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RESEARCH

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NURSING HOUR LOAD APPLIED TO THE PATIENT WITH ACUTE MYOCARDIAL INFARCTION

Carga horaria de enfermagem aplicada ao paciente com infarto agudo do miocárdio

Carga horaria de enfermería aplicada al paciente con infarto agudo de miocardio

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ABSTRACT

Objective: to identify the nursing time load applied to acute myocardial infarction, according to the Killip classification. field research with quantitative, descriptive, exploratory, retrospective approach. The medical records of patients **Methods:** who obtained an initial diagnosis of acute myocardial infarction and who presented alterations in the biochemical markers were used. **Results:** 200 medical records were evaluated. From the data obtained we were able to trace a progression of time load between the Killip categories, on the assistance needs provided. **Conclusion:** the nursing time load varies according to the complexity that the Myocardial Infarction can manifest. The patient needs a larger number of nursing personnel due to high workload to attend all necessary interventions.

Descriptors: Myocardial infarction; Acute coronary syndrome; Cardiac insufficiency; Work load; Disease severity index.

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RESUMO

Objetivo: identificar a Carga Horaria de enfermagem aplicada ao Infarto agudo do Miocárdio, de acordo com a classificação de Killip. **Método:** pesquisa de campo com abordagem quantitativa, descritiva, exploratória, retrospectiva. Foram utilizados prontuários de pacientes que obtiveram como diagnóstico inicial o Infarto Agudo do Miocárdio, e que apresentaram alterações nos marcadores bioquímicos. **Resultados:** foram avaliados 200 prontuários. A partir dos dados obtidos conseguimos traçar uma progressão de carga horaria entre as categorias Killip, sobre as necessidades de assistência prestada. **Conclusão:** a carga horaria de enfermagem varia de acordo com a complexidade que o Infarto do Miocárdio pode manifestar. O paciente necessita de maior número de pessoal de enfermagem devido alta carga horaria para atender todas as intervenções necessárias.

Descritores: Infarto do miocárdio; Síndrome Coronariana Aguda; Insuficiencia Cardíaca; Carga de trabalho; Índice de gravidade de doença.

RESUMEN

Objetivo: identificar la carga horaria de enfermería aplicada al infarto agudo de miocardio, de acuerdo con la clasificación de Killip. **Métodos:** investigación de campo con abordaje cuantitativo, descriptivo, exploratorio, retrospectivo. Se utilizaron prontuarios de pacientes que obtuvieron como diagnóstico inicial el Infarto Agudo del Miocardio, y que presentaron alteraciones en los marcadores bioquímicos. **Resultados:** se evaluaron 200 prontuarios. A partir de los datos obtenidos conseguimos trazar una progresión de carga horaria entre las categorías Killip, sobre las necesidades de asistencia prestada. **Conclusión:** la carga horaria de enfermería varía de acuerdo con la complejidad que el Infarto del Miocardio puede manifestar. El paciente necesita un mayor número de personal de enfermería debido a una alta carga horaria para atender todas las intervenciones necesarias.

Descriptores: Infarto de miocardio; Síndrome de coronaria aguda; Insuficiencia cardíaca; Carga de trabajo; Índice de gravedad de la enfermedad.

INTRODUCTION

Acute Myocardial Infarction (AMI) is a process by which a part of the heart suffers a decrease in oxygen supply due to a decrease in the blood flow of the coronaries, causing myocardial tissue necrosis. The onset of the AMI process can be sudden or gradual, and the progression from the beginning of the event to its end can last from 3 to 6 hours.¹

Since the 1970s, there has been a significant decline in deaths from cardiovascular causes due to advances in diagnosis and treatment, but myocardial infarction is still the single most common cause of death in both sexes, corresponding to around 25% to 30.0% of deaths in Brazil.^{2,3}

The most frequent manifestations among patients with heart disease are as follows: dyspnea, palpitation, weakness, fatigue, vertigo, syncope, or epigastric pain. Commonly, the pain starts in the mandible and extends to the navel, including both arms, especially the left arm, the posterior region of the chest, neck, and stomach.⁴

In addition to patients who already have Coronary Artery Disease, there are those who are also associated with predisposing risk factors for AMI. Among these factors, the following are related: Advanced age, alcohol consumption,

smoking, physical inactivity, systemic arterial hypertension, diabetes, dyslipidemia, and stress. Among these factors, there is a need to assess the severity of heart failure in post-infarction increasing its death potential.

In 1967, the classification proposed by Thomas Killip III and John T. Kimball was originally a bedside stratification, based on the physical examination of patients with probable AMI, to identify those most at risk of death and potential benefit with specialized management in coronary care units.⁵

Due to the high mortality rate, the patient diagnosed with AMI should be treated as a critical patient and liable to complications, even those who do not show signs of decompensation and heart failure and be referred to an Intensive Care Unit (ICU).

The ICU is a place that assists patients experiencing either acute or critical health condition, which requires permanent and specialized care. The unit has advanced equipment and technology, with trained and qualified human resources, in a continuous process of training and permanent education. It is an environment where nursing care must be sophisticated and complex, differentiated from other units of the institution, requiring from the nursing staff a differentiated workload for each severity assisted.⁶

It is worth mentioning that the care provided by the nursing team in an ICU has a high workload due to the clinical conditions of patients in the sector, which requires constant care and quick decision making.⁷

The Therapeutic Intervention Scoring System-28 (TISS-28) instrument is a tool that has been used widely, and its recognition is expanding worldwide. This tool is used to measure the nursing workload in the care of critically ill patients. Procedures performed by the patient are measured, where a single point in the TISS-28 corresponds to 10.6 minutes of assistance and direct care, in an 8-hour shift. So, it is concluded that a professional, on duty for 8 hours, can assist a patient with a maximum of 46 points.^{6,8}

Bearing in mind the problem raised, this study aimed to identify the nursing workload intended to address AMI according to the Killip Classification. The present research is justified by the need to improve the care provided to AMI, since the patient with such complications must be treated as a critical patient and subject to death, being the first research involving the Killip Classification and the TISS-28 score. This research intends to contribute to the academic and scientific community aiming to improve the care provided to patients diagnosed with AMI, then enabling a better survival to these patients.

METHODS

It is a field research with a quantitative, exploratory, descriptive, retrospective approach. Quantitative studies are based on statistical software, hypothesis tests, descriptive and multivariate statistics, through a continuous process in

which it seeks to identify dimensions, categories, trends, patterns and associations.⁹

The descriptive study exposes facts that are observed, registered, analyzed, classified, and interpreted, without the researcher involvement. Its method is the use of standardized data collection techniques. This kind of research does not intend to explain the phenomena it describes, although it serves as a basis for doing so. Therefore, in this type of investigation the researchers have practical intentions, as occurs with exploratory studies.¹⁰

The study was performed in a General Hospital from a countryside city of the *Rio de Janeiro* State, approximately 140 kilometers from the Capital, with an estimated population of 41 thousand inhabitants. Data collection took place from August to October 2017. There were evaluated a total of 200 medical records of patients who had a preliminary diagnosis of AMI and were hospitalized over the period from June 2015 to June 2017.

For the inclusion criteria were considered the hospitalized patients over 18 years old who had a preliminary diagnosis of AMI containing alterations in the biochemical markers over the first 24 hours.

Initially, patients were assessed and arranged according to the Killip and Kimball Classification. Such classification addresses that Killip I: No signs of decompensation and heart failure; Killip II: Presence of pulmonary crackles and/or presence of ventricular gallop in the third heart sound; Killip III: Presence of Acute Lung Edema; and, Killip IV: Cardiogenic Shock and/or Systemic Arterial Hypotension; Moreover, the TISS-28 score, where they were classified by the Cullen's proposition and then analyzed to identify the nursing workload.^{5,11}

After the arrangement according to Killip and Kimball, patients were classified according to the TISS-28 score that was developed in 1974 by David J. Cullen to measure the clinical classification of critically ill patients based on the quantification of medical and nursing therapeutic interventions. It is based on the premise that regardless of the diagnosis, the more procedures the patient has to go through, the greater the clinical severity of the disease. The study was originally done with 57 therapeutic interventions in 1974, then in 1983 it was reformulated and included 76 interventions. Only in 1996, it was simplified and started to contain 28 therapeutic interventions (TISS-28).¹²

The 28 variables are applied retrospectively and must be analyzed daily, to assess the patient's permanence in the last 24 hours, allowing access to the patient's evolutionary profile through the clinical severity classification. Although it can assist in the evolutionary evaluation of the patient's worsening, it should not be used for prognosis of life. In daily clinical practice, the association between death and the high score of the TISS-28 score has been observed in critically ill patients in the studied ICU.^{13,14}

The TISS-28 classifies patients into: Class I, from 0 to 20 points; Class II, from 20 to 35 points; class III, from 35 to 60

points; class IV, more than 60 points. The total TISS-28 score ranges from a minimum of zero to a maximum of 76 points and covers the following items, which are mutually exclusive: single intravenous and multiple intravenous medication; mechanical ventilation and supplementary ventilatory support; single vasoactive and multiple vasoactive medication and single and multiple ICU intervention. The result is that the higher score means a larger number of therapeutic interventions, higher patient's clinical severity and bigger need for hours of nursing care.¹⁵

The first 24 hours were established so that the results, concerning the nursing workload/clinical severity, are directly related to the AMI status, therefore, the exclusion method was applied to hours greater than 24 hours. Because they are exposed to experiencing complications, often not related to their initial condition, such as pressure injuries, hospital infections, various iatrogenic infections, which could alter the results of the research. Medical records that contain the diagnosis of AMI, but do not contain exams of biochemical markers, or that show changes in biochemical markers, but do not present a medical diagnosis of AMI, were also excluded.

The analysis of data regarding the calculation of the nursing workload classified the patient according to the Killip Classification and applied the TISS-28 score for each patient, determining which interventions they were subject. Then, the arithmetic mean of the TISS-28 points in each Killip category was calculated and multiplied by 10.6 minutes, which represents the working time of each TISS-28 in an 8-hour shift, multiplying the result by three (because it is a 24-hours evaluation), and finally we divided it by 60 minutes to get at the nursing working hours.

Data analysis was performed through the Bardin technique, using also statistical approach, averages and standard deviation for data interpretation.

The study complied with the formal requirements contained in the Resolution No. 466/12, which addresses that all research involving human beings must be submitted to the appraisal of an Ethics in Research Committee. This work was approved by the research ethics committee from the *Plataforma Brasil*, under the Legal Opinion No. 2.309.697.

RESULTS

The demographic and epidemiological data of the studied hospitalizations showed 142 (71.0%) males and 58 (29.0%) females, all residents of the same municipality of the studied hospital, with a predominance of the age group from 55 to 75 years old. All patients were admitted to the hospital's emergency room, 36 (18.0%) of whom were referred directly to the red room, without going through the risk classification room.

Among the studied patients who presented worsening in the clinical condition, were those of the Killip I and II classification, where 20 (10.0%) of these patients presented a

progressive evolution of the clinical condition in the 24 hours, from this sample, 50 (25.0%) progressed to Killip III and 150 (75%) to Killip IV. These patients were counted only once, being categorized, and counted within the highest Killip, as they present a higher risk of mortality. About the patients categorized as Killip III: 172 (86.0%) patients presented with Acute or Chronic Renal Insufficiency, which supported the clinical severity aforesaid.

Concerning drug prescriptions at the admission of patients found in this study: 58 (29.0%) patients were started only with drug treatment for gastrointestinal purposes, such as antiemetics and analgesics, and cardiovascular treatment was started, with the request for an electrocardiogram, hours later. On the other hand, 142 (71.0%) patients had specific drug treatment for infarction over the first three hours after admission.

According to **Table 1**, the proportions of patients assessed and categorized by the Killip Classification: 85 (42.5%) patients were categorized as Killip I and had an average of 18.55 TISS-28 score; 50 (25%) for Killip II, with 25.6 TISS-28

score; 35 (17.5%) for Killip III, with 29 TISS-28 score; and 30 (15.0%) for Killip IV, with 46 TISS-28 score.

Table 1 – Nursing Care workload by Killip category/TISS-28 for hospitalized patients due to AMI. Rio de Janeiro city, Rio de Janeiro State, Brazil, 2018

	Killip I	Killip II	Killip III	Killip IV
Results (%)	85 (42.5)	50 (25)	35 (17.5)	30 (15)
TISS-28 score	18.5	25.6	28.7	46
Standard deviation for TISS-28	2.5	3.2	3.0	3.4
Nursing Care workload	9.8	13.6	15.2	24.4
Standard deviation for workload	1.3	1.7	1.6	1.8

Based on the data, it was possible to trace the nursing workload progression line among the Killip categories addressing the health care needs. It was achieved by considering the therapeutic interventions in which the patients of each Killip were subject.

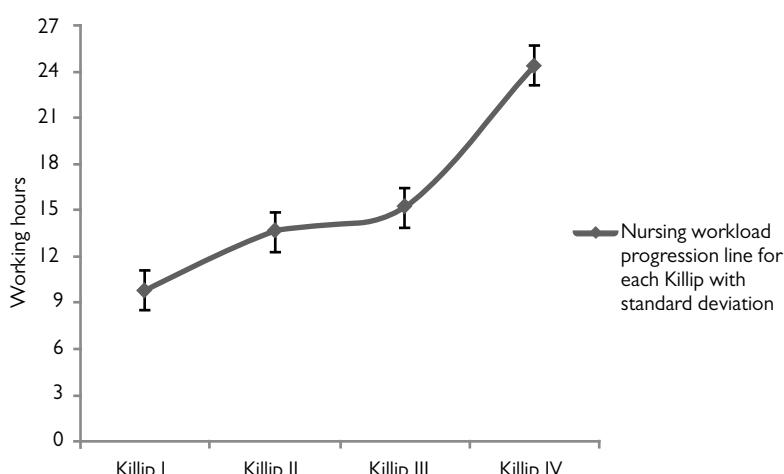


Figure 1 – Nursing workload progression line calculated for each Killip category/TISS-28. Rio de Janeiro city, Rio de Janeiro State, Brazil, 2018

According to the data presented in **Figure 1**, they showed the difference in nursing care provided to the different Killip categories, using the TISS-28 classification, being highlighted in nursing working hours, consequently, the need for continuous and specialized nursing care. Since they are critical patients, the results prove the extensive nursing workload intended to patients diagnosed with AMI so that they receive all the interventions necessary for their comorbidity. We highlight then: 9.82 hours for Killip I; 13.6 hours for Killip II; 15.22 hours for Killip III; and 24.38 hours for Killip IV.

Given the information acquired during the data collection, we also show that the difference in the total number of Killip I 85 patients (100%) who had 18 TISS-28 score corresponding to 21.2% of the patients who were undergoing supplementary ventilatory support, nevertheless, 10 (55.5%) of these patients were offered this support without complaints of dyspnea; they did not use

vasoactive amines; diuretics were used in 15 (17.6%) of the patients to control blood pressure.

Between Killip II (50 patients) and Killip III (35 patients), there was a small difference in the average hours of nursing care, but what differentiated them in their therapeutic interventions was related to supplementary ventilatory support, where the use of physiotherapy and tracheal aspiration were present in all Killip III patients, while only 9 (18.0%) in Killip II used this intervention. Cardiovascular support, where the use of a single vasoactive drug was introduced in therapies of 10 (28.5%) of the Killip III patients and none of the Killip II patients; Renal support, hemodialysis, and dialysis techniques were used in 28 (80.0%) Killip III patients and no Killip II patients. Regarding the Metabolic Support, the treatment of acidosis/alkalosis was initiated in 15 (42.8%) of the Killip III patients and none of the Killip II patients.

Concerning the Killip IV patients (30 patients), TISS-28 nursing care related to basic activities was common, except

for care with drains, as there were no interventions related to it, all patients presented all interventions related to support ventilatory, use of multiple vasoactive amines and volume replacement; 03 (10.0%) progressed to cardiorespiratory arrest, then requiring cardiopulmonary resuscitation.

DISCUSSION

This study addresses the difference in nursing workload while providing care for hospitalized patients diagnosed with Acute Myocardial Infarction (AMI), differentiating them by categorization based on the Killip Classification, which were measured by an instrument of therapeutic interventions (TISS-28).

Among the demographic descriptive aspects of the studied population, there was a predominance of males, as revealed in other studies addressing AMI, showing the male population propensity towards this problem, also revealing a need for interventions aimed at prevention primary for this population.^{2,3}

The Killip Classification, widely used in emergency care in cardiology, is one of the factors that allows presuming the cardiopulmonary clinical status, and specialized management for coronary care units. As expected, it showed a significant difference in the nursing workload when compared to the Killip I, II, III, and IV categories.⁵

Herein, as well as in the study on the validation of the Killip and Kimbal classification, it showed a greater number of patients classified in the category I of the Killip Classification, (without signs of decompensation and heart failure), however, it is noteworthy that registered nurses must have a critical view on the progression of the disease, since, in this study, a group of patients Killip I and Killip II - categories that had less workload - developed complications and, consequently, progressed in the category of Killip Classification, with workload much larger than needed.⁵

This research data shows the importance of the holistic assessment of registered nurses in the face of patients diagnosed with AMI, especially in the first 24 hours of hospitalization, where complications occurred in hemodynamically stable patients, to the point of progressing to cardiogenic shock or a Cardiorespiratory Arrest.

Considering the Killip III patients, most of whom presented comorbidities relevant to the progression of the patient's clinical case, requiring other studies to be carried out to verify the true correlation between the clinical manifestation of infarction, which places him in category III of the classification of Killip, and also the kidney disease presented by the patients.

For the categorization of patients according to the Killip Classification, pronounced difficulty was found due to the lack of semiology and semi-technical reports, mainly from nursing, especially for the categorization of Killip II patients, who only need the semiology for classification.

With regard to the results obtained on the nursing workload: we used TISS-28 to measure the nursing working hours intended to patients diagnosed with AMI, according to the complexity that the disease can cause and the interventions that the patients were subject, thus, a comparison of the patients that present minor or major complexities. Interestingly, the patients with Killip I classification presented nursing workload of 9.8 and patients classified as Killip IV, the workload increases significantly to 24.4. Such findings reinforce the evidence of the studies, where the greater the degree of complexity of the infarcted patient, the greater the need for the workload demand in nursing care, then showing that such patients need adequate time and personnel to carry out all the interventions that are necessary for them.

This research is in agreement with a recent study concerning the limitations of the instrument of therapeutic interventions in relation to direct nursing care. Among them, the need to validate the instrument in multinational groups, which would increase its reliability; another relevant point is the fact that the TISS-28 does not consider other essential activities and direct nursing care, such as hygiene, support and care procedures for families, in addition to the managerial and administrative tasks, which are part of the routine service and demand time from the whole nursing team.⁷

In another work, where both Nursing Activities Score (NAS) and TISS-28 scores were applied to estimate the nursing workload in a Pediatric Intensive Care Unit, it speculates exactly the insufficient score related to basic needs in order to supplant the interventions of TISS-28. It is worth emphasizing the importance of TISS-28 for measuring nursing workload and can function as a facilitator in the clinical practice of registered nurses.¹²

The reduction in time between the onset of AMI and myocardial revascularization influences and might lead to adverse outcomes. Nonetheless, few patients that are victims of AMI take unnecessary time until seeking help and initiating proven effective therapies, which can cause a mortality risk up to twice as high compared to those who seek specialized care immediately at the beginning of symptoms.^{16,17}

CONCLUSIONS

This study addresses the difference in nursing workload while providing care for hospitalized patients diagnosed with Acute Myocardial Infarction (AMI), differentiating them by categorization based on the Killip Classification, which were measured by an instrument of therapeutic interventions (TISS-28). So, this work was able to present the necessary workloads of nursing care to be adopted aiming to meet its demand and also to achieve standard nursing care.

The following hours were defined as the average workload required for patients diagnosed with AMI classified as Killip I 9.8 hours; Killip II 13.6 hours; Killip III 15.2 hours; and Killip IV 24.4 hours of nursing care. Hence, evidencing

the need for higher nursing workload according to the patient's health complexity level.

The results have indicated important contributions, as it has allowed us to analyze and verify the demand for nursing care and ponder upon the nursing workload concerning hospitalized patients diagnosed with AMI.

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