OBJN
ONLINE BRAZILIAN JOURNAL OF NURSING
ISSN: 1676-4285

EXPERIENCE REPORTS

# Transitional care in mechanical circulatory support: experience for advanced practice nursing

## Cuidados de transição na assistência circulatória mecânica: experiência para uma prática de enfermagem avançada

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**Submission:** 08/31/2023
**Approved:** 02/05/2024

## ABSTRACT

**Objective:** To describe the nurses' practice in the transition of care to adapt to the minimum home needs of patients with long-term mechanical circulatory support devices in a center in Rio de Janeiro. **Method:** The present study is an experience report on implementing home adaptations for transitional care of patients with long-term mechanical circulatory support devices, conducted at a center in Rio de Janeiro between January 2012 and July 2021. A checklist consisting of three domains was used to verify the necessary home adaptations, and the analysis was performed by descriptive statistics. **Results:** Low adequacy was observed in the domains related to communication, emergency plan, and fall risk. **Conclusions:** The use of the checklist by the coordinating nurse allowed an expansion of self-care education and improved the discharge planning process for these patients.

**Descriptors:** Transitional Care; Heart-Assist Devices; Home Calls; Heart Failure, Diastolic; Advanced Practice Nursing.

## RESUMO

**Objetivo:** Descrever a prática da enfermeira na transição do cuidado para adaptação aos requisitos mínimos do domicílio de pacientes em uso de dispositivos de assistência circulatória mecânica de longo prazo em um centro no Rio de Janeiro. **Método:** Relato de experiência sobre implementação de adaptações domiciliares para cuidados de transição de pacientes com dispositivos de assistência circulatória mecânica de longo prazo, realizado em um centro do Rio de Janeiro, entre janeiro de 2012 a julho de 2021. Utilizou-se um checklist composto por três domínios, para verificação das adequações necessárias do domicílio, cuja análise ocorreu por meio de estatística descritiva. **Resultados:** Verificou-se a baixa adequação nos domínios relacionados ao plano de comunicação e emergência e quanto ao risco de queda. **Conclusão:** A utilização do checklist pela enfermeira coordenadora do cuidado permitiu ampliar a educação para o autocuidado, melhorando o processo de planejamento da alta desses pacientes.

**Descritores:** Cuidado Transicional; Coração Auxiliar; Visita Domiciliar; Insuficiência Cardíaca; Prática Avançada de Enfermagem.

## INTRODUCTION

According to the Global Burden of Heart Failure (2023), the prevalence of heart failure (HF) ranges from 1% to 3% of the adult population in developed countries[1]. The prevalence is expected to increase substantially because of the increased availability of diagnostic therapies and medical treatment.

In Brazil, the annual incidence of HF is 240,000 new cases, with a prevalence of approximately 2 million patients[2]. Noncommunicable chronic diseases are responsible for 72% of deaths in the country, with cardiovascular disease being the leading cause[3].

Epidemiological data show that between 2016 and 2020, the number of hospitalizations for HF in Brazil decreased, while an increase in mortality

**How to cite:** Matos LN, Trotte LAC, Campos JGE, Reinoso LA, Stipp MAC. Transitional care in mechanical circulatory support: experience for advanced practice nursing. Online Braz J Nurs. 2024;23 Suppl 2:e20246705. https://doi.org/10.17665/1676-4285.20246705

was observed in all regions of the country. This represents a significant public health problem and contributes to high mortality rates worldwide[4-5]. Patients with advanced heart failure have severe signs and symptoms, even at rest, and experience recurrent hospitalizations despite management according to updated global guidelines. They are refractory or intolerant to treatment and require advanced therapies such as heart transplantation, mechanical circulatory support (MCS), and palliative care[6].

Nursing leadership in advanced HF has gained prominence in recent years, particularly in the United States, as new options for long-term MCS have become available. Of the various activities that have been developed, home adaptation counseling stands out as a practice that supports measures to maintain patient self-care[7].

The use of technology is becoming a fundamental part of care, especially for the terminally ill awaiting heart transplantation, making the use of MCS devices an effective strategy for hemodynamic control and, in many cases, the only chance of survival[8]. Over the years, as new generations of devices have improved, the pace of their use has accelerated; as the number of patients with MCS increases and their survival improves, so do the demands on advanced practice nursing (APN) in this area of care[9]. These devices have undergone progressive technological modifications by improving their operating mechanism, biocompatibility, and durability, allowing for patient discharge and indication-based care planning.

For patients to safely benefit from this therapy and improve their quality of life, nurses must have extensive knowledge, judgment, skills, responsibility, and independence. This may lead to the need for an additional scope of practice in the education of the generalist nurse, which is what distinguishes the APN. This additional breadth and depth of practice can be achieved through clinical practice experience, additional education, and at least a master's or doctoral degree in the specialty[7].

Major national and international guidelines recommend discharge education to address these device use needs during the transition of care from hospital to home[8]. A recent systematic review of the effectiveness of APNs for HF found that implementing this practice reduces hospital readmissions and mortality and has a better cost-effectiveness ratio than usual care[10].

Although the use of MCS has increased, it is used in a very characteristic group of patients; thus, there are some gaps in the literature regarding the support and adequacy of the home environment to receive them after hospital discharge[8]. Adapting to home environment requires the intervention of a specialized professional to ensure a safe, efficient transition. Although based on solid scientific evidence, this approach represents an innovative support that considers the clinical and demographic specificities of the patient. In addition, the specific needs of living outside the hospital environment must be met, including the organization of a home structure with access to coordinated health services[11-12].

When nurses can integrate technology in a thoughtful and balanced way, combining their experience in clinical and ethical judgment with the theoretical knowledge that underpins their work, it is evident that they are providing advanced care. Advanced practice nursing requires competence and evidence-based approaches to person-centered care[11-12].

Currently, the country has only four accredited centers for long-term MCS. The literature, especially in Brazil, needs more research that addresses the requirements related to preparing the home environment to better adapt to the patient's new reality. Therefore, this study aimed to describe the nurses' practice in care transition and adaptation to the minimum home requirements of patients using long-term mechanical circulatory support devices in a center in Rio de Janeiro.

## METHOD

This is an experience report of the nurse care coordinator's practice at a long-term MCS center. Experience reports describe how situations, procedures, and daily planning are handled to help professionals reflect on and replicate them in other practice settings[13].

The study was conducted at an advanced heart failure center in Rio de Janeiro, a reference in high-complexity care and a pioneer in artificial heart implantation. It lasted from January 1, 2012, to July 31, 2021.

A total of 15 patients underwent MCS implantation at that center. The data collected included eight patients living in Rio de Janeiro who were discharged from the hospital and received a home visit from the specialist nurse. The procedure could not be performed in seven patients, of whom five died, one was transferred to another health care center, and one underwent heart transplantation.

A checklist consisting of three domains was used to collect data and verify the necessary

adaptations in the home, considering the device manufacturer's recommendations and guidelines for the care of patients with left ventricular assist devices (LVAD)[14-15]. The first domain relates to the emergency plan, which includes communication between the patient and caregivers with the hospital reference team in emergencies. The second domain addresses device safety, which includes the electrical system and the placement of electrical outlets as a power source. The third domain focuses on fall prevention and provides specific guidance on placing furniture, carpeting, and bathroom fixtures.

The checklist was used in the patient's home during a scheduled visit with a family member and/or caregiver, even during the hospitalization period, to check for adequacies and deficiencies and to provide suggestions for meeting the requirements prior to hospital discharge.

Data were collected and stored in an institutional database (Microsoft Office Excel 2016) and analyzed using simple descriptive statistics with the same software.

**Ethical considerations**

The study complied with the ethical aspects of Resolutions No. 466 of 2012 and No. 510 of 2016 of the Brazilian National Council for Research Ethics. The Research Ethics Committee approved this study under opinion No. 2,044,920.

## RESULTS

**Experience report**

Eight home visits were made, representing 100% of the discharged patients. Approximately 37.5% of them lived in houses, and 62.5% in apartments. The mean age of the patients was 55, and the median age was 62.

Regarding the devices implanted, 62.5% were HeartMate II, and 37.5% were HeartWare. Overall, 50% of the patients were classified as Interagency Registry for Mechanically Assisted Circulatory Support I/II, and 62.5% used temporary MCS as a bridge to definitive therapy. The median life expectancy in this sample was 4.25 years, and 50% of the patients remained on therapy for more than 6 years.

The center's nurse coordinator has more than 10 years of clinical experience with advanced HF patients, a master's degree, and is currently pursuing a doctorate in the field. She also holds several international certifications required to work with patients on MCS. She is the first representative of the International Consortium of Circulatory Assist Clinicians in Latin America.

Regarding the emergency plan domain, patients were educated by the nurse during hospitalization to respond to emergencies (e.g., alarm triggers and power outages) (Table 1). In case of alarms, the patient needs to contact the hospital support team; therefore, we tried to facilitate the placement of telephones and the written record of hospital contacts to ensure they were easily visible. The presence of flashlights in the home was found to have the lowest percentage of adequacy (12.5%).

In an emergency, alarm detection and easy access to emergency telephones facilitate rapid intervention by the patient's care team. In a power outage, the patient can be unplugged and connected to 14-volt batteries with flashlights for safe, quick action.

Before discharge, the implant center is advised to notify the utility company so that the patient is aware of planned disconnection activities. The patient is responsible for a detailed analysis of the quality of the electrical network and prior identification of circuit breakers and access to sockets in the home.

**Table 1 –** Descriptive analysis of the emergency plan domain verified during home visits to patients (n = 8) with long-term mechanical circulatory support devices. Rio de Janeiro, RJ, Brazil, 2022

| Domain 1: Emergency plan | Adequacy (%) |
|---|---|
| Emergency phone numbers readily available | 75 |
| Telephone near the bed | 75 |
| Cordless phone in emergencies | 100 |
| Flashlights available | 12,5 |

LVAD components (e.g., battery charger, power module [HeartMate II and III], and power cord [HeartWare]) require electricity to operate. In device safety, the presence of appropriate outlets for proper use of the device and their location throughout the home were reviewed. Circuit breaker panels showed the highest percentage of inadequacy (100%), especially regarding instructions for restoring the power system. During the visit, the formal hiring of a professional (electrician) to check the sockets' polarity and assess the electrical system's condition was recommended (Table 2).

**Table 2 –** Descriptive analysis of the domain of equipment safety verified during home visits to patients (n = 8) with long-term mechanical circulatory support devices. Rio de Janeiro, RJ, Brazil, 2022

| Domain 2: Equipment safety | Adequacy (%) |
|---|---|
| Socket for connecting the power module during sleep and rest | 75 |
| At least two sockets for charging the 14-volt lithium batteries | 75 |
| There are dedicated and correctly labeled circuit breakers for the battery charger and power module | 62,5 |
| Instructions for restoring the power system | 0 |
| Use of voltmeter tester to ensure polarity of sockets | 50 |
| Potential sources of electrical discharge can be easily eliminated or removed | 87,5 |

As per Table 3, low adequacy was found for lighting (50%), non-slip mats in the bathroom (37.5%), access to toiletries (25%), rugs that pose a fall hazard (25%), lack of non-slip backing on rugs (15.5%), lack of grab bars in the bathroom (12.5%), and changes in floor level between rooms (12.5%) — items related to the fall prevention domain.

**Table 3 –** Descriptive analysis of the fall prevention domain verified during home visits to patients (n = 8) with long-term mechanical circulatory support devices. Rio de Janeiro, RJ, Brazil, 2022

| Domain 3: Fall prevention | Adequacy (%) |
|---|---|
| There is a light between the bedroom and the bathroom | 50,0 |
| Switch next to the bed | 87,5 |
| Bathroom on the ground floor | 100 |
| Is there a shower in this bathroom? | 87,5 |
| Are towels, shampoo, and soap easily accessible? | 25,0 |
| There is a non-slip mat in the shower stall | 37,5 |
| There are grab bars on the wall near the shower | 12,5 |
| The stairs are in good condition and have a non-slip surface | 62,5 |
| Corridors and stairs have adequate lighting | 87,5 |
| Are handrails fixed at waist level? | 75,0 |
| Are corridors and stairs free of obstructions? | 62,5 |
| If there are carpets, are they adequate in number and placement, or do they present a tripping hazard? | 25,0 |

| | |
|---|---|
| Carpets are non-slip | 15,5 |
| Objects, animals, and furniture in the home are neatly arranged | 75,0 |
| There is a change in floor level between rooms | 12,5 |

## DISCUSSION

Patients who experience recurrent falls while using devices are associated with a higher incidence of serious adverse events and increased mortality. Therefore, more rigorous screening to identify fall risk factors before device implantation is critical[16]. Changes in floor level, the presence of carpets, and the use of medications that affect sleep patterns, such as diuretics, may increase this risk.

In a study that used questionnaires to assess the human factors involved in the adaptation of 58 patients with LVAD, 65.3% of these patients modified their homes to adapt to life with LVAD. Although the study did not specify which household items were most frequently modified, it underscores the high demands placed on patients and their caregivers during the transition from the hospital to the home environment[17].

Coping with early and late-stage changes occurs between 3 and 6 months after device implantation. In the early stage, which occurs immediately after implantation, patients face challenges in adjusting to the home environment, dependence on therapy and caregivers, and limitations in socialization that need to be managed by the nurse. The late stage is characterized by functional improvement and quality of life, return to instrumental activities of daily living, and increased confidence from living with the device[18].

There is a clear consensus on the importance of post-discharge follow-up of these patients by a specialized interdisciplinary team, emphasizing the leadership of the device coordinator nurse in patient and caregiver education [14]. Transitional care should begin in the preoperative phase and address the specific needs related to the patient's clinical aspects, who will depend on new technologies and devices for continuity of care. This includes guidance to promote patient autonomy in self-care and education for caregivers and family members, focusing on maintaining the patient's quality of life in the home environment.

Transitional care has been increasingly implemented to improve patient care post-hospital discharge. This includes discharge planning, coordination with local support teams, patient education, and post-discharge follow-up by the healthcare team[17,19].

Home modification counseling has been used as a fundamental strategy in the development of transitional care to get to know the home environment and promote education for the safe use of therapy while preventing damage to LVAD components. Current evidence supports the implementation of transitional care models to reduce hospital readmissions; however, further studies are needed to determine which components of these care models can provide the greatest benefit[20].

Living with a LVAD is a complex, stressful challenge for both patients and caregivers, who must adapt to a new routine and maintain regular follow-up by a specialized team[21]. The introduction of new technologies often brings new demands that can increase the intensity of work, requiring not only the expertise of the specialist nurse but also an interdisciplinary approach involving professionals from different healthcare and related fields[22].

The official discussion of advanced nursing practice has gained prominence in the last decade, especially through debates in professional nursing councils. Although this practice is not yet a common reality in hospital units in the country, it is highly desirable, especially considering that hospitalized patients with decompensated HF require special care guided by clinical judgment and precise decision-making[23].

APN is emerging as an area of practice in which the nurse plays a central role in the provision and coordination of specialized care. Therefore, professionals must be prepared to apply new technologies and propose strategies to implement public policies that support the monitoring of users and their families and meet the needs of health professionals[7].

Strengthening the leadership of nurses, both current and future, is critical to ensuring that they can play an influential role in policy formulation and decision-making. This is essential to improving the effectiveness of health systems and promoting greater equity in access to health services, particularly in middle- and low-income countries[24].

Advanced practice registered nurses are recognized for their clinical leadership, which is de-

monstrated when they take independent control of treatment processes in complex care situations. They influence, develop, and implement change strategies, consult, educate, collaborate, and liaise with other healthcare professionals and management[25].

Therefore, professionals committed to providing holistic care that meets the individual's health needs and considers care perspectives at all levels of care are essential[7].

Furthermore, the importance of incorporating health advocacy as a competency for nurses to adopt in promoting the self-care of these patients must be emphasized. Specifically, understanding which models and approaches to health advocacy are essential and how to apply them in these specific contexts is critical[26].

## CONCLUSION

The nurse care coordinator's use of the checklist allowed for the expansion of self-care education, improving the discharge planning process for this patient population.

The role of the APN in transitional care for this population is critical, especially in empowering patients for self-care, strategic planning, and continued implementation of home care. Using a personalized script that addresses these nursing practices' complex and unique needs can significantly improve the discharge planning process and ensure compliance with rigorous national and international guidelines.

The relational link between transitional care and patient outcomes assumes paramount importance when considering the diverse home environments and nurses' integral role in adapting approaches to support patients and caregivers in their daily activities. This link influences the quality of life, highlighting the critical contribution of nursing in transitional care and promoting patient well-being in diverse scenarios.

Furthermore, there is a need for more research that comprehends and conceptualizes a nursing theory in the care of HF in Brazil to guide nursing practice in this specific context.

## CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

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| Final approval of the version to be published: Trotte LAC, Campos JGE, Reinoso LA, Stipp MAC |
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