FACTORS ASSOCIATED WITH THE PRACTICE OF PHYSICAL ACTIVITY IN OLDER DIABETIC PRIMARY CARE PATIENTS

Fatores associados à prática de atividade física de idosos diabéticos da atenção básica

Renata Muniz Freire Vinhal Siqueira Jardim, Márcia Carréra Campos Leal, Ana Paula de Oliveira Marques, Laís Sousa Barbosa, Mikaella Carla de França Cavalcanti, Fernanda Mirela Amaral Gomes

OBJECTIVE: To evaluate the scientific knowledge produced in relation to the factors associated to the practice of physical activity of older diabetic primary care patients in Brazil. METHODS: It involved an on-line research including original articles published between October 2008 and September 2018 in Portuguese, English, and Spanish, from the databases: Medline, Lilacs and Scopus. The keywords used were elderly, diabetes mellitus, exercise, and primary health care. The methodological quality of the articles was evaluated by means of two instruments: Critical Appraisal Skills Programme and Hierarchy of Evidence for Intervention Studies. After analysis, four articles were included. RESULTS: No articles were found with samples consisting only of older people, and only one of them made an exclusive analysis for this age group. There is a need for studies addressing the older diabetic individuals, due to the specificities of this population. None of the articles made use of instruments for physical activity evaluation. CONCLUSION: The practice of physical activity was associated to an improvement in quality of life, self-care, and adherence to treatment for diabetes mellitus, highlighting the importance of professional counseling. Factors such as frequency and type of physical activity were not verified in the studies, which highlights the need for the use of instruments for this evaluation. KEYWORDS: elderly; diabetes mellitus; exercise; primary health care.

RESUMO

OBJETIVO: Avaliar o conhecimento científico produzido em relação aos fatores associados à prática de atividade física de idosos diabéticos assistidos na atenção primária à saúde no Brasil. MÉTODOS: Trata-se de uma revisão integrativa, e a busca por estudos ocorreu de forma on-line, sendo incluídos artigos originais da língua portuguesa, inglesa ou espanhola, publicados de outubro de 2008 a setembro de 2018, nas bases de dados Medical Literature and Retrieval System Online (MEDLINE), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) e Scopus. Os descritores utilizados foram: idosos, diabetes mellitus, exercícios e atenção primária à saúde. A qualidade metodológica dos artigos foi avaliada por meio de dois instrumentos: Critical Appraisal Skills Programme e Hierarchy of Evidence for Intervention Studies. Após análise, quatro artigos foram incluídos. RESULTADOS: Não foram encontrados artigos com amostras constituídas apenas de idosos, e somente um deles fazia uma análise diferenciada para essa faixa etária, chamando atenção para a necessidade de estudos abordando idosos diabéticos, por causa das especificidades desses indivíduos. Nenhum dos artigos fez uso de instrumentos para avaliação da atividade física. CONCLUSÃO: A prática da atividade física esteve associada à melhora da qualidade de vida, do autocuidado e da adesão ao tratamento do diabetes melitus, evidenciando a importância do aconselhamento dessa prática por meio dos profissionais de saúde. Fatores como frequência e tipo da prática de atividade física não foram verificados nos estudos, o que destaca a necessidade do uso de instrumentos para a sua avaliação. PALAVRAS-CHAVE: idosos; diabetes mellitus; exercício; atenção primária à saúde.
INTRODUCTION

Population aging is a worldwide reality that, combined with new habits and lifestyle, such as physical inactivity and changes in nutritional patterns, contributes to the increased incidence of chronic noncommunicable diseases (NCDs), such as diabetes mellitus (DM). According to the Brazilian Society of Diabetes (BSD), there were over 14 million people with the disease in 2015 in Brazil.4

The presence of DM is related to multiple factors such as genetic load, overweight, and advanced age.1 Without cure, this pathology can lead to serious consequences, such as cardiovascular and cerebrovascular diseases, blindness, renal failure, and non-traumatic lower limb amputations.4 However, it is possible to have a good quality of life (QoL), even in the presence of DM, by adhering to drug treatment and preventive actions, such as nutritional control and physical activity (PA).4,5

Non-pharmacological prevention measures for type 2 DM (DM 2) should be implemented in all patients, regardless of age, and possibly associated with pharmacological therapies, when a higher risk of developing the disease is presumed or identified.4 Lifestyle change is proven to be an impact factor in diabetes prevention, and longitudinal studies have already shown a reduction in its incidence after the adoption of healthy lifestyles.6,7

In 2015, around 12 million primary health care (PHC) services were provided to individuals with DM.8 The main health action focused on the follow-up of individuals with DM in Brazil is the System for Registration and Follow-up of Hypertensive and Diabetic Patients (HIPERDIA), which, since 2002, allows the epidemiological profile of hypertension and DM in the population to be known, in addition to serving as a basis for the creation of intervention strategies.9

DM-related hospitalizations consume a significant portion of health resources and lead to a high mortality rate in Brazil, especially in the age group of 60 years or older.4 Complications of DM can be avoided through timely and quality primary care guidelines, reducing the need for hospitalizations.1,2 Preventive health actions, such as counseling and monitoring the practice of PA, are still little studied in PHC in Brazil.10

Although the practice of PA is one of the most important strategies for the promotion, prevention, and rehabilitation of the health of older adults, physical inactivity in this population reaches rates of 31 to 63% in Brazil.11-14 Despite the existence of national programs that stimulate the practice of PA, additional investments are still needed to improve the adherence to the practice in this population.15-17

In addition to being one of the foundations of healthy aging,18 being physically active has numerous benefits recognized in the literature, such as reduced body weight and improved QoL, in addition to having action on insulin resistance, which is particularly favorable to diabetic individuals, influencing self-perception of health and well-being.4,5 Specifically in older diabetic individuals, apart from all the benefits mentioned, PA helps maintain lean mass, alleviating the effects of sarcopenia.4

Considering the importance of the practice of PA in the adoption of healthy living habits, inserted in the health pillar of active aging,19 and the role of PA in the prevention and control of DM, it is justified to seek evidence that points to factors associated with the practice of PA in the older diabetic population assisted in PHC in Brazil. Studies such as the present one enables the dissemination of the knowledge produced on the subject, generating scientific support to professionals and consequent improvement in the care offered to older adults.

OBJECTIVE

This study aimed to evaluate the scientific knowledge produced regarding the factors associated with the practice of PA by older diabetic patients assisted in the PHC in Brazil. To that end, the following aspects were investigated: sociodemographic profile of participants and published knowledge about the practice of PA by them, the role of PA in promoting healthy living habits, and the provision and structuring of specific actions for this population and their interference in prevention and control of DM.

METHODS

This is an integrative literature review. The integrative review method was used for the design of the study, as it provides the synthesis of knowledge on a given theme and the incorporation of the applicability of the results in practice, besides allowing the identification of gaps in the literature on the theme explored.19,20

The stages of construction of the review were: definition of the theme and formulation of the guiding question; choice of electronic databases used in the research; establishment of inclusion and exclusion criteria; definition of the descriptors; pre-selection of the articles; evaluation of pre-selected studies and selection of studies included in the review; interpretation of results and presentation of the integrative review.
The data collection period took place from July to October 2018, with the following guiding question: What are the scientific evidences that describe the factors associated with the practice of PA by older diabetic patients assisted in PHC in Brazil?

Regarding eligibility, primary empirical research published in peer-reviewed journals exclusively in Portuguese, English, or Spanish were considered, which included (fully or partially) people aged 60 years or older, with DM, assisted in PHC in Brazil, and which addressed directly or indirectly the practice of PA. To be eligible, the articles should have been published in the last 10 years (2008–2018), in order to ensure contemporary findings. The search strategy was applied in the following databases: Latin American Health Sciences Literature (LILACS), Medical Literature and Retrieval System Online (MEDLINE), and Scopus (Elsevier). Works that did not include the established theme were excluded.

The search for articles was performed in pairs by 2 authors of the article, in October 2018, and considered the following descriptors, indexed in the Health Science Descriptors (DeCS) and the Medical Subject Headings (MeSH): elderly, aged 80 years or more, DM, Type 2 DM, exercise, and PHC, which were combined through Boolean operators (AND and OR). The following search strategies were used:

- for MEDLINE: (aged[MeSH Terms] OR “aged, 80 and over”[MeSH Terms]) AND (“diabetes mellitus”[MeSH Terms] OR “diabetes mellitus, type 2”[MeSH Terms]) AND (exercise) AND (“primary health care”);
- For LILACS: (tw:(Aged OR “Aged, 80 and over”)) AND (tw: (“Diabetes Mellitus” OR “Diabetes Mellitus, type 2”)) AND (tw: (Exercise)) AND (tw: (“Primary Health Care”)). For the Scopus database: (Aged OR “Aged, 80 and over”) AND (“Diabetes mellitus” OR “Diabetes Mellitus, type 2”) AND (Exercise) AND (“Primary Health Care”).

After careful reading of the title and abstract, four articles were selected, all available for full reading. With complete reading, the articles selected for review were evaluated by two instruments. The first was adapted from the Critical Appraisal Skills Programme (CASP), part of the Public Health Resource Unit (PHRU), developed by the University of Oxford.21

The second instrument corresponded to the Hierarchy of Evidence for Intervention Studies (HEIS), which classifies the quality of evidence into seven levels:

- systematic review or meta-analysis;
- randomized clinical trials;
- clinical trial without randomization;
- cohort and case control studies;
- systematic review of descriptive and qualitative studies;
- single descriptive or qualitative study;
- authority opinion and/or specialty committee report.22

The CASP was elected because of the proposal of objective, systematic, and easy to understand analysis proposal. This instrument contains 10 items (totaling 10 points), comprising:

- objective;
- methodological adequacy;
- presentation of theoretical and methodological procedures;
- sample selection;
- procedure for data collection;
- relationship between the researcher and those surveyed;
- consideration of ethical aspects;
- procedure for data analysis;
- presentation of results;
- importance of research.

The articles were classified according to the following scores:

- from 6 to 10 points: good methodological quality and reduced bias;
- from 0 to 5 points: satisfactory methodological quality, but with increased risk of bias.

Regarding the evaluation with HEIS, based on the eligibility criteria, only studies with evidence levels II, III, IV and VI were considered.

For the analysis of the articles, the descriptive method was used, according to the data collection instrument, which made it possible to evaluate the following characteristics of each research: authorship, journal, language, research design, and year of publication.

RESULTS

According to the established criteria, the search was performed, and the sample consisted of four articles. The selection and exclusion according to each database are represented in Figure 1. In the MEDLINE database 127 articles were found, of which 91 were published in the delimited period of the search. Only two were selected for reading, since 89 were international articles and/or whose sample did not cover PHC patients in Brazil.

At LILACS, six studies were found after combining the descriptors, all in accordance with the chronology of interest,
but only two papers were selected after excluding two international papers and two dissertations.

Finally, in the Scopus database, of the 250 articles found, 172 were from publications between 2008 and 2018. Of these, 168 were international studies and/or whose sample was not composed of those assisted by PHC in Brazil, leaving, therefore, four articles. However, these were duplicates, i.e., the same studies found in MEDLINE and LILACS.

No articles were excluded after the application of the instruments. The CASP score was equal to or greater than six in all selected articles, and the four studies were of the same level of evidence according to the HEIS instrument. The classification of the articles by the instruments found is verified in Table 1.

During the period of publication contemplated, which was from October 2008 to September 2018, we observed that the articles that met the established criteria were published from 2014 to 2017 in three national and one international journal. Table 1 provides a summary of the articles, according to the title, journal, authorship, objectives, methodology, main results, and year of publication.

All the articles contained older people in the sample, but none of them was a study whose population was composed exclusively of older individuals. Two of the articles analyzed individuals with systemic arterial hypertension (SAH) and DM.

Among the articles elected, only one had the practice of PA in older diabetic primary care patients as the central theme, but all answered the main question, providing data on factors associated with the practice of PA of the population studied. Although the practice of PA was not the central theme of most studies, common points were observed to all of them that could influence this practice, such as some sociodemographic aspects and the recommendation of PA by health professionals.

Only one article classified the practice of PA in the population studied according to type and duration, and another

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**Table 1** Classification of articles according to the instruments: Critical Appraisal Skills Programme (CASP) and Hierarchy of Evidence for Intervention Studies (HEIS).

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Articles (Author, year)</th>
<th>CASP</th>
<th>HEIS</th>
</tr>
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<tbody>
<tr>
<td>Mendes, 2014</td>
<td>6</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>Silva, 2016</td>
<td>7</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>Barbosa, 2017</td>
<td>9</td>
<td>VI</td>
<td></td>
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<tr>
<td>Corrêa, 2017</td>
<td>8</td>
<td>VI</td>
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### Box 1 Identification of articles according to title, author(s), objective(s), methodology, main results, year of publication.

<table>
<thead>
<tr>
<th>Title of the article/Title of Journal</th>
<th>Author(s)</th>
<th>Objective(s)</th>
<th>Methodology</th>
<th>Main results</th>
<th>Year</th>
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<tr>
<td>&quot;Correlates of physical activity counseling by health providers to patients with diabetes and hypertension treated at the Family Health Strategy in the state of Pernambuco, Brazil&quot;</td>
<td>Barbosa et al.</td>
<td>To study physical activity counseling by health professionals for individuals with DM and SAH assisted at the FHS in the state of Pernambuco, Brazil and the practice of leisure-time PA by these individuals.</td>
<td>Analytical cross-sectional study conducted based on data from 785 hypertensive patients and 822 diabetic patients from the epidemiological study 'Evaluation of Health Services for Diabetic and Hypertensive Subjects' (SERVIDIAH). Counseling and practice of physical activity were related to sociodemographic and clinical variables using multiple logistic regressions.</td>
<td>Of the individuals surveyed, 50% received physical activity counseling. This counseling was related to obesity or overweight in both groups and in diabetic individuals with associated SAH. Physical activity counseling was less directed to older diabetic patients, especially those over 75 years. Leisure-time PA was reported by one-third of individuals in both groups and these individuals were more likely to receive physical activity counseling. Individuals aged 60–74 years were more likely to engage in leisure-time physical activity than other age groups. Individuals living in middle-sized municipalities received more physical activity counseling and were more likely to engage in physical activity during leisure time.</td>
<td>2017</td>
</tr>
<tr>
<td>&quot;Quality of life and characteristics of diabetic patients&quot;</td>
<td>Corrêa et al.</td>
<td>To evaluate the association between quality of life and clinical and sociodemographic variables in type 2 diabetic patients, after the onset of treatment in primary and specialized care in the city of Piracicaba, state of São Paulo</td>
<td>Analytical cross-sectional study with a sample of 385 diabetic patients from PHC and 385 from specialized care. Quality of life was investigated using the Quality of Life Measure Brasil. A bivariate analysis was performed by the ( \chi^2 ) test, and then the multiple logistic regression analysis, which investigated the sociodemographic and clinical variables among groups (including physical activity practice).</td>
<td>In specialized care, the worst quality of life was related to not practicing physical activity and to the time of diagnosis of DM less than or equal to 13 years. In primary care, the worst quality of life was related to women, glycated hemoglobin higher than 7%, and to individuals who followed a diet.</td>
<td>2017</td>
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Brazil in the last 10 years. The four articles found address the importance of PA in the prevention and treatment for DM, but only 1 of them has this practice as a central theme. However, it was possible to perform a critical analysis of the main thematic axes that are related to the proposed goal.

**Sociodemographic aspects**

The samples from the studies analyzed were mostly composed of older individuals, but all of them also included adults. It is common for the presence of older people to be significant in the health services, with the increase in life expectancy and the consequent growth of comorbidities in this population.

**DISCUSSION**

Literature is scarce in articles that address the practice of PA in older diabetic patients attending PHC services in Brazil in the last 10 years. The four articles found address the importance of PA in the prevention and treatment for DM, but only 1 of them has this practice as a central theme. However, it was possible to perform a critical analysis of the main thematic axes that are related to the proposed goal.

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**Table: Continuation**

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<th>Title of the article/Title of Journal</th>
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<tbody>
<tr>
<td>“Rational use of medicines by individuals with diabetes mellitus and hypertension in the city of Rio de Janeiro, Brazil”</td>
<td>Mendes et al.</td>
<td>To analyze the rational use of medications from the perspective of adherence to treatment, self-medication, and home-drug care, considering hypertensive and diabetic patients attending primary care units (PCU) in the city of Rio de Janeiro, state of Rio de Janeiro, Brazil, in 2009.</td>
<td>Analytical cross-sectional study using data from the Home Remedy program (RECSA) in the city of Rio de Janeiro. A total of 139 patients over 18 years with DM and / or SAH were investigated regarding the rational use of medications (RUM), which was related to sociodemographic variables, self-rated health and indication of healthy habits (diet and physical activity counseling by the health professional).</td>
<td>Adherence, lower self-medication, and improvement in drug care were associated with patients receiving diet and physical exercise counseling from their physicians.</td>
<td>2014</td>
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<tr>
<td>“Use of health services by diabetics with private health insurance compared to users of the Brazilian Unified National Health System in Belo Horizonte, Minas Gerais State, Brazil”</td>
<td>Silva et al.</td>
<td>To compare indicators of health service use and health behaviors among individuals who know they have DM and are affiliated with private health plans in relation to their peers who use the public health system.</td>
<td>Analytical cross-sectional study that used data from the Second Adult Health Survey of the Metropolitan Region of Belo Horizonte. They were divided into: private health plan members, covered by the FHS and covered by traditional PCU (370 participants), aged 45 or older, with DM. Attributes and indicators of primary health care (PHC) and health behaviors (including physical activity) were compared among the groups.</td>
<td>The performance of the PHC attributes was better among the affiliated with private health plans, especially regarding the first contact and access. In addition, regular physical activity practice was significantly higher in this group.</td>
<td>2016</td>
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DM: diabetes mellitus; SAH: systemic arterial hypertension; FHS: Family Health Strategy; PA: physical activity; PHC: primary health care.
Despite the specificities of the older population, none of the studies had a sample exclusively of people aged 60 and over. Only 1 article separated individuals by age group, with a specific analysis for groups of individuals aged 60–74 and 75 years or older.10

Published studies27–29 that specifically addressed older diabetic individuals showed results that may better represent this population, due to typical aging chances, such as molecular and cellular damage, which lead to the gradual loss of physiological reserves, culminating in functional decline and increased susceptibility to illness.3

The predominance of women among PHC users occurred in all studies.10,23-25 Women are more present in health services, either because they tend to be more self-caring,30 or because they have more comorbidities than men as they get older.28 In the study by Corrêa et al., the worst QoL in primary care was related, among other factors, to women.23 This finding draws attention to a reflection, already present in literature for some years, about the role of women in society, given the burden of work and family care responsibilities, which may lead them to leave aside healthy habits, such as the practice of PA.31,32

Regarding schooling, the articles took different approaches: two checked the level of education in years, with most individuals reporting less than 8 years of schooling,23,25 and 1 checked only formal schooling, with a yes or no answer, with most individuals answering yes.10

Diabetes mellitus in primary care

PHC has a major impact on DM, including health promotion and prevention, diagnosis, treatment, and follow-up, and even the treatment for complications.31 The studies analyzed addressed some aspects related to the care provided in PHC, such as access, comprehensiveness, user satisfaction, and adherence to treatment.10,23-25

Two studies included individuals with SAH in their sample, besides those with DM.10,24 These 2 conditions are often addressed together in the literature because they are strongly related and often present at the same time,14 but joint analysis may lead to bias, due to the specificities of each condition.

The analysis of the studies draws attention to the promotion of the practice of PA as a function of PHC, linking this practice to other factors, such as adherence to treatment, health education, access to consultations, and QoL.23-25 The importance of promoting the practice of PA for the older population is internationally recognized in studies that demonstrate its impact on the treatment for DM and cardiovascular diseases, on reducing the prevalence of obesity, on changing living habits, and on preventing diseases.35-37

Mendes et al. analyzed the adherence to drug treatment for diabetic and hypertensive PHC users. The continuity of care and medical recommendation of PA and diet practices were related to improved adherence, which positively highlights the role of PHC in the control of NCDs. However, in this study, adherence was lower among individuals with DM.24

The study by Silva et al. identified two challenges for the Brazilian Unified Health System (SUS) in the treatment of patients with DM in the city of Belo Horizonte (MG): more effective actions to promote PA and reorganization to improve PHC performance, especially regarding access to medical appointments. Compared to PHC in private health plans, the performance of public services was worse in the quality attributes analyzed, and the practice of PA was lower among users.25

Barbosa et al. emphasize the importance of the Family Health Strategy (FHS) in controlling DM and SAH, highlighting the action of PA counseling.10 In this study, medium-sized municipalities had better rates of PA counseling by health professionals and of leisure-time PA practice. These municipalities had a higher capacity of human and financial resources compared to small municipalities and a population with a less busy lifestyle and more prone to the practice of PA compared to larger municipalities, which may have impacted on good PA performance.

Another impact factor of PHC on DM is health education, which was highlighted by Corrêa et al.23 Performed in an instrumental, multidisciplinary, and daily manner, health education demonstrated impact on the QoL of diabetic individuals.

Physical activity counseling

Physical activity counseling by health professionals was an approach present in 3 of the 4 articles.10,24,25 Unlike international studies in which professionals expressly recommend the practice of PA regardless of age, in Brazil this counseling is still little acknowledged for the older population.10,38,39

The continuity of care in PHC was strongly related to PA counseling by health professionals in the study by Mendes et al. Patients who received counseling on diet and PA showed greater adherence to drug treatment, lower self-medication rate, and better care with home administration of drugs.24

Counseling on healthy habits (including PA) was investigated in the study by Silva et al. among PHC users of private and public health services.25 The proportion was high in all groups (over 89% of users), and this variable was not related to other factors.

Barbosa et al. found that the older population of municipalities in the state of Pernambuco was less likely
to receive PA practice counseling from health professionals than adults.\textsuperscript{19} PA counseling seemed to be restricted to overweight individuals and/or with cardiovascular risk factors, when it should be extended to the entire population analyzed, since they were patients with DM and/or SAH.

**Physical activity practice**

The practice of PA was a variable investigated in 3 of the 4 selected studies.\textsuperscript{10,23,25} Even though it was the main theme in only 1 article,\textsuperscript{10} PA was addressed as a method of prevention and treatment for DM in all studies. As this is an important modifiable factor for disease follow-up,\textsuperscript{4} studies with the theme of PA in older diabetic individuals are relevant to investigate the specific effects of this practice.

None of the studies used instruments to classify the level of PA of individuals. Only one of them classified PA according to type and duration,\textsuperscript{10} and another classified it only according to duration.\textsuperscript{24} The use of instruments to classify PA is important because it enables the quantification of this practice and facilitates the reevaluation of the individual.\textsuperscript{40,41} Moreover, in specific groups, such as patients with DM, it is important to know the type and intensity of PA. The American Diabetes Association (ADA) and the BSD recommend these individuals to practice moderate-intensity PA, totaling at least 150 minutes per week, divided into 3 times a week.\textsuperscript{4,42}

Silva et al. compared regular leisure-time PA among PHC users of private and public health care (FHS and primary care unit — PCU) in Belo Horizonte.\textsuperscript{25} Physical activity was considered regular for 30 minutes daily, at least three times a week. This practice was significantly higher among members of private health plans, highlighting the need for actions to promote healthy living habits in public health services.

In the comparison by age in the study by Barbosa et al., the older adults aged 60 to 74 years were more physically active than individuals of other age groups,\textsuperscript{10} however the percentage of older diabetic individuals who practiced leisure-time PA was lower than that of older hypertensive individuals. The most significant PA practice in young aging adults may be related to the phenomenon of more recent retirement, which draws attention to the need for continued stimulation of healthy living habits for all individuals, even as age progresses. The need to encourage the practice of PA among patients with DM is also highlighted.

In the study by Corrêa et al. neither type nor frequency of PA were taken into account to evaluate the practice of PA, which may have led to an interpretation bias of the interviewees.\textsuperscript{21} There was no difference in QoL between individuals who reported performing PA and those who did not.

**CONCLUSION**

Few articles covering the proposed theme were found, which supports the need for future studies that address the practice of PA by older diabetic individuals. However, even with the small number of studies exploring the theme, some relevant aspects can be punctuated.

The practice of PA was related to the improvement of QoL, self-care, and adherence to DM treatment, highlighting the importance of the culture of PA counseling by health professionals.

Finally, none of the articles used instruments to quantify and classify PA practice. As an important modifiable factor for the treatment and prevention of DM in older individuals, the instrumentation of the evaluation of PA is essential to adjust factors such as quantity and type of practice.\textsuperscript{40}

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