Relationship between type 2 diabetes mellitus, postural balance, and the risk of falls in older adults

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ABSTRACT

Older adults with diabetes mellitus have reduced muscle mass, which increases their risk of falls and, consequently, their fear of falling. The aim of this study is to conduct an integrative literature review to analyze the relationship between type 2 diabetes mellitus, postural balance, and the risk of falls in older adults. The PubMed, Scopus, LILACS, and SciELO databases were consulted using the terms "Type 2 Diabetes Mellitus," "postural balance," "falls," "elderly," and "balance and elderly"; "balance and elderly and falls"; "balance and elderly and falls and diabetes mellitus." The inclusion criteria defined for the selection of articles were articles published in Portuguese and English, full-text articles that addressed the theme of the integrative review, and articles published and indexed in the aforementioned databases. Older adults with type 2 diabetes have a greater fear and risk of falls and postural balance problems, especially those who use insulin or other medications.

Keywords: Elderly, diabetes mellitus, postural balance, falls.

INTRODUCTION

According to Alshammari et al. (2014), with the aging process, postural balance deteriorates due to multiple declines and a high incidence of diseases common to this process, a factor in the high risk of balance impairment and gait disorders. Sensory deficits in the lower extremities, peripheral neuropathy, visual impairment, and vestibular impairment significantly influence inadequate postural control in the elderly. In individuals with diabetes, the consequences are worse. (REIS; REIS; TORRES, 2015, YANASE et al, 2018; MALTA et al., 2019, RINKEL et al., 2019).

The elderly with diabetes mellitus (DM) have reduced muscle mass, among other things, and are at greater risk of falls, thus increasing the fear of falling ( ). Elderly people with diabetic polyneuropathy (DP) have worse static

balance patterns with their eyes closed compared to patients who have DM but not DP. Closely related to posture and gait, falls are often the result of acquired morbidities. (PALMA et al., 2013, PINHEIRO, VILAÇA, CARVALHO 2015; CANUTO et al, 2020)

Given this problem, does type 2 diabetes mellitus affect postural balance more and increase the risk of falls in older adults? Therefore, the objective of this study is to conduct an integrative literature review that can analyze the relationship between type 2 diabetes mellitus, postural balance, and the risk of falls in older adults.

METHODOLOGY

To conduct this integrative review, the following steps were taken: formulation of the research question, selection of databases, definition of inclusion and exclusion criteria, and consultation of the PubMed, LILACS, and SciELO databases were consulted using the terms "Type 2 Diabetes Mellitus," "postural balance," "falls," "elderly," and "balance and elderly"; "balance and elderly and falls"; "balance and elderly and falls and diabetes mellitus." The inclusion criteria defined for the selection of articles were: articles published in Portuguese and English between 2014 and 2020, full articles that addressed the theme related to the integrative review, and articles published and indexed in the aforementioned databases. The research took place from September 2023 to February 2024. Studies that did not directly address this thematic relationship were excluded.

RESULTS

STUDY SELECTION

Two authors (JFFF and DYSO) were responsible for reading the titles and abstracts of all articles, subsequently analyzing any discrepancies in the selection of articles. All types of studies were included, except case reports that identified an association between diabetes mellitus, postural balance, and risk of falls in older adults. Only studies conducted in a community- y population aged 60 years or older were selected. Subsequently, the articles were read in

full by the two authors who performed the selection in the first stage. An eligibility form was developed for the final selection of articles. The two authors (JFFF and DYSO) read the articles and analyzed any discrepancies in the selection, and the decision to keep or exclude these articles from the study was made with the help of the other authors (BAPFO, JMPS, DAAPO). For data extraction, a table was created containing: study database, study identification information, study design, mean age of participants, definition and risk factors for diabetes, and falls, postural balance, and identification of falls.

RESULTS

Below we describe the keywords and the number of records in the respective databases consulted by the authors.

PUBMED: "balance and elderly"= 1300; "balance and elderly and falls" = 826; "balance and elderly and falls and diabetes mellitus" = 19. **LILACS:** "balance and elderly" = 545; "balance and elderly and falls" = 250; "balance and elderly and falls and diabetes mellitus" = 100. **SCIELO:** "balance and elderly = 132; "balance and elderly and falls" =2; "balance and elderly and falls and diabetes mellitus"= 132. **TOTAL:** 3,206 articles

SCREENING AND INCLUSION OF THE STUDY.

- Studies identified through database search = 3,306; Pubmed = 2,145; Lilacs = 895;
- After removal of duplicate studies and abstracts = 1,506
- Studies selected = 1,800
  - Articles excluded = 1,715
  - Falls not mentioned = 850; no relationship between postural balance, falls, and diabetes = 375; did not include population aged 60 years and older = 331; publication more than 10 years ago = 91; editorials, case reports, letters to the editor = 68
- Articles evaluated for eligibility = 85

- Articles evaluated in full and excluded, with reasons = 77
- Articles selected for descriptive analysis n= 8

DISCUSS

The findings of this review indicate that type 2 diabetes mellitus (T2DM) is strongly associated with postural instability and an increased risk of falls in older adults due to multiple factors that affect postural balance. Peripheral neuropathy, sarcopenia, and frailty emerge as the main mechanisms underlying this association. Neuropathy leads to decreased proprioception and impaired postural reflexes, while sarcopenia reduces the muscle strength necessary for maintaining balance. In addition, inadequate glycemic control can aggravate these conditions, further increasing the risk of falls. Interventions should therefore focus not only on glycemic control but also on physical rehabilitation programs aimed at improving balance and muscle strength. (NUGRAHA, 2024; CHAPMAN et al., 2017, RASHEDI et al., (2019) SARODNIK (2018)

CONCLUSION

Older adults with type 2 diabetes have a greater fear and risk of falls and postural balance problems, especially those who use insulin or other medications. This is related to complications of the disease they suffer, such as diabetic neuropathy, decreased sensory and motor skills, and decreased cognitive function.

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