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The Effect of Technology in Overcoming Length of Stay (LOS) and its Implications for Heart Failure Patients: A Systematic Review

Vera Veriyallia*, Abu Bakar, Ika Nur Pratiwi, Rheyma Sinar Al Fitri and Ahmad Abdul Ghofar Abdulloh

Master Students of Nursing Faculty, Airlangga University, Surabaya, Indonesia

ABSTRACT

Background: The increasing prevalence of heart failure with, along with prolonged length of stay (LOS), can increase the cost of medical care, drastically decrease the patients' quality of life, and more worryingly lead to high mortality rate. This research sought to identify the effect of technology in overcoming LOS and its implications for heart failure patients.

Method: This research employed a systematic review with access to four article databases including Scopus, Science Direct, ProQuest, and PubMed within duration of 2017-2021, using specific keywords and MESH according to PICOS/PICOT. Quality assessment was done using the PRISMA Checklist where title, full-text abstract, and methodology were assessed for conduct of this systematic review. The results of extracting, tabulating, and analysing descriptive narratives were then briefly summarized.

Results: In Overall, the results revealed various methods being implemented, including telemonitoring, home monitoring of IT management specialists, multidisciplinary transition planning, individualized nutritional support, return trip board program (Visual), Palliative Care (ACP), revascularization therapy, outpatient inotropic therapy, body mass index, heart rate reduction therapy, Lung ultrasound (LUS), and phone tele-monitoring. These series, after being investigated, were proven to reduce LOS of heart failure patients and the program was able to reduce the rate of hospital care readmission.

Conclusion: The types of methods and programs in the intervention are very effective in reducing LOS in heart failure patients.

***Corresponding author**

Vera Veriyallia, Airlangga University, Campus C Mulyorejo, Surabaya, Indonesia.

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Keywords: Discharge Planning, Heart Failure, Length of Stay, Readmission

Introduction

Heart failure is becoming a major problem because of the increasingly longer treatment and higher economic burden on the family due to prolonged treatment admissions and repeated re-admissions. Heart failure is also a progressive health problem with high mortality and morbidity rates in developed and developing countries, including Indonesia. In 2014, this disease was recorded with more than 30% mortality rate in developing countries and 50% of patients with heart failure needed to be hospitalized. The prevalence of heart failure increases with age, the World Health Organization (WHO) and the World Palliative Care Alliance predict that there are more than 19 million adult patients requiring treatment in the world, and half of them die from heart disease. As the number of victims of heart failure has risen to become the main cause of death in Indonesia, a regulation is needed whose treatments are based on the New York Heart Association (NYHA) classification, morbidity, life quality of patients and length of stay, all of which can determine the recovery process, predict length of stay, and mortality rate [1].

Regardless of advances in its treatment, mortality from heart failure will remain high, especially for patients requiring hospitalization, with mortality is highest in the first 30 days of admission. As hospitalization is an indication of deteriorating patient's condition, we can find out or examine what technology designs are currently able to overcome the Length of Stay (LOS) for heart failure patients. The existence of this mechanism can offer solutions regarding the patient's recovery rate and the length of stay. Therefore, it is expected that the life quality of life, the mortality rate, and the morbidity rate of heart failure patients will move towards better direction [1].

A lot of research has been conducted taking the issues about good intervention process and discharge planning for heart failure patients, including those that discuss patient interventions during long hospitalizations. Therefore, the researchers obtained some results that might be taken into consideration in providing health services for the well-being of heart failure patients [2].

Method

This research implemented a systematic review methodology by identifying relevant research. Data and information searching was performed by using an electronic site as a source of data taken, which is PRISMA (Preferred Reporting Items for Systematic Reviews & Meta-Analyses), with instruments using Flowcharts based on PRISMA 2009 checklist, removing articles not meeting

the identified criteria, screening eligibility, and eventually downloading the appropriate or relevant research articles. The initial step was to open the databases of https://www.scopus.com/home.uri, https://pubmed.ncbi.nlm.nih.gov/, https://www.proquest.com/, and https://www.sciencedirect.com/.

Document Selection

The selection was done using the keywords "Heart Failure" AND "Length of Stay" OR "Re-admission" AND "Discharge Planning" in articles available at Scopus, PubMed, Science Direct, ProQuest. The process obtained 18,552 full-text articles ranging from 2017 to 2021 and written in English. The articles were then selected based on the titles and abstracts according to the filtering criteria, obtaining 272 articles. Finally, re-selection was done according to the inclusion and exclusion criteria thoroughly, obtaining 12 articles eligible for further analysis.

Inclusion and Exclusion Criteria

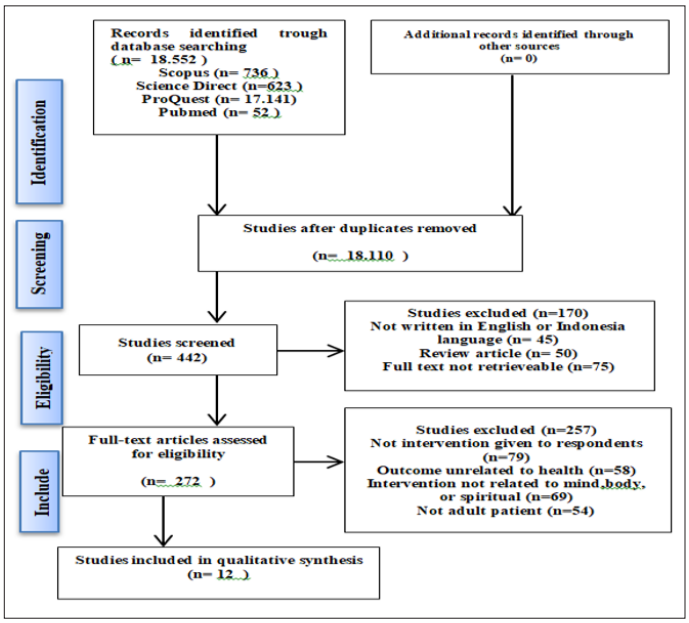
The inclusion criteria for articles to be considered suitable for systematic review consisted of research articles, reported in English ranging from 2017 to 2021, and using systematic review for the research design. The research articles discussed heart failure patients who experienced Length of Stay (LOS) and heart failure patients who required interventional therapy technology design in order to reduce Length of Stay (LOS) and re-admission. The research location varied, involving countries with articles related to Length of Stay (LOS) and re-admission, which resulted in increased patient mortality and morbidity.

Study Selection

By considering PRISMA guidelines, the obtained articles were then filtered and selected based on the suitability of title and abstract. The same articles were omitted. The text obtained in the selected articles that met the inclusion criteria were then reviewed.

Data Extraction

The data obtained from searching were assessed by including author, quality, year, country, design, age and sample size, intervention, result, and conclusion, from all research articles evaluating factors and the benefits of the interventions being implemented.



Results

Based on the search results, several themes and factors were obtained regarding the provisions of technological interventions in patients with long hospitalization and the implications for preventing and maintaining opportunities for re-admission of heart failure patients. Some of the methods carried out included Tele-monitoring, Guidance-Based Medical Therapy (GBMT), Home Monitoring of IT Management Specialists, Multidisciplinary Transition Planning, Individualized Nutritional Support, Return Trip Board Programs (visual), Palliative Care (CP), Revascularization Therapy, Inotropic Therapy, Body Mass Index, Heart Rate Reduction Therapy, Lung Ultrasound (LUS), Phone Tele-monitoring. After reviewing these series of method, it was proven that they could reduce the Length of Stay (LOS) of heart failure patients and the rate of re-admission.

Tele-Monitoring

The effectiveness of Tele-monitoring support for heart failure patients is under discussion, in which heart failure is seen as health problem with a high prevalence of death. Tele-monitoring refers to a technology that enables data transmission and monitoring related to the health of patients which are located far away, or separated by long distances. Tele-monitoring is carried out by telephone to post-patients and discharged patients so that the implications, signs, and symptoms could be recorded and reported by the patients and reviewed by health professionals in order to determine the appropriate action immediately. Tele-monitoring improves the quality of nursing services where health workers can make decisions quickly and accurately. It also increases nurse productivity, for example by reducing documentation time or even in the application of transitional care related to home visits, making it easier for nurses and patients to control risk factors and provide guidance on what to do if symptoms worsen [3].

Home Monitoring of IT Management Specialists

Home monitoring using specialist management with IT support is very effective in supporting the implementation of medical therapy compared to home monitoring that does not use management specialists, for heart failure patients. This is useful for chronic heart failure cases, as this delivery model is more innovative in utilizing a sophisticated technology which can reduce the expenditure of financial resources and reduce face-to-face interactions with health workers. This is especially true during the Covid-19 pandemic. The system created can provide a sustainable and reliable reference in intensive care [4].

Palliative Care (ACP)

Nursing intervention using palliative care for heart failure patients can have a large systematic effect in improving quality of life, feelings of anxiety, mental stress, and spiritual well-being, compared to self-care with no nursing support. In overall, patients who have been grouped in receiving palliative care who previously received inappropriate physical, psychosocial, and spiritual burden from the family. The provision of palliative care has been proven very influential in improving various aspects of the patients' life quality who are heading to the end-stage stage. Therefore, palliative care is viewed as a holistic management for patients with recurring heart failure [5].

Phone Tele-Monitoring

Phone Tele-monitoring using can support the progress of treatment and provide great benefits for heart failure patients. Prior to the treatment, the level of patient management is measured using an activation measure, a heart failure knowledge scale, and a heart

failure patient self-care index. This kind of mechanism serves as an additional external support from hospitals, especially for heart failure patients, which in combination with Tele-monitoring and Phone Tele-monitoring is very effective compared to standard care. This is especially useful in reducing other utilization of health services. From the results of patient reports on the level of knowledge, this support is actively provided by nurses with a scheduled period of half a year, this utilization can provide benefits to heart failure patients by increasing the life quality and utilization of remote health services as well as providing patients with self-care and necessary knowledge and information. Heart failure patients can feel the benefits and feel confident in performing self-management, consulting and getting information about their health [6].

Heart Rate Reduction Therapy

Hospitalization admission is an optimal process in the treatment of heart failure. However, prolonged treatment is not always good for the patient's life quality. Some heart failure patients experiencing an unexplained sinus rhythm heart rate >70 Bpm have been investigated, revealing the effect of combined beta-blockers and ivabradine, leading the patients to re-admission and lengthy duration of hospitalization. The high number of death in heart failure patients, especially in patients who have been hospitalized for a long time, is the proof that prolonged treatment is an indication of the poor condition of patients. The European Society of Cardiology (ESC) has made some recommendations in which heart failure patients should be treated with reduced ejection fraction, including those experiencing angiotensin converting enzyme/angiotensin receptor blocker inhibitors, as well as beta blockers (BB), and mineralocorticoid receptor antagonists (MRA). In heart failure patients experiencing prolonged treatment, there is usually increased heart rate both on discharge and during treatment, acting as the factors leading to prolonged treatment or even death. It is recommended by research to reduce heart rate using beta-blocker treatment and ivabradine combined for heart failure patients which are hospitalized, with a heart rate above 70 bpm, leading to a substantial reduction in overall mortality and a reduction in the Length of Stay [6].

Lung Ultrasound (LUS)

This is a valid tool to perform heart failure assessment. This tool is applied to reduce prolonged hospitalizations, heart functional failure, decrease cardiac output or increase intra-cardiac pressure at rest or someone who is under stress. This LUS therapy is used in diuretic therapy, which is very effective for patients to reduce prolonged hospitalizations [7].

Body Mass Index

The impact of body mass index on the daily activities of heart failure patients is important to discuss, where nutritional factors greatly affect heart failure patients undergoing treatment. 23.1% patients with heart failure are malnourished and 51.9% are at high risk of malnutrition. Malnutrition will result in worsening condition of patients with heart failure and cause prolonged hospitalization and re-admission, which ultimately leads to increased mortality and worsened condition. Therefore, nutritional status and nutritional management are very influential in the process of healing and rehabilitation of heart failure patients. Underweight heart failure patients show low independence in daily activities when they return home. Meanwhile, overweight patients show high independence in daily activities when returning home, as well as low mortality rate. This is an obesity paradox. Underweight patients are more likely to have sarcopenia in acute decompensated heart failure. Meanwhile, overweight patients have higher muscle mass, allowing greater independence in activities of daily living and therefore weight loss in cardiac patients is not good when drastic, except in reducing edema or pleural effusion as a result of diuretic therapy in hospitalized patients. In heart failure patients, it is very important to perform cardiac rehabilitation and nutritional management [7].

Individualized Nutritional Support

A worsening nutritional status in heart failure patients during hospitalization will increase the rate mortality. Nutrition is an important risk factor for patients undergoing hospitalization. To prevent the occurrence of malnutrition and its subsequent bad impacts, it is recommended to start a nutritional support for heart failure patients who are hospitalized. It is said that a prognostic implication and the risk of low nutrition in determining a complication and a long length of hospitalization is not necessarily due to edema in heart failure patients but in the most important group of heart failure patients is high nutrition, it will support to reduce patient mortality. The use of nutritional support is effective in supporting strategic programs to meet nutritional needs in patients prone to heart failure [8].

Multidisciplinary Transition Planning

It refers to a transition plan for heart failure patients, in which patients will return to the hospital due to relapse and length of stay, a transitional care program for implications for use in patients with heart failure, where a transitional care plan is effective in reducing re-admissions to the hospital, and reduction of stress associated with prolonged hospitalization and post-discharge due to medicine side effects [8].

Return Trip Board Program (Visual)

Discharged heart failure patients need to change their life style to improve their functional status and obtain good health outcomes from previous treatment. Prolonged self-care management for heart failure patients with chronic conditions is deemed very necessary in improving their good quality of life, such as performing health education to patients and conducting partnerships in appropriate self-care management. It is noteworthy that for patients with heart failure, lack of understanding and lack of education during post-discharge timeline can contribute to longer hospital stays and faster re-admission to the hospital. This trip board support provides a visual way to guide discharged patients, provide education, and increase participation. So, it is designed to provide information and education for discharged patients with chronic diseases such as patients with heart failure [8].

Revascularization Therapy

In heart failure patients with atrial fibrillation and congestive heart failure, this therapy will reduce the likelihood of excess in-hospital mortality, and decrease in-hospital mortality associated with IVT therapy, provide a better outcome than patients who do not receive IVT therapy, which is an effective therapeutic strategy to manage the risk of Length of Stay [9].

Inotropic Therapy

In end-stage heart failure patients, inotropic therapy is widely used as short-term therapy in stabilizing cardiogenic shock in hospital or moderately decompensated. This therapy is used extensively in palliative care or sometimes in surgical planning. In this era of greatly improved inotropic therapy in the contemporary era it seems very well and suitable in the process of therapeutic goals where the length of treatment will be reduced [10].

Discussion

In providing health service, we need to consider the supports for treatment process and technologies that produce outcomes and implications in order to reduce prolonged hospitalization and re-admission of patients. Therefore, it should be noted very carefully that health workers can design a strategy to reduce Length of Stay (LOS) and prevent re-admission before 30 days after discharge for heart failure patients. The general theme obtained in the identification of health services that have been systematically reviewed, all research showed that the supports being implemented were focused on the life quality of patients and had an effect on LOS. There is also the provision of therapy with the same goal of preventing prolonged LOS and drastic decline in condition. The findings also revealed that patients should receive health education after being discharged from the hospital or while still being treated at the hospital. Regarding the theme, there must be a condition that estimates the resources and abilities of the patients undergoing the treatment process, especially patients with heart failure, in order to complete their life where their quality of life increases from interventions and therapies subjected to the patients with heart failure. Therefore, the patients will be more comfortable with the procedures obtained by health services and facilities.

Conclusion

The use and effectiveness of health services provided by health workers in hospitals, especially for heart failure patients, needs to be constantly improved. Several findings of research have included Tele-monitoring, home monitoring of IT management specialists, multidisciplinary transition planning, individualized nutritional support, return trip board program (Visual), Palliative Care (ACP), revascularization therapy, outpatient inotropic therapy, body mass index, heart rate reduction therapy, Lung ultrasound (LUS), and phone Tele-monitoring. Therefore, hospitals need to review and develop the aforementioned options to be implemented properly by their health workers, so that they can continue to improve the quality of life of patients and support of palliative care.

PICOS Framework

PICOS Framework	Inclusion Criteria	Exclusion Criteria
Population/ Problem	Focus on heart failure patients with prolonged Length of Stay (LOS) and decreased quality of life.	Focus on patients with CHD and other acute and chronic diseases that do not review the Length of Stay.
Intervention	Research that examine the effectiveness of intervention or technology or design in reducing Length of Stay (LOS) for heart failure patients, including Tele-monitoring, therapy, and discharge planning design.	Research that do not explain the effect of a technology or design or intervention on heart failure patients.
Comparison	Other intervention groups or groups that were observed without intervention or groups that received interventions such as Tele-monitoring, therapy, and discharge planning plans for heart failure patients.	Research that do not discuss intervention or design technology or research that discuss other interventions for other diseases.
Outcome	Research that describe the effect of an intervention or its effectiveness in reducing the Length of Stay (LOS).	Research that do not discuss Length of Stay (LOS) and other intervention designs.
Research Design and Publication Type	Randomized Controlled Trial (RCT), Quasi Experiment, Retrospective Cohort	Cross Sectional Design and Review or Meta-Analysis
Language	English	Non-English

No	Journal	Population	Intervention	Comparison	Outcome
1	**Researcher:** D. Committee **Year:** 2019 **Title:** Home monitoring with IT-supported specialist management versus home monitoring alone in patients with heart failure: Design and baseline results of the SUPPORT-HF 2 randomized trial **Journal Type:** American Heart Journal **Research Methodology Type:** RCT **Place:** Unite Kingdom	**Sample:** A sample was recruited from 7 sites in the UK 202 adults with heart failure and a high risk of adverse outcome **Inclusion Criteria:** Patients who are willing and able give informed consent for participating women and men age 18 years and over patients who experienced heart failure with high risk and potential for management very far from typical symptoms congested breath, swelling wrist feet, and signs increase ini jugular veins, pressure, lung crackles. **Exclusion Criteria:** Patients who plan his return including long-term care long or facilities maintenance skilled, who were referred to the hospital and who had limited English language skills or impaired cognitive function, and patients who refused to participate. **Total:** 202 adults, average age 73 years and 28% women, respectively each of the usual care study groups **Sampling Technique:**	**Type of Intervention:** The central clinical management unit administers and assigns according to clinical guidelines prior to randomization, The SUPPORT-HF 2 digital health system consists of a home monitoring kit for patients and a clinical reporting and management application for clinicians. **Duration:** last 30 days **Frequency:** **Instruments:** The Minnesota Living with Heart Failure (MLWHF) questionnaire and changes to the New York Heart Association (NYHA) self- assessed class to assess the impact of the intervention on participants' physical well- being **Implementation Procedure:** - First the investigators identified two periods of 6 months for each patient. - Next researcher use score matching to control for baseline differences between the intervention and control groups. Through multivariate adjustment with subclassification at higher scores. The three investigators examined usage and total costs for 6 months after discharge from the hospital.	Patient which qualify refuse to participate. Patients who not participating not given interventions	**Results** The current report shows that the main baseline features of those in the usual care group were broadly similar to the randomized group in terms of clinical and demographic features, but that they had a poorer quality of life. monitoring that participants in the control group receive may lead to a dilution of the effects of treatment, particularly for subjective outcomes such as quality of life. Another disadvantage is that the findings of trials that do not have the usual care group may be less relevant to policy makers. To address this latter issue, we introduce a third, non-randomized arm group that can assist with estimation of resource implications in a typical clinical scenario. The current report shows that the main baseline features of those in the usual care group were broadly similar to the randomized group in terms of clinical and demographic features, but that they had a poorer quality of life. monitoring that participants in the control group receive may lead to a dilution of the effects of treatment, particularly for subjective outcomes such as quality of life. Another disadvantage is that the findings of trials that do not have the usual care group may be less relevant to policy makers **Data Analysis** Using x2 tests for categorical variables and two-tailed t-tests for continuous variables. All analyzes were performed using SAS.

2	**Researcher:** Wai Leng Chow1, Chaw Yu K Aung1 , Shao Chuen Tong1 , Geraldine SL Goh1 , Sheldon Lee1 , Michael R MacDonald1 , Angela NK Ng1 , Yan Cao1 , Atikah E Ahmad1 , Mei Foon Yap1 , Gerard Leong2 , Armin Bruege3, Alexandra Tesanovic4 , Jarno Riistama4 , Sze Yunn Pang5 and Fernando Erazo **Year :** 2019 **Title:** Effectiveness of telemonitoringenhanced support over structured telephone support in reducing heart failure-related healthcare utilization in a multiethnic Asian setting **Journal Type:** Journal of Telemedicine and Telecare **Methodology type:** RCT **Place:** Singapore	**Sample:** 150 recently discharged heart failure patients enrolled in the telemonitoring and 55 patients who only received structured telephone support after refuse Telemonitoring **Inclusion criteria:** Patient fulfills condition to apply to the program if they are at least 21 years old, live in Singapore, sent home home in the community without end-stage renal failure, have a life expectancy of more than one year and can utseechnology platforms. **Exclusion criteria:** Younger than 21 years or older than 90 years, pregnant, suffering from chronic obstructive pulmonary disease, moderate or severe, on more drugs than salbutamol or ipratropium or both of them, or have disease mental health on treatment in the previous year; have coronary artery bypass graft (CABG) surgery which planned or post- CABG in the first six months out; no followed up on CGH or in bed or at high risk of falling; unable to take standing weight measurements for safety reasons and have an active infection. **Amount:** 150 recently discharged heart failure patients **Sampling Technique:** RCT	**Type of Intervention:** Distance monitoring far (RM) has used to provide additional out-of-hospital support to heart failure patients as part of a disease management program either in the form of structured telephone support (STS), telemonitoring (TM) or a combination both with evidence of their effectiveness compared to usual care in reducing utilization of health services and other patient-reported outcomes such as level of knowledge. **Duration:** 12 months **Frequency:** **Instruments:** TM requires daily measurements by the patient of body weight, blood pressure and heart rate using a blue toothed device. These measurements are transmitted wirelessly via a central console which has a built-in SIM card to the backend monitoring platform for the nurse to view as well as the patient tablet device for self-monitoring by the patient. The platform used is Motiva and is configured to send advice to patients such as repeating blood pressure measurements at rest and assignments to nurses for follow-up if hospital- defined thresholds are violated. **Implementation procedure:** - All patients admitted for heart failure at CGH were reviewed and approached for follow-up enrollment by STS during HMU's six-month HF telehealth program. - The telehealth program consisted of STS by trained nurses according to a planned schedule after discharge according to their 30-day risk of heart failure re-entry as determined by a program-specific risk prediction model developed using hospital-specific patient data. - 8 Patient education and worsening heart failure symptoms were actively assessed in the first six months after enrollment and a final review telephone call at 12 months. Patients received a total of 11, 13 and 15 calls for low, medium and high risk levels over 12 months, respectively. A telephone number is also provided to patients to access nursing advice during working hours from Monday – Friday	Compare effectiveness telemonitoring through support structured phone in reduce utilization health services related fail heart	**Results** This study revealed the effectiveness of a TM-enhanced HF management program over STS in reducing HF- related sleep days and total HF-related care costs and increasing self-care knowledge and levels over a one- year period. Given the modest dropout rate and positive feedback on the TM system in improving the patient education experience. involvement and participation in HF self-care, Our study suggests that TM could be preferred over STS for delivery of HF management programs to support patients after acute hospital discharge as well as patients **Data analysis:** Involvement and support as part of the TM enhanced HF management program will be applicable in guiding the design and development of other similar programmes. Findings from our study have informed the development of other HFTM programs in Singapore

3	**Researcher:** joseph g. rogers, md **Year:** 2017 **Title:** palliative care in heart failure the pal-hf randomized, controlled clinical trial **journal type:** journal of the american college of cardiology **type of research methodology:** randomized controlled trial design **Place:** Durham north carolina	**Sample:** 150 clients **Inclusion criteria:** PAL-HF filtered and enrolled both inpatients (n¼.148) and recently discharged patients (n¼.2) who are at high risk for rehospitalization and mortality based on Evaluation Studies Fail Congestive Heart and Risk Score Effectiveness PulmonaryArtery Catheterization **Exclusion criteria:** - Trial exclusion was failure to meet disease severity criteria in the Congestive Heart Failure Study Evaluation and risk score effectiveness pulmonary Artery Catheterization **Amount:** **Sampling technique:** Randomized trial (RCT)	**Type of intervention:** We are interdisciplinary, multicomponent palliative care driven interventions by the guidelines given in combination with contemporary HF management as previously described (11). In summary, the study team assessed and managed multiple domains of quality of life in patients with advanced heart failure, including physical symptoms, psychosocial and spiritual problems, and planning follow-up care. A nursing nurse practitioneparlliative certified coordinate these aspects of patient care in collaboration with hospitals and palliative medicine board-certified physicians. Intervention **Duration:** The duration of the intervention phase of the trial was 6 months, but patients in both groups were followed until death or the end of the study **Frequency:** **Instruments:** Quality of life Specific HF (measured using Kansas keseluruhan overall summary score City Cardiomyopathy Questionnaire [KCCQ][16]) and general and palliative care, health-related quality of life (measured using the Chronic Disease Therapy Functional Assessment Palliative Care [FACIT – Pal] scale). The KCCQ is a 23-item disease-specific questionnaire that is scored from 0 to 100 with higher scores representing better health status. The overall summary score is derived from the domains of physical function, symptoms, social functioning, and quality of life. **Implementation procedure:**	Patient which registered random in allocation1:1 for maintenance just normal (UC) or UC plus intervention maintenance palliative (UCthPAL) use scheme randomization complete. That experiment not blinded because blind no intervention worthy	**Results** HF further imposes significant physical, psychosocial, and spiritual burdens on patients and their families. PAL-HF provides empirical evidence that palliative care improves health-related quality of life in end-stage heart failure patients. Palliative care is an important component of the holistic management of patients with advanced HF. **Data analysis** Cochrane randomized clinical trial

4	**Researcher:** Yuan Yu, MD; * Aakriti Gupta, MD, MS; * Chaoqun Wu, MD, MS; Frederick A. Masoudi, MD, MSPH; Xue Du, MD, PhD; Jian Zhang, MD, PHD; Harlan M. Krumholz, MD, SM; KanJing Li, MD, PhD; Kanto Group China PEACE collaboration **Year:** 2019 **Title:** Characteristics, Management, and Outcomes of Patients Hospitalized for Heart Failure in China: The China PEACE Retrospective Heart Failure Study **Journal type:** American Heart Association Research methodology type: RCT	**Sample:** 10,000 admissions for HF from 189 hospitals in 2015 in China. Characteristic data patient, management and results obtained through abstraction centralized medical record. The mean age of the cohort was 73 years **Inclusion criteria:** We collected all left ventricular ejection fractions (LVEF) which documented as assessed b echocardiogram ultrasonic during treatment stay and not more than 1 month before enter. History medical and comorbidity (including heart and noncardiac) obtained from a documented historyin login notes, diagnosis discharge, or test results positive laboratory. For example, dyslipidemia16 was defined as a diagnosis of dyslipidemia or total cholesterol > 5.18 mmol/L or low-density lipoprotein .3.37 mmol/L or high- density lipoprotein < 1.04 mmol/L in men or < 1.30 mmol/L. in women. Anemia defined as anemia diagnosis or hemoglobin <120 g/L in men or <110 g/L in women **Exclusion criteria:** **Amount:** **Sampling technique:** Randomized control trial (RCT) to create a cohort	**Type of intervention:** characterize landscape national contemporary inpatient heart failure care. **Duration:** Median hospital LOS is 9 days (range **Frequency:** **Instruments:** plotted the distribution of systolic blood pressure, LVEF, and glomerular filtration rate across strata by age group (<35, 35–54, 55–64, 65–74, 75–84, and >85 years), gender, ethnicity (Han, non-Han), or 5 defined economic-geographical areas. We report proportions to describe categorical variables and medians with interquartile ranges to describe continuous variables. Implementation procedure: Extract relevant data from each article, review data extraction for completeness and accuracy. Using predefined criteria based on AHRQMethods Guide for Comparative Effetiveness Reviews	No comaprisone	**Results** Patients treated with acute heart failure in China have a distinctive epidemiology, receive substandard care, and have lower hospitalization mortality. We demonstrate a substantial gap between real-life practice and the care guidelines recommended for these patients. The reasons for the relatively lower inpatient mortality rate despite the longer LOS are unclear, but may be related to hospitalization of patients with heart failure who can be treated in an outpatient setting. Our findings underscore the need for national initiatives to better understand the reasons for the existing gaps in care and implement tools and strategies to reduce these factors and increase adoption of evidence-based treatments for HF in China. **Data analysis:**
5	**Researcher:** Chiara Mozzini1, Marco Di Dio Perna1, Giancarlo Pesce2, Ulisse Garbin1 • Anna Maria Fratta Pasini1, Andrea Ticinesi3, Antonio Nouvenne3,Tiziana Meschi3 Ages Casadei4, Maurizio Soresi5, Luciano Cominacini **Year: 2017** **Tittle:** Lung ultrasound in internal medicine efficiently drives the management of patients with heart failure and speeds up the discharge time **Journal type:** Internal and Emergency Medicine **Research methodology type:** RCT **Place : italia**	**Sample:** 120 patients. **Inclusion criteria:** 120 patients (aged 70-94). They are treated from the ER to the Department Disease In House Sick University Verona with diagnosis HF clinical. **Exclusion criteria:** **Exclusion criteria:** Associated acute coronary syndrome, pneumonia, chronic obstructive pulmonary disease, lung cancer or metastases, pulmonary fibrosis, pneumonectomy or lobectomy previously, prosthesis breast, obesity, also for avoid B-line detection other than heart failure. **Total:** 120 patients who entered the study. **Sampling Technique:-**	**Type of intervention:** LUS **Duration:** **Frequency:** **Instruments:** The potential of LUS in adjusting diuretic therapy and accelerating discharge time in heart failure patients has been confirmed. Until this technique is used in general in different departments, it makes sense that LUS will develop with aspects **Implementation procedure:** Data entered into Microsoft Excel	without with LUS intervention	**Results** The results of this study confirm the potential of LUS in adjusting diuretic therapy and speeding up time to hospitalization for heart failure. This study emphasizes the real need for an appropriate timing and modality of LUS in Internal Medicine. Until this technique is used generally across different departments, it makes sense that LUS will evolve with different aspects and needs accordingly.

6	**Researcher:** Greene, Stephen JO'Brien, Emily C. Mentz, Robert J. Luo, Nancy Hardy, N. Chantelle Laskey, Warren K. Heidenreich, Paul A. Chang, Chun LanTurner, Stuart J.Yancy, Clyde W. Hernandez, Adrian F. Curtis, Lesley H. Peterson, Pamela N. Fonarow, Gregg C. Hammill, Bradley G. **Year:** 2019 **Title:** Home-Time After Discharge Among Patients Hospitalized With Heart Failure **Journal type:** Journal of the American College of Cardiology **Type methodology study:** study cohort **Place:** north carolina	**Sample:** Among 59,736 patients, 57,992 (97.1%) and 42,153 (70.6%) have act carry on complete for counting time House each for 30 days and 1 year **Inclusion criteria:** Participants aged 65 years and over with scope Medicare fee-for-service linked with data Medicare use technique that has validated before(15). In short, patient associated with strong use combination date index hospitalization, date of birth, gender, and index location of hospitalization. For research this, we use data claim hospitalizations, skilled care facility (SNF) claims, and recipient summary files for the period from January 1, 2011, to December 31, 2014 **Exclusion criteria:** **Amount:** **Sampling technique:**	**Type of intervention:** post-discharge hometime. **Duration:** **Frequency:** **Instruments:**	Facilities maintenance skilled (SNF)	**Results** In this cohort of older patients hospitalized for heart failure, many patients spend a lot of time after discharge from home. Discharge time is associated with several patient characteristics and is closely correlated with post-discharge mortality and hospitalization outcomes. Home time can be easily derived from administrative claims data and can complement traditionally reported heart failure outcomes, for purposes of patient-centred care, health outcomes research, and clinical trials. **Data analysis** All statistical tests were 2-sided, with $p < 0.05$ considered statistically significant. All analyzes were performed using SAS software, version 9.4 (SAS Institute, Cary, North Carolina
7	**Researcher:** Antoine Garnier1*, Nathalie Roulle1, David Gachoud1, Carole Nachar2, Pierre Voirol2, Anne-Claude Griesser3, Marc Uhlmann4, Gerard Waeber1 and Olivier Lamy **Year:**2018 **Title:** Effectiveness of a transition plan at discharge of patients hospitalized with heart failure: A before-and after study **Journal type:** ESC Heart Failure **Type of research methodology:** Quasi experimental **Place:** Switzerland	**Sample:** Of the 431 patients, 138 received the plan transition while 293 did not complete. **Inclusion criteria:** HF patients aged 18 years and over have HF as diagnosis active, and sent home. **Criteria exclusion:** exclude patient which hemodialysis chronic, fail asymptomatic heart declared as functional class 1 new york heart association and hospitalization rejected by algorithm **Amount:** In the preintervention period, 1441 hospitalizations were eligible. On intervention period, 431 hospitalizations were included for analysis. In 293 of 431 hospitalizations, patients (non-complementary) no complete plan transition: 130 diagnosed for heart failure after screening, 111 were discharged before enrollment, and 52 refused to give their consent. The remaining 138 patients received the transition plan **Sampling technique:** intervention on control group non- non-equivalent interventions	**Type of intervention:** multimodal care transition plan **Duration:** 30 days after discharge from the hospital **Frequency:** **Instruments:** 3 years of retrospective data (pre- **Implementation procedure:** We collected patient characteristics, inpatient settings, and diagnoses from the hospital's medico-administrative database. We ensured identical inclusion and analysis of the before and after groups by using a diagnosis code after discharge summary. We therefore avoided selection bias. The transition team did not have access to the results of the statistical analysis until the end of the study.	No comaprisone	**Results** A transition plan is feasible and will likely enhance the home transition for heart failure patients. However, this is resource-intensive, and the benefits demonstrated by reduced readmissions are not clear. Future research should focus more on PARE than readmission rates, and on other indicators such as stress associated with hospitalization, patient satisfaction, medication side effects, or adherence **Data analysis:**

8	**Researcher:** Grubb, Christopher S. Truby, Lauren K. Topkara, Veli K. Bohnen, Michael S. Yuzefpolskaya, Melana DeFilippis, Ersilia M. Kleet, Audrey Nakagawa, Shunichi Haythe, Jennifer H. Axsom, Kelly Colombo, Paolo Takeda, Koji Uriel, Nir Sayer, Gabriel Garan, Hasan Naka, Yoshifumi Farr, Maryjane **Year:**2021 **Title:** Advanced heart failure patients supported with ambulatory inotropic therapy: What defines success of therapy? **Journal type:** American Heart Journal **Type of research methodology:** cohort study **Place:** Switzerland	**Sample:** 241 patients **Inclusion criteria:** 241 patients discharged from AIT and who met the criteria inclusion for retrospective this, analysis observational entered (Image 1). Of these, 81 patients used AIT as BTT (approved by Heart Transplant Committee and officially registered for HT), 70 patients as BTVAD (approved by LVAD committee) and 49 patients using AIT as part of a palliative care plan **Exclusion criteria:** BTT patients and expressed a strong preference for avoiding LVAD. For 70 BTVAD patients, reasons for not moving directly to LVAD during index hospitalization included the need for medical optimization, hesitancy of the patient or medical provider to continue with LVAD, or lack of adequate contemporary insurance coverage for LVAD. Forty-one patients were discharged with AIT as BTD **Sampling technique:** Patient issued from analysis if they previously has accept LVAD or HT, had a primary diagnosis of pulmonary arterial hypertension or if they were discharged for follow-up at another institution. Patients were categorize	**Type of intervention:** AIT is a short-term option or increasingly common, for use as a bridge to a heart transplant (BTT), a bridge to a ventricular assist device (BTVAD), a bridge to decisions regarding continued therapy (BTD) or as palliative care Duration: **Frequency:** **Instruments:** **Implementation procedure:**	No comaprisone	**Results** The overall results of AIT seem to have improved in the contemporary era. AIT appears to be a viable strategy for delaying LVAD implantation in goal-therapy candidates for a short period of time, perhaps long enough to get one's "business done".17 However, BTT AIT does not ameliorate the risk of clinical decompensation requiring more urgent LVAD implantation and increases the risk of death or delisting. . Thus, this risk should be weighed against patient preference in the context of the expected waiting list time to optimize BTT outcomes, particularly as patients increasingly understand that patients who are stable on LVAD devices wait very long times for transplant and may have poor post-transplant survival. lower.18 Complications of AIT, including rehospitalizations for heart failure, indwelling line complications, and common ventricular arrhythmias. Finally, in palliative AIT patients, the involvement of palliative care consultations is underutilized and is an important strategy to prevent complications and improve patients' quality of life at the end of life **Data analysis** Cochrane randomized clinical trial

9	**Researcher:** Lara Hersberger, MD, B,*Anna Dietz, , B,*Helene Burgler, , BAnnika Bargetzi, MD, ,BLaura Bargetzi, MD, ,B Nina Kogi- Braun, MD, Pascal Tribolet, RD, CFilomena Gomes, PHD, DClaus Hoess, MD, eVojtech Pavlicek, MD, e Stefan Bilz, MD, FSarah sigrist, MD,FMichael brändle, PHD,FChristoph Henzen, PHD, Robert Thomann, MD,H Jonas Rutishauser, PHD, Drahomir Aujesky, PHD, JNicolas Rodondi, PHD, J, kJacques Donze, PHD, J, I Zeno Stanga, PHD, M Beat Mueller, PHD, BPhilipp Schuetz, MD, MPH Grubb, Christopher S. Truby, Lauren K. Topkara, Veli K. Bohnen, Michael S. Yuzefpolskaya, Melana DeFilippis, Ersilia M. Kleet, Audrey Nakagawa, Shunichi Haythe, Jennifer H. Axsom, Kelly Colombo, Paolo Takeda, Koji Uriel, Nir Sayer, Gabriel Garan, Hasan Naka, Yoshifumi Farr, Maryjane **Year:** 2021 **Title:** Effects Of a Transitional Palliative Care Model On Patients With End- Stage heart Failure: A Randomized Controlled Trial **Journal type:** British Medical Journal **Type of research methodology:** Randomized Controlled Trial **Place:** China	**Sample:** 645 Patients **Inclusion criteria:** we enter the patient mature with score total NRS of $3 points, estimated length of stay (LOS)> 4 days, and written consent **Criteria exclusion :** exclude patient which admitted to an intensive care or surgical unit; the patient is unable to have oral intake; patients receiving long-term nutritional support on admission; patients with disease terminal, operation bypass stomach, anorexia nervosa, acute pancreatitis, acute liver failure, cystic fibrosis, or stem cell transplantation; and patients previously included in the trial **Amount:** This trial was from Spain with 120 patients including report drop the death that strong >50% over a 6 month time period (3). Sampling technique: -	**Type of intervention:** individualized nutritional support **Duration:** **Frequency:** **Instruments:** EFFORT (Effect of Early Nutrition Support on Frailty, Functional Outcomes and Recovery of inpatient medical malnutrition Implementation procedure:	No Comparison	**Results** Our data suggest that among hospitalized patients with chronic heart failure, malnutrition assessed by the NRS is an important risk factor for short- and long-term mortality and other clinical outcomes. The use of individualized nutritional support, as compared to standard hospital meals, was effective in reducing this risk, particularly in groups of patients at high nutritional risk. These data support screening for malnutrition on admission followed by individualized nutritional support strategies in this vulnerable patient population **Data analysis** Using descriptive statistical analysis is presented to describe the demographic and clinical variables.
10	**Researcher:** Olivari, Zoran Giacomelli, Sara Gubian, Lorenzo Mancin, Silvia Vincent, Elisha Di Francesco, Vincenzo Iliceto, Sabino Penzo, Michelangelo Zanocco, Albino Marcon, Carlo Anselmi, Maurizio Marchese, Domenico Stafylas, Panagiotis **Year:** 2017 **Title:** The effectiveness of remote monitoring of elderly patients after hospitalization for heart failure: The renewing health European project **Journal type:** International Journal of Cardiology **Type of research methodology:** Randomized Controlled Trial **Place:** Italy	**Sample:** patients with chronic disease, **Inclusion criteria:** hospital discharge after acute heart failure within three months and previous age ≥.65 plus left ventricular ejection fraction (EF) B40% or EFA40% added GDPA400 (or NT- proBNP A 1500) during hospitalization. **Exclusion criteria:** presence of severe comorbidities with life expectancyB12month, inability for use equipment telehealth, myocardial infarction or percutaneous coronary intervention in the previous three months, heart surgery performed in the previous 6 months or scheduled for this intervention, being on a waiting list for a heart transplant or enrollment in another trial **Amount:** **Sampling technique:**	**Type of intervention:** Telemonitoring service On **Duration:** **Frequency:** **Instruments:** Usual maintenance and remote monitoring service characteristics **Implementation procedure:**	patient in UC group accept care and care control road like which is determined in the hospital which participate	**Results** During the 12-month follow-up of elderly patients discharged after heart failure, in an intention-to-treat analysis, remote monitoring did not improve the combined primary endpoint of all-cause mortality and hospitalization for heart failure, but did significantly improve quality of care. . life. In the treatment analyses, a trend to increase the primary endpoint was observed in the RM group. **Data analysis** Using descriptive statistical analysis is presented to describe the demographic and clinical variables

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