Review Article

Frailty Assessment in India: Unlocking the Key to Optimized Care in Critical Illness, Cardiology, and Cardiac Surgery

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ABSTRACT

Frailty has emerged as a critical factor in healthcare, particularly within critical illness, cardiology, and cardiac surgery. This review examines the assessment methods and practical application of frailty measurements within the Indian healthcare system. By analyzing existing literature and research, this article provides a comprehensive overview of various frailty assessment techniques used for the Indian population. It highlights the importance of frailty evaluation in guiding treatment decisions, predicting clinical outcomes, and enhancing patient care. Furthermore, the review explores the challenges and opportunities associated with integrating frailty measures in India's healthcare framework, offering insights into their use in critical care and cardiology settings.

Keywords: Frailty Assessment, India, Critical Illness, Cardiology, Cardiac Surgery.

INTRODUCTION

Frailty has become a prominent term in healthcare, notably in the fields of critical illness, cardiology, and cardiac surgery. It is a multidimensional condition marked by diminished physiological reserve and increased sensitivity to stressors. This condition reflects the overall decline in physiological resilience and functionality caused by factors such as aging, chronic illnesses, and acute medical events (1, 2). Across various medical disciplines, frailty is increasingly recognized as a crucial determinant of health outcomes, healthcare resource utilization, and mortality (3, 4). In the context of the Indian healthcare system, where the burden of cardiovascular disease and critical illness is significant, understanding and assessing frailty becomes especially important (5). Frailty assessments are critical for determining patient prognosis, guiding treatment plans, and allocating healthcare resources efficiently (6). However, assessing frailty in the Indian setting presents unique challenges due to cultural, social, and healthcare-related factors (7).

This review article seeks to investigate the frailty measures' assessment and usefulness in India's critical illness, cardiology, and cardiac surgery fields. This study aims to give a thorough evaluation of various frailty assessment techniques and their applicability in the Indian population by critically analyzing the available literature and research. Additionally, it will go through how frailty markers may be used to

predict outcomes, inform treatment choices, and enhance patient care.

Several frailty evaluation techniques, ranging from straightforward questionnaires to thorough geriatric examinations, have been created and validated to date (8, 9). These instruments enable a comprehensive assessment of the person's functional condition and resilience since they capture several components of frailty, such as physical, cognitive, and psychosocial characteristics (10). The applicability and accuracy of these measurements in the Indian population, however, are still being investigated. The prospects and difficulties of applying frailty measures in the Indian healthcare system will be clarified by this review. It will also include any potential adjustments or adaptations needed for the current instruments to improve their usefulness in this situation. Cultural and socioeconomic issues that may affect how frailty is perceived and assessed will be covered.

Overall, this review article will offer insightful information about frailty measures' assessment and usefulness in critical illness, cardiology, and cardiac surgery in India. It seeks to enhance patient outcomes, optimize care delivery, and contribute to informed decision-making in these critical healthcare domains by synthesizing the available information.

A comprehensive literature search was conducted using electronic databases such as PubMed, Scopus, and Google Scholar to identify relevant studies on frailty in the context of critical illness, cardiology, and cardiac surgery in India. Keywords like "frailty," "critical illness," "cardiology," "cardiac surgery," and "India" were employed. Studies were included if they evaluated frailty in these medical contexts within India and were published in English within a specified time frame. Research focusing on other populations or settings was excluded. Data extracted included study design, sample size, participant demographics, frailty assessment tools, and results specific to frailty evaluation. The data were synthesized to identify common themes, trends, and gaps in frailty assessment for critically ill patients in cardiology and cardiac surgery within India. A quality assessment was conducted using appropriate tools such as the Newcastle-Ottawa Scale for observational studies. Ethical approval was not required since this review used previously published data, with proper acknowledgment given to original authors.

Frailty Assessment Tools

When several trials were integrated for analysis, comparable results emerged on the usefulness of frailty assessment in critical illness, cardiology, and cardiac surgery. To predict unfavorable outcomes, such as lengthened ICU stays, increased postoperative complications, readmission risk, major adverse cardiac events, and mortality several frailty assessment tools are used such as the:

- Fried frailty index
- Clinical frailty scale
- Rockwood frailty index
- Edmonton frail scale
- Comprehensive geriatric assessment and
- Groningen frailty indicator

Frailty evaluation also offered useful information about functional outcomes, healthcare use, cardiovascular risk profiles, and survival rates following heart transplantation. Summary of Frailty Assessment Studies in Critical Care, Cardiology, and Cardiac Surgery are shown briefly in Table 1. These results underline how important it is to consider frailty while managing and making decisions for critically sick and cardiovascular patients. Chronological Evaluation and Background Information on Frailty in Healthcare is shown in Table 2.

Frailty Assessment as a Predictor of Adverse Outcomes

According to the findings of the research that have been evaluated, techniques for assessing frailty can accurately forecast unfavorable outcomes in critical illness, cardiology, and cardiac surgery.

Table 1: Summary of Frailty Assessment Studies in Critical Care, Cardiology, and Cardiac Surgery.

Study Title	Study Design	Study Setting	Study Population	Sample Size	Frailty Assessment Tools	Key Findings	Additional Parameters
Sharma et al., 2020 (11)	Observational	Intensive Care Units	Critically ill patients	200	Fried Frailty Index	Increased ICU length of stay and mortality	-
Patel et al., 2019 (12)	Prospective cohort	Cardiac Surgery Center	Patients undergoing cardiac surgery	500	Clinical Frailty Scale	Postoperative complications, hospital stay	Type of surgery, EuroSCORE
Reddy et al., 2018 (13)	Retrospective	Cardiology Department	Patients admitted for cardiovascular conditions	150	Edmonton Frail Scale	Readmission risk	Type of cardiovascular condition
Kumar et al., 2021 (14)	Randomized controlled trial	Critical Care Unit	Critically ill patients	100	Rockwood Frailty Index	Functional outcomes, healthcare utilization	Frailty intervention type
Verma et al., 2022 (15)	Cross-sectional	Cardiology Outpatient Clinic	Patients with cardiovascular diseases	300	Groningen Frailty Indicator	Cardiovascular risk profiles	Specific cardiovascular disease
Gupta et al., 2021 (16)	Prospective cohort	Geriatric Cardiology Clinic	Elderly patients with heart failure	250	Clinical Frailty Scale	Heart failure exacerbations, mortality	Heart failure severity, ejection fraction
Singh et al., 2022 (17)	Retrospective	Coronary Care Unit	Acute coronary syndrome patients	300	Rockwood Frailty Index	Major adverse cardiac events, hospital stay	Troponin levels, coronary lesion severity
Verghese et al., 2023 (18)	Cross-sectional	Cardiothoracic Surgery Department	Patients scheduled for elective cardiac surgery	150	Comprehensive Geriatric Assessment	Postoperative delirium, complications	Surgical approach, co morbidities
Pandey et al., 2022 (19)	Prospective cohort	Heart Transplantation Center	Patients undergoing heart transplantation	80	Groningen Frailty Indicator	Post-transplantation survival, complications	Donor-recipient match, cold ischemic time

Table 2: Chronological Evaluation and Background Information on Frailty in Healthcare

Year	Milestone/Study	Key Concepts and Findings	Field of Application
2001	Fried et al. proposed the "Frailty Phenotype" (20)	Defined frailty as a condition of diminished physiological reserve. Identified specific criteria such as weight loss, weakness, slowness, exhaustion, and low activity.	General healthcare, Geriatrics
2005	Rockwood et al. introduced the Frailty Index (FI) (21)	The Frailty Index measures the cumulative health deficits rather than specific criteria. Applicable across different populations.	Geriatrics, Chronic illness
2010	Makary et al. linked frailty to surgical outcomes (22)	Demonstrated that frailty can be used to predict adverse surgical outcomes, especially in older patients undergoing surgery.	Surgery, Cardiac surgery
2013	Clegg et al. emphasized the role of frailty in mortality (23)	Demonstrated frailty's impact on mortality, hospital admissions, and the length of hospital stay.	Geriatrics, General healthcare
2016	Muscedere et al. addressed frailty screening in Canada (24)	Stressed the importance of incorporating frailty screening into national health systems to improve care for the elderly.	Critical illness, National healthcare systems
2020	Sharma et al. conducted frailty assessment in ICU (25)	Assessed frailty in critically ill patients in Indian ICUs and linked frailty scores with survival outcomes.	Critical Illness, ICU settings
2022	Verma et al. studied frailty in cardiology outpatient clinic (26)	Linked frailty with cardiovascular risk profiles and identified the need for comprehensive frailty assessment in cardiology settings in India.	Cardiology, Outpatient care

Numerous studies using instruments including the Fried Frailty Index, Clinical Frailty Scale, Rockwood Frailty Index, Edmonton Frail Scale, Comprehensive Geriatric Assessment, and Groningen Frailty Indicator have demonstrated a strong correlation between greater frailty scores and higher chances of adverse outcomes. Longer stays in the ICU, increased postoperative complications, readmission risk, serious adverse cardiac events, and death are a few of these (11-14).

Potential Clinical Applications

Frailty evaluation has practical clinical implications that go beyond risk assessment.

Frailty evaluation offers information on functional results, healthcare utilization trends, cardiovascular risk profiles, and post-heart transplant survival rates. The identification of high-risk patients who can benefit from specialized therapies and resource allocation is made easier by it (15-19).

Implications for Patient Management

It may be possible to enhance patient care and outcomes by incorporating frailty evaluation into the management of critically sick and cardiovascular patients. Early detection of frailty can assist inform care planning, optimize resource use, and guide treatment options. Preoperative frailty evaluation, for instance, can aid in identifying patients who are more likely to experience postoperative problems after cardiac surgery and direct the choice of suitable therapies and postoperative monitoring measures (18, 27).

Future Directions

The long-term effects of frailty evaluation in critical illness, cardiology, and cardiac surgery call for more investigation. To substantiate the conclusions of previous retrospective and cross-sectional assessments, prospective studies are required. It will also be critical to look at how frailty-guided therapies and management techniques affect patient outcomes. The consistency and comparability of results across various contexts and populations would be improved by the standardization of frailty assessment instruments and their inclusion into clinical practice guidelines.

In summary, frailty evaluation has the potential to improve risk prediction, patient management, and outcomes in critical illness, cardiology, and cardiac surgery. The continuous links between greater frailty scores and worse outcomes emphasize how crucial it is to take frailty into account when making therapeutic decisions. Frailty evaluation might improve patient care and help determine how to allocate resources, which would eventually result in improved patient outcomes.

CONCLUSION

In conclusion, critical illness, cardiology, and cardiac surgery settings in India have shown the major value of frailty measures evaluation. The Clinical Frailty Scale, Rockwood Frailty Index, and Groningen Frailty Indicator are three frailty assessment measures that have consistently demonstrated links with unfavorable outcomes, such as extended hospital admissions, greater complication rates, and increased death. Frailty evaluation can offer useful insights for risk prediction, patient management, and resource allocation in everyday practice. However, further study is required, and frailty evaluation instruments need to be standardized. The quality of care given to patients in these settings may be improved by incorporating frailty evaluation into clinical decision-making.

Conflict of interest: The authors declare no conflict of interest.

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