    - Studies examining transition care programs powered by digital tools. This includes, but is not limited to, electronic health records (EHRs), telehealth services, mobile health applications, remote monitoring devices, and AI-driven analytics.
3. **Comparison:**
    - Studies comparing digital tool-powered transition care programs with traditional care management approaches.
4. **Outcomes:**
    - Primary outcomes: Hospital readmission rates.
    - Secondary outcomes: Patient outcomes such as quality of life, patient satisfaction, adherence to treatment, clinical indicators (e.g., blood pressure, glucose levels), and healthcare costs.
5. **Study Design:**
    - Randomized controlled trials (RCTs), cohort studies, case-control studies, quasi-experimental studies, and systematic reviews/meta-analyses that focus on the effectiveness of digital tools in transition care.
6. **Language:**
    - Studies published in English.
7. **Publication Status:**
    - Peer-reviewed journal articles, conference papers, and relevant grey literature (e.g., government reports, policy briefs).

Exclusion Criteria

1. **Population:**
    - Studies focusing exclusively on pediatric populations or specialized groups not representative of general adult transition care (unless they offer broadly applicable insights).
2. **Intervention:**
    - Studies that do not specifically investigate digital tool-powered transition care programs.

- Studies focusing on digital tools used in other contexts, such as primary care or outpatient settings without a transition care component.

3. **Outcomes:**
   - Studies that do not report on hospital readmission rates or patient outcomes relevant to transition care.
4. **Study Design:**
   - Case reports, editorials, opinion pieces, and non-systematic literature reviews.
   - Studies lacking a comparison group (for instance, descriptive studies without a control or traditional care group).
5. **Language:**
   - Studies published in languages other than English.
6. **Publication Status:**
   - Non-peer-reviewed articles, letters, and comments without substantial data or analysis.

Information source

A wide range of trustworthy and thorough information sources was used when doing research on how well digital tool-powered transition care programmes reduce hospital readmissions and improve patient outcomes when compared to traditional care management techniques. The following categories of sources played a crucial role in obtaining the information required:

- **Articles from peer-reviewed journals:** Journals of Medicine and Health Sciences: These include prestigious journals like BMJ, The Lancet, JAMA, The New England Journal of Medicine, and The Journal of the American Medical Association. High-quality data on observational studies, systematic reviews, and clinical trials can be found in the articles published in these publications.

- **Specialised Journals:** Publications like the Journal of Medical Internet Research, Telemedicine and e-Health, and Journal of Healthcare Engineering that concentrate on patient care management, digital health, and healthcare technology.

- **Comprehensive Evaluations and Meta-Analyses:** Meta-analyses and systematic reviews provide thorough summaries of the body of research that has been done on a certain subject. Finding high-quality reviews will need using resources like the PROSPERO International Prospective Register of Systematic Reviews and the Cochrane Database of Systematic Reviews.

- **Healthcare Databases:** Comprehensive literature searches were conducted using major healthcare databases, including EMBASE, MEDLINE, CINAHL

(Cumulative Index to Nursing and Allied Health Literature), PubMed, and MEDLINE. Access to an extensive selection of biomedical and health-related periodicals is provided via these databases.

- **Reputable Healthcare Websites:** Websites of authoritative health organizations such as the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and National Institutes of Health (NIH) provided access to guidelines, policy documents, and reports that are relevant to the topic.

- **Gray Literature:** Grey literature included sources such government reports, policy papers, white papers, conference proceedings, and dissertations that are not under the jurisdiction of commercial publishers.

Search strategy

This approach conforms to established practices in systematic literature reviews and guarantees thorough coverage of the available evidence. The steps involved in the search are as follows:

Terms and Expressions:

These contain phrases like "digital tools," "transition care programmes," "hospital readmissions," "patient outcomes," "traditional care management," "healthcare technology," along with "care coordination."

To increase the search's breadth, synonyms and similar phrases are also considered. For instance, "readmission rates," "post-discharge care," and "digital health tools."

Choose a Database:

Several important biomedical and healthcare databases were consulted to carry out the literature search. PubMed: MEDLINE; CINAHL: Cochrane Library; EMBASE: Google Scholar are some of these databases.

Formulating a Search Query:

To create exact search queries, truncation symbols (*) and boolean operators (AND, OR, NOT) was utilised. "Digital tools" OR "digital health tools" OR "healthcare technology" AND "transition care" OR "post-discharge care" OR "care coordination") AND "hospital readmissions" OR "readmission rates") AND "patient outcomes" OR "health outcomes" are a few examples of search terms.

The search results was further refined by applying filters for publication date (past ten years), language (English), and study kind (clinical trials, systematic reviews, meta-analyses).

Selection and Screening:
Relevance to the research topic was assessed by screening the titles and abstracts of the identified papers. Articles that aren't relevant were removed.
To ascertain if an article is appropriate for inclusion in the study, the full texts of any potentially pertinent articles were retrieved and evaluated in relation to the inclusion criteria.

Examining the reference list
We examined the reference lists of the chosen publications to find more pertinent research that might have slipped through the cracks during the first search. To guarantee thorough coverage, a manual search of important journals and conference proceedings were carried out.

Filtering paper based on Inclusion and exclusion criteria's
Selection process
To make sure that only the best and most relevant papers are included in the analysis, I used a multi-stage selection method. The following are the steps involved in the selection process:

Initial Screening: All identified papers' titles and abstracts were reviewed for relevance to the study topic. By taking this action, publications that do not specifically discuss transition care programmes driven by digital tools or their effects on patient outcomes and readmissions to hospitals were removed.

Full text review: Studies that make it past the first screening stage were subjected to a full-text review. To ascertain if an item is appropriate for inclusion in the study, each one was assessed according to predetermined inclusion and exclusion criteria.

Data Extraction: From the included studies, pertinent data was taken out and put into a structured format. The study design, sample size, specifics of the intervention, outcomes that were measured, and important findings were included in this data.

Synthesis and Analysis: Using digital tool-powered transition care programmes as a benchmark, the efficacy of these programmes was compared to more established care management techniques.

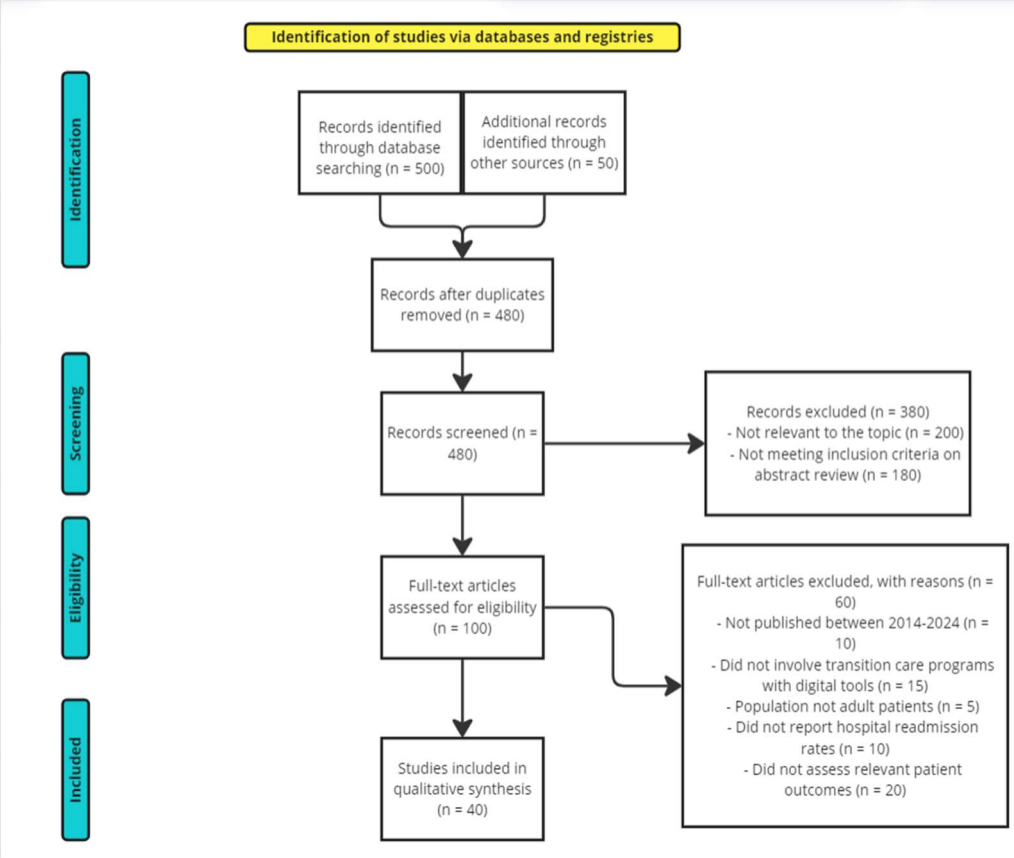

Figure 3 Prisma flow diagram

Data items

Primary outcome:

The hospital readmission rates are the primary outcome. Defined as the proportion of patients who are readmitted to the hospital within a given time frame (such as 30 or 90 days) following their discharge.

Patient-reported outcomes, such as quality of life (QoL) and functional status, as well as mortality and complication rates are all included in the category of patient health outcomes.

Secondary Outcome:

Patient Contentment: measured by means of questionnaires and surveys that gauge patient satisfaction and experience with care.

Use of Healthcare Resources: metrics including number of outpatient visits, length of hospital stay, and visits to the emergency room.

Cost of Care: A comparison between the intervention's medical expenses and those of conventional care management.

Results

Author & Year	Database	Digital tool used	Comparator	Outcome measures	Results
Brown et al, 2023[iv]	PubMed	Artificial Intelligence	Traditional care management	Rehospitalization in 30 days	- Integration of AI patient insights into existing transition of care navigation programs significantly reduced incidence of 30-day rehospitalization by 21.0%, (95% CI 0.65–0.95). -AI-enhanced transitional care demonstrated greater effectiveness and financial efficiency.
Mansukhani et al, 2015[v]	PubMed	EHR/EMR	Traditional care management	Rehospitalization in 30 days Medication reconciliation	-EHRs improve provider-to-provider communications and streamline patient health histories and diagnostics. -Enhanced access to health information facilitates better informed decision-making among physicians. -Implementation of EHRs reduced medication errors significantly on both surgical (from 90% to 47%) and medical units (from 57% to 33%).

Romero-Brufau et al, 2020 [vi]	PubMed	Artificial Intelligence	Traditional care management	Rehospitalization in 30 days	-Readmission rates decreased from 11.4% to 8.1% over six months post-implementation ($p < 0.001$). -There was a relative reduction of 25% in readmission rates compared to the comparative period ($p < 0.001$). -Control hospitals experienced a minor decrease from 9.3% to 8.8% in readmission rates ($p < 0.001$), highlighting the contrast with the implemented intervention's impact.
Ganefianty et al, 2024[vii]	Science direct	Mobile Health	Traditional care management	Post discharge Outcomes of Caregivers	-M-health transitional care intervention alleviated stress and burden among caregivers of patients with moderate or severe Traumatic Brain Injury.
Bouchand et al, 2021[viii]	Google scholar	Medication reconciliation using EHR	Traditional care management	Rehospitalization in 30 days Medication reconciliation	-In the intervention group, 3.4% of patients were readmitted to the hospital after 30 days, compared to 20.7% in the control group. -In the intervention group, 11% of in-hospital prescription adjustments were not maintained by the PCP, while in the control group, 24% did so
Noel et al, 2020[ix]	PubMed	Telehealth	Traditional care management	Medication Reconciliation Medicatio	-Telehealth patients were seven times more likely to adhere to their prescription regimen and showed higher rates of medication

				n adherence Rehospitalization in 30 days Patient engagement	reconciliation compared to the control group. -Patients using telehealth expressed excitement and confidence in technology's ability to enhance their medical care. -Telehealth did not show statistically significant differences in readmissions or emergency department usage when compared to traditional care. -98% of telemedicine patients expressed a willingness to continue using telehealth for managing their healthcare needs, and all telehealth patients found the intervention beneficial. -94% of surveyed individuals reported that remote patient monitoring technology was helpful.
Dawson et al, 2021[x]	PubMed	Tele monitoring	Traditional care management	30-day hospital readmission 30-day emergency department visit	-The 30-day readmission rate among high-risk patients was 17.0% in the telemonitoring group and 22.5% in the control group, suggesting a notable improvement in outcomes with telemonitoring.
Ben-Assuli et al, 2013[xi]	PubMed	EHR & HIE	Traditional care management	7-day readmission 1 day readmission	- Using the Health Information Exchange (HIE) network and an EHR Information System to access medical history decreased all patients' seven-day readmissions and single-day

					hospitalisations. - Including past medical history from outside sources could help with more thorough patient assessments and possibly cut down on pointless hospital stays.
Wang et al, 2022[xii]	Scientific reports	AI predictive model	Traditional care management	30-day readmission rate	-Prior to the app and intervention, the low-risk group's average readmission rate in 2015–2016 was 3.9%, while the high-risk groups was 15.2%. -Following the app's implementation and the intervention, the low-risk group's average readmission rate stayed constant at 3.6% from January 2017 to July 2020 (with no discernible change from 3.9%). -The average readmission rate dropped to 7.9% in the high-risk group that the app identified and that subsequently received in-hospital clinical interventions—a notable 4.8% decrease from prior statistics.

Gap Analysis

Key gaps in the administration of transition care have been identified using a fishbone diagram, which also highlights the different elements that lead to an inefficient transition. Here, we go into great depth about these shortcomings and offer possible solutions that make use of telehealth, electronic health records (EHRs), remote monitoring tools, mobile health apps, and artificial intelligence (AI) analytics.

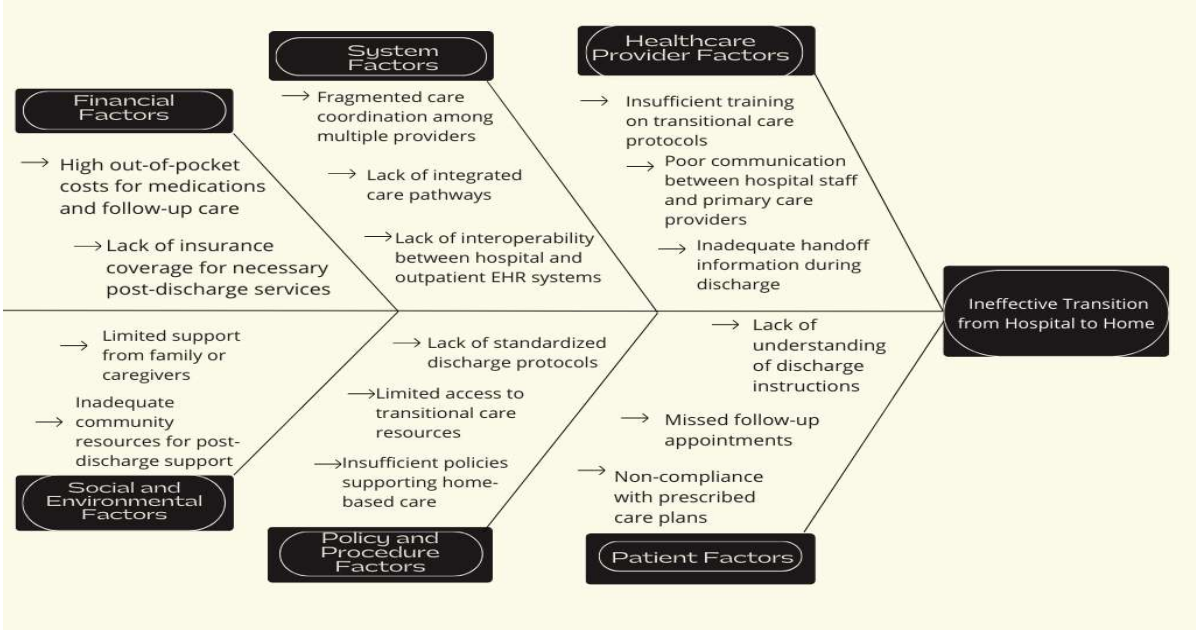

Figure 4 Fishbone diagram

- **Patient Factors**
  - Health Literacy: Patients frequently do not fully comprehend the instructions provided upon discharge, which can result in improper prescription administration and follow-up care. Mobile health apps can help with this by offering interactive discharge education that includes tests, videos, and reminders. Platforms for telehealth can provide virtual follow-ups to check understanding and answer any queries.
  - Adherence to Follow-Up: Missed follow-up visits and disregard for recommended care plans are frequent problems. Automated reminders for appointments and medication schedules can be sent via mobile health apps. AI analytics could recognize patients who are at risk of non-compliance and initiate tailored interventions.

- **Healthcare Provider Factors**
  - Communication: Inadequate handoff information upon discharge and poor communication between hospital staff and primary care physicians have a substantial negative influence on care continuity. Ensuring that

comprehensive patient information is accessible in all care settings can be achieved through the implementation of interoperable EHR systems. Real-time communication and information exchange between providers can be facilitated by telehealth consultations.

- Training and Knowledge: Medical professionals may not be well-versed in the medical histories and care requirements of their patients, nor do they always receive adequate training on transitional care protocols. Mobile-friendly online training modules can help providers stay current on best practices. Real-time advice based on patient history and current data can be given by AI-driven decision support systems that are incorporated into EHRs.

- **System Factors**
  - Care Coordination: There are generally too few integrated care pathways and a fragmented approach to care coordination amongst various providers. Care gaps can be found and recommended paths of care can be suggested by using AI analytics to analyse patient data. Coordination can be facilitated by mobile health platforms that allow care team members to communicate seamlessly with one another.
  - Health Information Technology: Ineffective information exchange is impeded by inefficient EHR systems and a lack of compatibility between hospital and outpatient EHR systems. Purchasing cloud-based EHR solutions that are compatible with one another helps promote smooth information exchange. Health records may be easily accessed by patients and clinicians at any time and from any location with the help of mobile health apps.

- **Policy and Procedure Factors**
  - Discharge Planning: Inadequate post-discharge care might result from inconsistent discharge planning procedures and a lack of standardized discharge guidelines. AI-driven technologies can be used to standardize discharge procedures, resulting in thorough and uniform care plans that are customized to meet the needs of each patient. Patients can follow step-by-step instructions on their customized discharge plans using mobile apps.
  - Policies for Transitional Care:Two main obstacles are a lack of rules that support home-based care and restricted access to resources for transitional care. Care can be extended into the home by putting in place telehealth rules that provide remote monitoring and virtual home visits. Through the prediction of patient demands and results, AI analytics can aid in the optimal allocation of resources.

- **Social and Environmental Factors**
    - Home Environment: Patients returning home face major obstacles due to inadequate home safety assessments and a lack of accessible house modifications. Caretakers can be warned of any risks and have their home's safety regularly assessed by remote monitoring systems. Services related to telehealth can offer virtual evaluations of homes and suggestions for improvements.
    - Social Support: Inadequate post-discharge community resources and restricted family or carer support may have an impact on a patient's ability to heal. Patients can find support groups and community resources through mobile health apps. Telehealth platforms provide the ability to conduct virtual sessions for carer support and offer immediate support.

- **Financial Factors**
    - Cost of Care: Patients face financial obstacles due to high out-of-pocket expenses for prescription drugs and follow-up care, as well as the absence of insurance coverage for essential post-discharge services. Apps for mobile health can help find more affordable drug options and offer cost transparency. By allocating resources optimally, AI analytics can lower the overall cost of transitional care programmes.
    - Obtaining Resources: Effective care is hampered by financial obstacles to obtaining essential medical equipment and by a lack of funding for programmes providing transitional care. To guarantee ongoing patient monitoring, programmes that offer financial assistance may be used to purchase remote monitoring equipment. AI-powered financial planning solutions can assist patients in finding funding sources and managing expenses.

Findings

Digital tool used	Outcome measures	Results
Artificial Intelligence	30-day rehospitalization	Following the implementation of the intervention, the average readmission rate dropped by 21%.
EHR	30-dayrehospitalization	Following the implementation of EHR 3.4% of patients were readmitted to the hospital after 30 days, compared to 20.7% in the control group.
Telehealth	30-dayrehospitalization	Telehealth did not show statistically significant differences in readmissions or emergency department usage when compared to traditional care.
Tele monitoring	30-day rehospitalization	The 30-day readmission rate among high-risk patients was 17.0% in the telemonitoring group and 22.5% without the intervention, suggesting a notable improvement in outcomes with telemonitoring.
Telehealth	Patient satisfaction	-98% of telemedicine patients expressed a willingness to continue using telehealth for managing their healthcare needs, and all telehealth patients found the intervention beneficial. -94% of surveyed individuals reported that remote patient monitoring technology was helpful.
Telehealth	Medication adherence	-Telehealth patients were seven times more likely to adhere to their prescription regimen and showed higher rates of medication reconciliation compared to the control group.

Discussion

For older persons, the move from the hospital to the home is a crucial time that is frequently associated with increased readmission risks and unfavorable health consequences. Careful management is necessary throughout the crucial phase of a patient's treatment when they go from the hospital to their homes to avoid readmissions and guarantee good health. The digital technologies offer a promising solution, but they also have following challenges.

Technology related challenges

- Lack of technical knowledge and expertise on the part of patients and providers
    - Accidentally disabling device functionality.
    - Not remembering to charge the device or forgetting log-in credentials.
    - Not being comfortable with technology
- Technical problems pertaining to the device
    - Problems with Internet access
    - Updates to software that influence functionality
- Issues with compatibility and fit
    - Not integrated with the organization's electronic documentation system.
    - incompatible with earlier devices
- Content and function of technology
    - The language used was too technical.
    - The hypertext links were distracting and unclear.
    - The symptom-reporting questions were too general or specific, which led to misunderstandings.
    - Excessive number of alerts produced "alert fatigue," which made people pay less attention to the alert or ignore it completely.

Digital tool examples

1. DayToDay Health

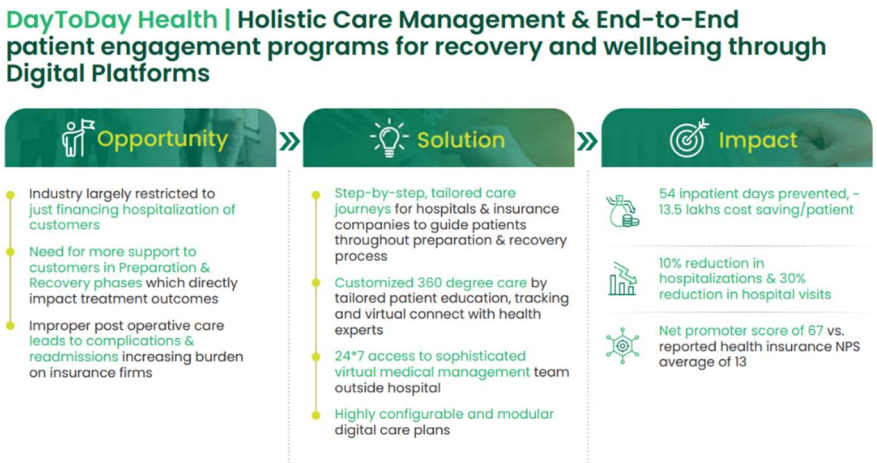

Figure 5 DayToDay Impact

2. MyChart by Epic Systems:
   An app that allows patients to access their medical records, communicate with healthcare providers, schedule appointments, and receive reminders for medication and follow-up visits.

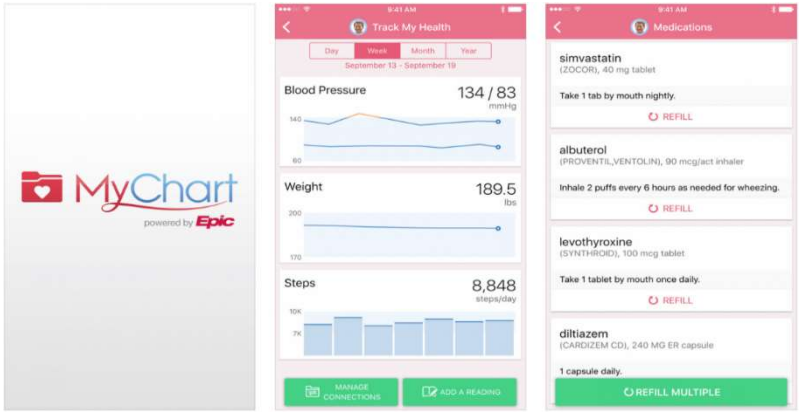

Figure 6 Epic patient portal

3. CareZone: A medication management app that helps patients and caregivers manage prescriptions, track dosages, and set reminders for taking medications.

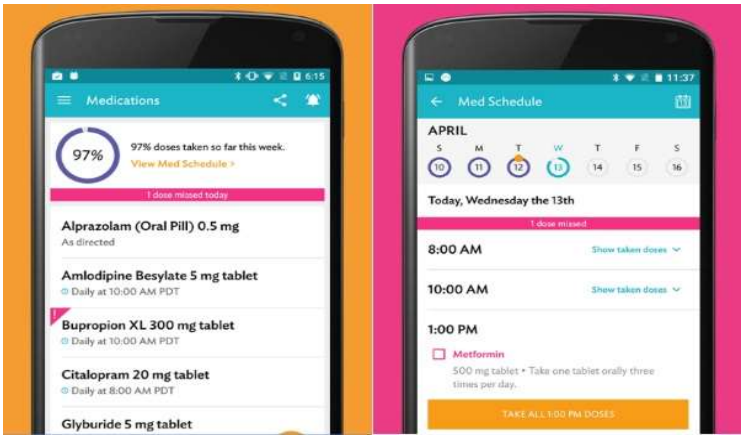

Figure 7 Care zone patient portal

4. Continuous care for health
    - Telemedicine
    - Patient PHR
    - Health trackers
    - Personalized chronic care plans
    - Remote monitoring
    - Device integration
    - Real-time feedback

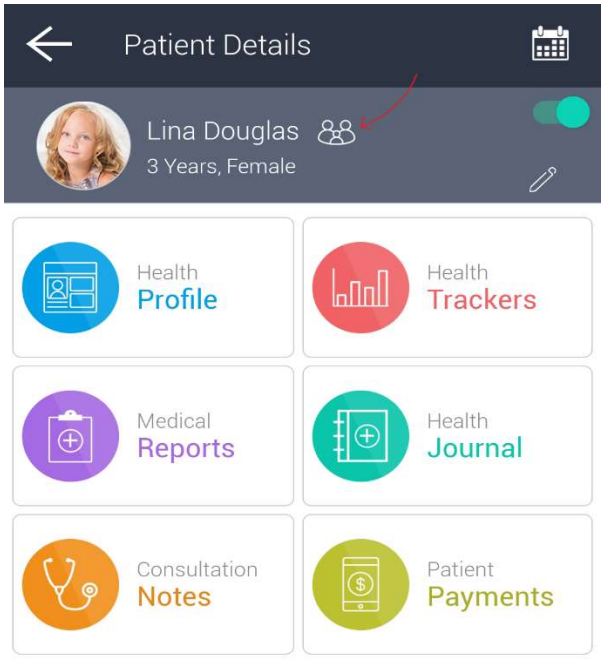

Figure 8 Continuous care for health patient portal

5. IBM Watson Health
   An AI analytics tool that analyzes patient data to predict health risks, recommend preventive measures, and optimize care plans.

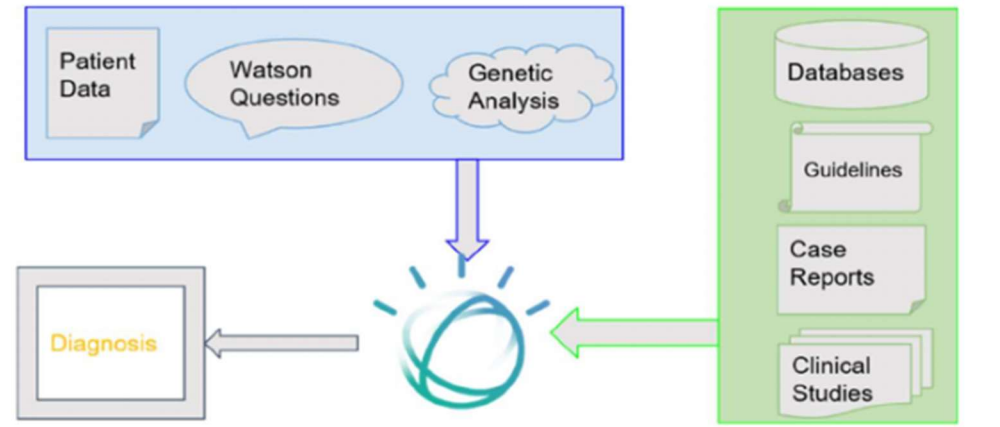

Figure 9 Working of IBM Watson in Health Care

The accompanying graphic illustrates how IBM Watson functions when it receives two distinct types of inputs. The first is patient data, which includes genetic analysis and a few fundamental Watson questions to help get to know the patient better. Watson already has access to various forms of input, such as databases that hold historical data, best practices, case studies, and clinical research.

Limitations of study

- **Time Constraints:** Rapid reviews are conducted within a shorter timeframe compared to systematic reviews, potentially leading to a less exhaustive search and selection process. Important studies might be missed, affecting the comprehensiveness of the review.
- **Limited Databases and Grey Literature:** Due to time constraints, the review might not include a thorough search of all relevant databases and grey literature sources, leading to potential publication bias.
- **Geographical Relevance:** The studies included in the review are predominantly from a global perspective and may not account for the unique healthcare infrastructure, patient demographics, and care management practices specific to India. As a result, the findings may not be entirely applicable or relevant to the Indian context, limiting the utility of the review for local healthcare policy and practice improvements.
- **Quality of Included Studies:** The quality of the studies included in the review might vary, and rapid reviews might not have the capacity for a detailed quality assessment of each study.
- **Heterogeneity of Studies:** There might be significant heterogeneity in the types of digital tools used, patient populations, and outcomes measured, making it challenging to synthesize findings and draw robust conclusions.
- **Reviewer Bias:** Rapid reviews might rely on fewer reviewers for study selection and data extraction, increasing the risk of bias and subjectivity in the process.
- **Inconsistent Reporting:** Inconsistencies in how outcomes are reported in different studies might complicate comparisons and synthesis of results.

Conclusion

In summary, there is great potential for enhancing hospital-to-home transitions through the integration of digital health technologies, artificial intelligence, and telemedicine, especially for older persons. Improved care coordination, fewer readmissions, and improved handling of complicated medical diseases are all possible with the help of these technologies. Healthcare systems may advance towards more patient-centered, efficient, and sustainable care by assuring the financial sustainability of these digital treatments and integrating them with current healthcare roles. The constant challenge will be to fully improve these technologies possible while making sure all patients can use them and benefit from them.

Way forward

It is imperative to investigate the possibilities of digital tool-powered transition care programmes in the Indian healthcare system, considering their global success. Numerous international studies have demonstrated the efficacy of various methods, including telehealth, electronic health records (EHRs), remote monitoring devices, mobile health applications, and artificial intelligence (AI) analytics, in mitigating hospital readmissions and enhancing patient outcomes. Significant advantages of using digital technologies have been shown, such as decreased rates of patient readmission, improved patient and carer quality of life, and cheaper healthcare expenditures.

Nevertheless, there is currently little data from research done in India. It is crucial to conduct in-depth study to assess the suitability and efficacy of these digital tools within the Indian healthcare system to close this gap. It is advised that you take the following actions:

A. **Pilot Programmes:** To evaluate the viability and effects of digital tool-powered transition care, conduct pilot programmes in a range of Indian healthcare settings. These initiatives should involve varied demographics to ensure inclusivity and generalizability of the findings.

B. **Collaborative Research:** To perform thorough investigations, encourage partnerships between academic institutions, technology businesses, and healthcare providers. These collaborations may make it easier to create digital solutions that are specifically suited to the requirements of Indian patients and healthcare systems.

C. **Policy Framework:** Create a framework that supports and promotes the use of digital health technology. This framework should take legal, moral, and privacy issues into account to guarantee the safe and efficient use of digital instruments.

D. **Education and Training:** Make an investment in educating patients and healthcare workers on the effective use of digital tools. Programmes for education should be created to improve digital literacy and provide patients and providers the tools they need to fully utilise these tools.

E. **Cost-Benefit Analysis:** Analyze the costs and benefits to determine the financial effects of using digital tools into transitional care programmes. Policymakers in the healthcare industry will be better able to allocate and invest resources with the support of this analysis.

F. **Patient-Centered Approaches:** Make sure that the design of digital health treatments considers the specific socioeconomic, linguistic, and cultural aspects of the Indian environment. Patients will be more engaged and likely to stick with transition care programmes as a result.

Supplementary

Instrumentation

- Prisma_2020-checklist

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