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Safety of physical exercise in heart failure patients undergoing inotropic infusion

Segurança do exercício físico em pacientes com insuficiência cardíaca submetidos à infusão de inotrópicos

Seguridad del ejercicio físico en pacientes con insuficiencia cardíaca sometidos a infusión inotrópica

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ABSTRACT

Objective: To describe the occurrence of adverse events during physical exercise in patients with Decompensated Heart Failure (DHF) undergoing inotropic therapy. **Methods:** This is a retrospective, single-center cohort study using electronic medical records. Data were collected from patients undergoing inotropic therapy attended by the physiotherapy team of the Cardiointensive Unit of a University Hospital, from June 2021 to June 2022. Clinical and sociodemographic information, vital signs, adverse events during physiotherapy sessions under inotropic infusion, and the level of mobility classified by the Intensive Care Unit Mobility Scale (IMS) were recorded. Data were analyzed using JAMOVI® 2.3.21 software. **Results:** Thirty-four patients were included, with 263 physiotherapy sessions. In these sessions, 16 adverse events (6.10%) were reported, with 5.70% classified as mild, 0.40% as moderate, and no serious adverse events. The most frequent events were dizziness without hypotension (7) and hypotension (6), especially with high doses of inotropic agents. The IMS between 6 and 10 was achieved in 71.00%, 56.80%, and 15.60% with low, moderate, and high doses, respectively. **Conclusion:** The absence of serious adverse events and the low occurrence of moderate events suggest that physical exercise is safe for this patient profile.

Keywords: Heart failure, Cardiac rehabilitation, Adverse event, Physiotherapy.

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RESUMO

Objetivo: Descrever a ocorrência de eventos adversos durante o exercício físico em pacientes com Insuficiência Cardíaca Descompensada (ICD) com terapia inotrópica. **Métodos:** Trata-se de estudo de coorte retrospectivo, unicêntrico, utilizando prontuários eletrônicos. Os dados foram coletados de pacientes em terapia inotrópica atendidos pela equipe de fisioterapia da Unidade Cardiointensiva de um Hospital Universitário, no período de junho de 2021 a junho de 2022. Foram registrados informações clínicas e sociodemográficas, sinais vitais, eventos adversos durante as sessões de fisioterapia sob infusão inotrópica e o nível de mobilidade classificado pela Escala de Mobilidade em Unidade de Terapia Intensiva (IMS). Os dados foram analisados com software JAMOVI ® 2.3.21. **Resultados:** Foram incluídos 34 pacientes, com 263 sessões de fisioterapia. Nessas sessões, foram relatados 16 eventos adversos (6,10%), sendo 5,70% classificados como leves, 0,40% como moderados e nenhum evento adverso grave. Os eventos mais frequentes foram tontura sem hipotensão (7) e hipotensão (6), especialmente com altas doses de inotrópico. O IMS entre 6 e 10 foi alcançado em 71,00%, 56,80% e 15,60% com doses baixas, moderadas e altas, respectivamente. **Conclusão:** A ausência de eventos adversos graves e a baixa ocorrência de eventos moderados sugerem que o exercício físico é seguro nesse perfil de paciente.

Palavras-chave: Insuficiência cardíaca, Reabilitação cardíaca, Evento adverso, Fisioterapia.

RESUMEN

Objetivo: Describir la ocurrencia de eventos adversos durante el ejercicio físico en pacientes con Insuficiencia Cardíaca Descompensada (ICD) sometidos a terapia inotrópica. **Métodos:** Se trata de un estudio de cohorte retrospectivo, unicéntrico, que utiliza registros médicos electrónicos. Se recopilaron datos de pacientes sometidos a terapia inotrópica, atendidos por el equipo de fisioterapia de la Unidad de Cardiointensivos de un Hospital Universitario, entre junio de 2021 y junio de 2022. Se registró información clínica y sociodemográfica, constantes vitales, eventos adversos durante las sesiones de fisioterapia con infusión inotrópica y el nivel de movilidad clasificado según la Escala de Movilidad de la Unidad de Cuidados Intensivos (IMS). Los datos se analizaron con el software JAMOVI® 2.3.21. **Resultados:** Se incluyeron 34 pacientes, con 263 sesiones de fisioterapia. En estas sesiones, se reportaron 16 eventos adversos (6,10%), de los cuales el 5,70% se clasificaron como leves, el 0,40% como moderados y ningún evento adverso grave. Los eventos más frecuentes fueron mareos sin hipotensión (7) e hipotensión (6), especialmente con dosis altas de agentes inotrópicos. El IMS entre 6 y 10 en el 71,00%, el 56,80% y el 15,60% con dosis bajas, moderadas y altas, respectivamente. **Conclusión:** La ausencia de eventos adversos graves y la baja ocurrencia de eventos moderados sugieren que el ejercicio físico es seguro para este perfil de paciente.

Palabras clave: Insuficiencia cardíaca, Rehabilitación cardíaca, Evento adverso, Fisioterapia.

INTRODUCTION

Heart failure (HF) presents a chronic and progressive clinical syndrome and remains a leading cause of morbidity and mortality in Brazil and worldwide despite advances in its treatment (SHANG Z, et al., 2022). Patients with HF present symptoms such as dyspnea on exertion and peripheral plus ventilatory muscle fatigue, leading to exercise intolerance due to hyperactivity of the ergoreflex system (BOZKURT B, et al., 2021; FÜLSTER S, et al., 2013; PIEPOLI MF and COATS AJ, 2013).

During the disease, patients experience acute HF decompensation due to exacerbation of symptoms (NJOROGE JN and TEERLINK JR, 2021). This requires immediate therapeutic intervention, which usually involves hospitalization and administration of inotropes (MANGINI S, et al., 2013). In patients with decompensated heart failure (DHF) should perform exercises after clinical compensation and dyspnea improve (HERDY AH, et al., 2014). Inotropic infusion can be a barrier to physical exercise within the cardiac intensive care unit (CICU), as there is a lack of information about safety in this scenario, as Brazilian HF and cardiac rehabilitation guidelines do not provide data on exercise prescriptions for this patient profile (CARVALHO T, et al., 2020; ROHDE LEP, et al., 2018).

The heterogeneity in defining safety criteria and adverse events (AEs) appears as a limitation of the literature due to the need for more standardization in the definitions and naming of AE in clinical practice (NYDAHL P, et al., 2017). Mild and moderate AEs cause transient events, but the first does not require medical intervention (FURINI ACA, et al., 2019). Severe AEs cause permanent sequelae, serious complications, life-threatening conditions or death (LINDHOLZ M, et al., 2022).

Although the benefits of physical exercise during inpatient cardiac rehabilitation have already been described, there is still a gap regarding safety and the best moment to start exercising in DHF individuals using inotropes.

Ueno K, et al. (2025), states that further studies are needed on the assessment of the occurrence of AEs during physical training to investigate the safety of initiating rehabilitation. Therefore, this study aims to retrospectively evaluate the safety of physical exercise in DHF patients in a university hospital's CICU. The hypothesis of this study is that physical exercise is safe for hospitalized patients with DHF using inotropes, due to the low occurrence of AEs during exercise.

METHODS

This was a retrospective single-center cohort study conducted at a University Hospital in Rio de Janeiro, Brazil, with patients hospitalized by heart failure decompensation, accompanied by the Physiotherapy team. Ethical approval was obtained by the Institutional Research Ethics Committee (approval no. 6.190.905; CAAE 71057623.2.0000.5259) in July 2023.

The ethics committee received a waiver of the Informed Consent Form as it was a retrospective study, with data collected from the electronic medical record (BRASIL, 2013). Data collection occurred between August 2023 and December 2023. Reported according to the STROBE guideline checklist, as recommended by the EQUATOR Network for reporting observational studies (VON ELM, et al., 2008).

Participants

Adult patients (>18 years) of both sexes hospitalized with a diagnosis of DHF and continuous inotropic infusion who underwent physical exercise sessions were eligible for the study. Patients were excluded if they presented a cognitive disorder that would impair the understanding of commands given by the physiotherapist, previous or transient neurological or orthopedic disorders, as well as patients who required invasive hemodynamic monitoring, invasive ventilatory and circulatory support, such as orotracheal intubation, intra-aortic balloon pump and extracorporeal membrane oxygenation (ECMO) or cardiogenic shock. Physical exercise sessions under noradrenaline infusion and those with missing data regarding hemodynamic variables were excluded.

Outcome measures

Data was manually collected from the electronic medical record and organized in a specific form. Sociodemographic and relevant clinical information such as age, sex, height, weight, comorbidities, medication, dobutamine dosage (mcg/kg/min), etiology of HF, complementary exams, and functional class according to the NYHA Functional Classification (BENNETT JA, et al., 2002), and length of stay was recorded.

During the physical exercise sessions in the ICU, patients receive daily assessment and physiotherapy treatment, which were prescribed according to their clinical condition and degree of functional impairment. Information from the physiotherapeutic assessment routinely carried out by the ICU team concerning functional status through FSS-ICU, the mobility scale classified by the Intensive Care Unit Mobility Scale (IMS) and the Medical Research Council (MRC) scale for muscle strength was registered (SILVA VZMD, et al, 2017; DE JONGHE B, et al., 2006). As part of the service routine, all the information about the assessment and physiotherapy sessions is recorded in the electronic medical record as soon as the patient is seen.

The exercise prescription was carried out individually and based on the principles of the FITT-VP acronym (frequency, intensity, time, type, volume, and progression) according to the functional level presented by the patient (ACSM, 2017).

The sessions were performed once or twice daily, ranging from 20 to 40 min. The target intensity was low to moderate, with levels 3-4 on the Modified Borg Scale (KAERCHER PLK, et al., 2018). Exercises consisted of mobilization and postural transfers, assisted, active, and resisted exercises with body weight or external load, and aerobic training with a cycle ergometer. The volume and progression of training were adjusted with the patient's clinical condition (JACOB P, et al., 2021).

The dobutamine dose classification was done as described by Jacob P, et al. (2021) in low (1 - <3 mcg/kg/min), moderate (3 - <10 mcg/kg/min), and high (>10 mcg/kg/min) doses. Mobility levels were classified according to IMS in bed (1-3) and out of bed (4-10) mobilization.

AEs were classified as mild, moderate, or severe (LINDHOLZ M, et al., 2022; BARROSO WKS, et al., 2021; CARVALHO T, et al, 2020; HODGSON CL, et al., 2014; ADLER J and MALONE D, 2012), as described in **Table 1**.

Table 1 - Adverse event classification.

Mild	Transient changes • SBP > 120; SBP > 130 (SAH); MAP < 65 and symptoms of arterial hypotension. • HR > 130, < 40 or a reduction in 20% of rest HR.
Moderate	Permanent changes • SBP > 120; SBP > 130 (SAH); MAP < 65 and symptoms of low cardiac output; • HR > 130, < 40 or a reduction in 20% of rest HR; • Rhythm disorders such as: grade 2 or 3 atrioventricular blockade, atrial fibrillation, supraventricular tachycardia or complex ventricular arrhythmia; • Exertional angina and vascular claudication; • RR > 40; SpO_2< 88 – 90% or a reduction > 4%; • Fall or musculoskeletal injuries; • Displacement or avulsion of dialysis catheters, venous and arterial catheters, nasogastric tube, pleural drain and/or bladder tube.
Severe	• Cardiorespiratory arrest; • Loss of consciousness; • Syncope; • Death.

Legend: SPB: systolic blood pressure; MAP: median arterial pressure in millimeters of the mercury column; SAH: systemic arterial hypertension; HR: heart rate in beats per minute; RR: respiratory rate per minute; SpO_2: peripheral oxygen saturation. **Source:** Camelo DN, et al., 2026.

BIAS

Considering the nature of the design of this study, the interpretation of the results must consider some potential biases. Concerning selection bias, all patients receiving dobutamine in a given period were selected to achieve a more reliable representation of the population, and no patient was excluded due to missing data. The physical sessions performed on these patients that did not contain data on hemodynamic variables were excluded to minimize information bias due to inconsistent data collection.

Other missing data on the participants' characteristics were reported in the results of this paper and were not included in the statistical analyses. Understanding the noradrenaline infusion as a potential confounding bias to AEs due to exercise, all physical sessions under this medication were also excluded (HAMMER GP, et al., 2009).

Statistical analysis

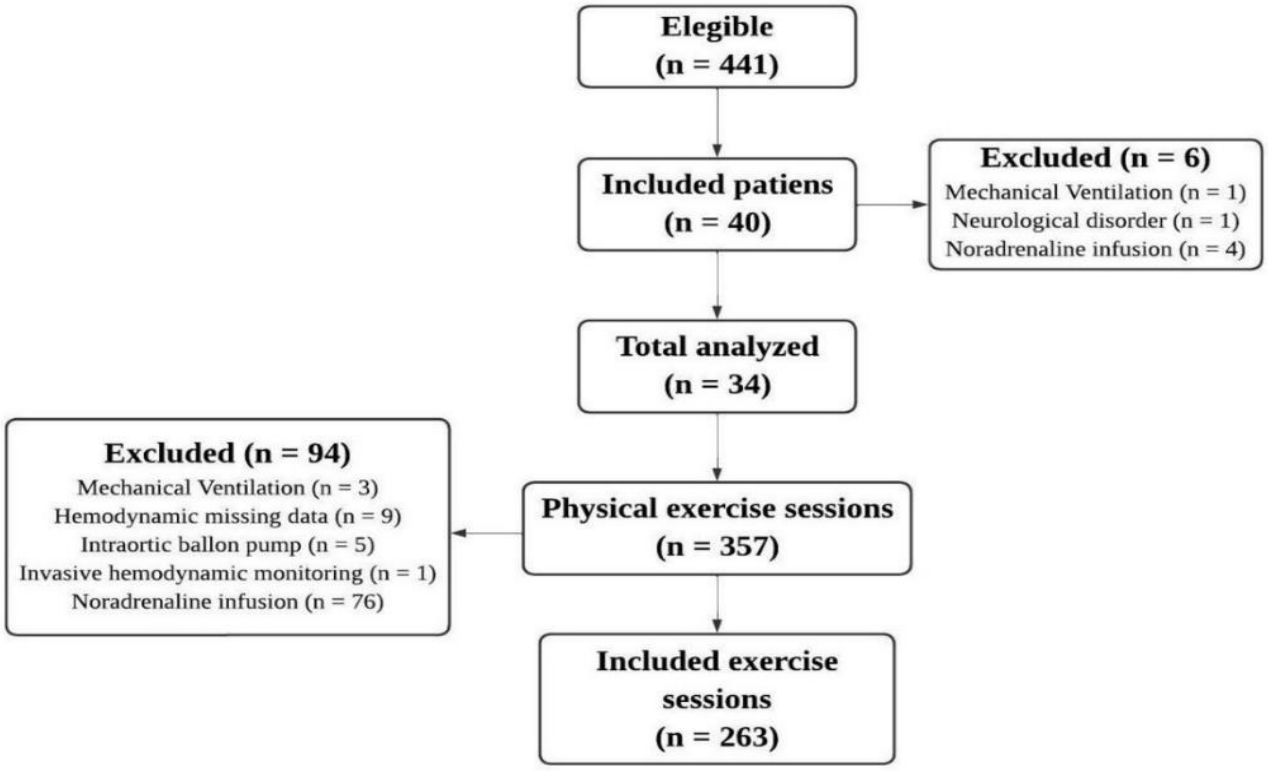
Collected data was organized and archived in an Excel spreadsheet. Statistical analysis was performed using JAMOVI 2.3.21. Data normality was verified by the Shapiro-Wilk test, and results are expressed as suitable measures of central tendency and dispersion for numerical data (mean ± standard deviation (SD) or median and interquartile ranges (IQRs) and as frequency and percentage for categorical data.

The occurrence of adverse events was calculated as the ratio between the number of adverse events and the number of physical exercise sessions performed in the same period. The association between adverse events and mobility levels was compared with the dobutamine dose using the chi-squared test. The significance level was established at $p \leq 0.05$. Physical therapy sessions with missing data regarding hemodynamic values were excluded from the study, and variables with missing data greater than 20% were disregarded for analysis.

RESULTS

The flowchart of the study is described in **Figure 1**. From June 2021 to June 2022, 441 patients were admitted to the ICU due to DHF and had their electronic medical records evaluated. The sample consisted of 34 patients; the patients included in the study received 357 physiotherapy sessions. Of these sessions, 263 were mobilized with inotropic therapy, and the data were recorded. **Table 2** presents the characteristics of the participants who underwent physical sessions. The median age of 63 years (56.30 – 71.80), the majority male, with a left ventricular ejection fraction (LVEF) of 31.80%. Regarding heart failure, most presented biventricular heart failure, with ischemic etiology, hemodynamic profile C upon admission, and NYHA IV. The most frequent comorbidity presented was systemic arterial hypertension, and the median length of stay in the ICU and hospital was 12 (8.00 – 16.80) and 25 (17.00 – 45.50) days, respectively. Missing data comprised the education level of 8 patients, place of birth of 4 patients, weight of 2 patients, and height of 9 patients.

Figure 1 - Data flowchart.



Source: Camelo DN, et al., 2026.

Table 2 - Characteristics of the participants.

Variables	Participants (n = 34)
Age (years)	63.50 (56.30 – 71.80)
Men (%)	76.50 (26)
Race (%)	
Mixed race	41.20 (14)
White	38.20 (13)
Black	17.60 (6)
Heart failure (%)	
Right-sided	2.90 (1)
Left-sided	35.30 (12)
Biventricular	61.80 (21)
Etiology (%)	
Isquemic	32.40 (11)
Amiloidosis	17.60 (6)
Unknown	14.70 (5)
LVEF	31.80 ± 13.50
NYHA (%)	
II	2.90 (1)
III	38.20 (13)
IV	58.80 (20)
Hemodynamic profile (%)	
B	11.80 (4)
C	73.50 (25)
L	14.70 (3)
Comorbidities(%)	
Sistemic arterial hipertension	55.90 (19)
Flutter or atrial fibritationn	52.90 (18)
Diabetes Mellitus	38.20 (13)
Chronic renal failure	20.60 (7)
Dyslipidemia	17.60 (6)
Coronary artery disease	17.60 (6)
Orovalvar Disease	2.90 (1)
Social History (%)	
Smoker	2.90 (1)
Former smoker	50.00 (17)
Alcoholic	17.60 (6)
Former alcoholic	26.50 (9)
Illicit drug user	5.90 (2)
UCI lenght of stay UCI (days)	12.50 (8.00 – 16.80)
Hospital lenght of stay (days)	25.00 (17.00 – 45.50)

Legend: Data presented as media □ standard deviation, median (25-75% interquartile), or percentage (absolute frequency). LVEF: left ventricular ejection fraction; NYHA: New York Heart Association.
Source: Camelo DN, et al., 2026.

During physical exercise sessions, the most frequent level of consciousness concerning the Glasgow scale was 15 (94.30%), oxygen was supplemented in 7.60%, and 3.40% additionally used non-invasive ventilation during exercise. The inotropic agents used were dobutamine (100%), with a median dose of 7.00 mcg/kg/min (5.00 – 12.50), classified as a moderate dose, and milrinone (3.00%), with a mean dose of 0.02 mcg/kg/min (0.02 ± 0.12), classified as a low dose.

The assessment of functionality by FSS-ICU and mobility by IMS presented a median of 28.00 (0.00 – 35.00) and 6.00 (3.00 – 6.00), respectively. Concerning postural changes, in 88.60% of sessions, patients were sited at the bedside, 70.00% reached orthostasis, and 27.90% remained seated in the armchair at the end of the physical exercise session. The exercises performed most frequently were described as motor kinesiotherapy (84.40%), stationary gait (60.50%), walking (19.90%), sitting and standing (15.60%), cycle ergometry (4.00%), climbing up and down steps (1.50%). At the end of their stay in the ICU, 44.10% of patients were discharged walking without assistance, 2.90% with assistance, 5.90% performed stationary gait, 17.70% were transferred to another intensive unit performing exercises in bed, and 29.40% evolved into death.

All AEs were reported in 7 patients (**Table 3**). The more frequent events reported were classified as mild, with no occurrence of a severe event. The most frequent was dizziness without hypotension, followed by hypotension without the need for intervention and tachycardia.

Table 3 - Description of adverse events during physical exercise.

Adverse events	N	%
Total	16	6.10
Mild	15	5.70
MAP < 65 mmHg	6	2.30
Dizziness without hypotension	7	2.70
Heart rate > 130 bpm	2	0.80
Moderate	1	0.40
MAP < 65 mmHg and low cadiac output signs	1	0.40
Severe	0	

Legend: Data presented as percentage (absolute frequency). MAP: Median arterial pressure; mmHg: millimeter of the mercury column; bpm: beats per minute. **Source:** Camelo DN, et al., 2026.

The AEs reported were significantly associated with a high dose of dobutamine compared to the moderate and low doses (**Table 4**). A significant association was also found between the dose of dobutamine and the posture achieved, where patients on the low and moderate doses tended to reach more advanced levels of IMS mobility than those on the high dose (OR -0.753; CI -1.29- 0.216; p= 0.006).

Table 4 - Association between an adverse event and dobutamine dose.

Dobutamine dose	Adverse event		Total
	No	Yes	
Low/Moderate	155	5	160
High	92	11	103
Total	247	16	263
Odds Ratio	X^2	P value	[95% CI]
3.71	6.26	**0.012**	0.22– 2.40

Legend: P value highlighted in bold represents statistical significance (p ≤ 0.05).
Source: Camelo DN, et al., 2026.

DISCUSSION

The description of exercise prescription for patients with DHF using inotropes is limited in the literature, due to the low of evidence to support its safety and the risk of AEs during physical exercise while using inotropes, due to clinical instability. The present study demonstrated that AEs occur in 6.10% of physical therapy sessions, and 93.75% were classified as mild. Additionally, no severe event was registered. The AEs reported were significantly associated with a high dose of dobutamine compared to moderate and low doses. Adverse events, mild to moderate, were observed in moderate to high doses of inotropes. Unlike these results, Lindholz M, et al. (2022) reported no statistically significant correlation between the dose of

noradrenaline and AEs. They showed a predominance of exercises performed outside of bed with a moderate dose of norepinephrine. Jacob P, et al., (2021) found that patients with low doses of vasoactive drugs were five times more likely to be mobilized than those with high doses. In addition to drug dosage, evaluating these patients' clinical and hemodynamic stability with microcirculation analysis is essential. Signs and symptoms of low cardiac output, blood lactate ≥ 4 mmol/L or increase > 2 mmol/L, and reduction in central venous oxygen saturation (SvcO2) at <60% (GARDENGHI G, 2020; AMIYAE and TAYA M, 2018; BRUM PC, et al., 2014; ADLER J and MALONE D, 2012) might be considered an interruption criterion for exercise training.

Nakamura M, et al. (2023) demonstrate in their study the absence of AEs during physical exercise in patients with DHF using inotropic. The sample consisted of 10 participants, patients using a low dose of inotropic agent, dobutamine, with a median of 3.00 mcg/kg/min. In the present study, the median dose of dobutamine was 7.00 mcg/kg/min (5.00 – 12.50), classified as a moderate dose, with patients exposed to exercise on moderate to high doses of dobutamine. The high dose of dobutamine in these patients is directly correlated with the clinical severity of the condition (SHANKAR A, et al., 2022). As progressive myocardial dysfunction leads to a reduction in stroke volume, cardiac output, and mean arterial pressure, this decreases myocardial perfusion. Inotropes act by increasing myocardial contractility, consequently increasing cardiac output. However, they stimulate the sympathetic-adrenal system, accompanied by an increase in heart rate, increased myocardial oxygen demand, and an increased risk of myocardial ischemia and ventricular arrhythmias associated with the use of the medication, especially in high doses (NAKAMURA M, et al., 2023; SHANKAR A, et al., 2022).

Bortsova MA, et al. (2023) state that inotropic support should not be considered a contraindication to physical rehabilitation in patients with heart failure, provided there is no hemodynamic instability or signs of exercise intolerance. However, the literature does not establish at what point an increase in metabolic demand would not be indicated in this patient profile, even with high doses of inotropic. Physiotherapeutic strategies associated with exercise can increase exercise tolerance, such as the combination of non-invasive ventilation with aerobic training, as described by Di Leone CN, et al. (2024), reducing left ventricular afterload with the use of positive pressure, thus increasing cardiac output in patients with left ventricular dysfunction.

Nydahl P, et al. (2017) showed that early mobilization and rehabilitation in the ICU appear safe, with a cumulative incidence of 2.60% of adverse events. However, the sample comprised individuals with different profiles, including clinical, surgical, and heart disease patients on invasive mechanical ventilation and those with invasive hemodynamic support. The most often reported AEs were hemodynamic changes, with a predominance of hypotension, similar to the results of the present study.

The description of the types of AEs and the definition of safety varies widely in the literature (JACOB P, et al., 2021). According to the WHO (2009), the risk of unnecessary damage secondary to interventions during any care must be reduced to an acceptable minimum to ensure patient safety. The health professional's specialization, available resources, and the scenario in which the care is provided must be considered, as well as understanding the risk and benefit of the offered care compared to other interventions, including non-intervention. This broader and less objective definition makes comparing the data found with the available literature difficult. Therefore, following the WHO (2009) definition, considering that 0.90% of moderate AEs and no serious events were low occurrences, thus, physical exercise sessions can be considered safe.

Brum PC, et al. (2014) described that hospitalized DHF patients are susceptible to the harmful effects of immobility, especially those who are still on prolonged bed rest and may suffer from muscular atrophy and weakness, which may impact a worse prognosis. Amiya E and Taya M (2018) described that postponing the start of physical exercise by one day may interfere with the likelihood of improvement in physical fitness during a hospital stay. Furthermore, exercise training through an individualized program can prevent functional disability after hospitalization and increase exercise tolerance, positively impacting quality of life (CARVALHO T, et al., 2020; AMIYA E and TAYA M, 2018). As a low occurrence of AEs was found, it is understood that exercise training has a crucial role in reducing the effects of immobility and should be considered.

Cardiac rehabilitation can be performed to improve cardiorespiratory fitness even in hemodynamically compensated patients with heart failure using inotropic therapy (UENO M, et al., 2025). Ueno M, et al., (2025) describe that early initiation, considered up to 3 days after admission, resulted in lower mortality, reduced length of stay, and a lower readmission rate for HF and all causes within 30 days. Furthermore, early intervention was associated with a higher rate of achieving independence during walking and a lower number of days required to achieve that independence.

In the present study, mobility reported by the IMS scale ranged from 6 to 10. It was observed that 39.50% of patients were walking at ICU discharge (IMS 10). JACOB P, et al., (2021) reported that mobility in intensive care patients using vasoactive drugs also reached a higher level, and most achieved the maximum level of functional independence (IMS 6-10) without serious AEs, corroborating the understanding of the safety of physical training in the ICU. Regarding exercise prescription, patients performed training based on the FITT-VP, including stationary walking, seated and standing training, stair climbing and descending, and cycle ergometry during their hospitalization, with controlled intensity and progression according to tolerance.

Few studies were available on exercise training in patients with inotropic therapy and vasopressors, limiting the discussion and interpretation of the data. There remains a gap in the literature on the relationship between physical exercise and safe doses of inotropics, but for the first time, safety was evaluated in this patient profile. The findings of this study suggest that physical exercise sessions can be safely performed in patients with DHF under inotropic support, particularly at low to moderate dosages of dobutamine, provided that the patient does not present clinical instability or signs of intolerance to physical exercise. The occurrence of AEs was low, and the majority were classified as mild, supporting the integration of individualized physiotherapy programs even in critically ill cardiac patients.

These results highlight the importance of functional mobility during ICU stay, with many patients progressing to higher mobility levels, including independent ambulation at discharge. The early initiation of mobilization appears beneficial in mitigating the effects of immobility, such as muscle atrophy and functional decline, commonly seen in DHF patients. Physiotherapists should evaluate inotropic dosage and the patient's clinical and hemodynamic stability prior to initiating exercise. Monitoring signs of low cardiac output and using validated functional scales, such as IMS and FSS-ICU, can support clinical decisions and improve patient outcomes.

CONCLUSION

The absence of serious AEs and the low occurrence of moderate events suggests that it is safe to perform physical exercise in patients with DHF undergoing inotropic infusion. This study contributes to a safer clinical reasoning framework for physiotherapists working in intensive care units, reinforcing that exercise interventions—when carefully planned—should be considered part of the standard care for patients with DHF receiving inotropic support.

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