Original article

Osteoarthritis among elderly: cross-sectional study of hospitalization between 2010 and 2022

Osteoartrite em idosos: estudo transversal de internações hospitalares entre 2010 e 2022

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ABSTRACT | INTRODUCTION: Osteoarthritis is a common joint disease and one of the main causes of years lived with disabilities as well as one of the reasons for visits to health services. In 2020, 8% of the world's population has lived with this disease; however, the demographic trend could cause the increase in OA prevalence in the next years. This study aimed to describe the hospitalization characteristics of older adults with osteoarthritis diagnosis in Mexico between 2010 and 2022. **MATERIALS AND METHODS:** This was a cross-sectional study. Records of hospitalized older adults diagnosed with OA contained in the databases of the Ministry of Health were included. Variables available were those related to patients (sex, weight, height, place of residence, ethnicity, and public health insurance) and hospital care (admission service, cause of discharge, month of hospitalization, and hospital stay). Descriptive and inferential statistical analysis was carried out using Infostat®. **RESULTS:** Sixteen thousand fifty-six hospitalized older adults' data were analyzed. The frequency was higher in women (64%) than in men (36%). The median age was 69.67; 40.10% of the patients were overweight; 54.74% had medical care; 52.16% were hospital-admitted by external consultation; 93.21% of elderly patients were discharged by clinical improvement; and the median period of hospitalization was three days. The main OA in 78.16% of the cases was knee osteoarthritis. **CONCLUSION:** In Mexico, osteoarthritis is more common in early adulthood and has gender differences. Gaps in health care can jeopardize successful aging and exacerbate older adults' health problems.

KEYWORDS: Osteoarthritis. Elderly. Hospitalization. Observational Study.

RESUMO | INTRODUÇÃO: A osteoartrite é uma das doenças articulares mais comuns. Em 2020, 8% da população mundial conviveu com essa doença. O estudo teve como objetivo descrever as características de hospitalização de idosos com diagnóstico de osteoartrite no México entre 2010 e 2022. **MATERIAIS E MÉTODOS:** Foi realizado um estudo transversal com os registros de hospitalização de idosos nos bancos de dados abertos da Direção Geral de Informação em Saúde do México. As variáveis incluíram aquelas relacionadas aos pacientes (sexo, peso, altura, local de residência, etnia e seguro saúde pública) e ao atendimento hospitalar (serviço de admissão, causa da alta, mês de hospitalização e internação hospitalar). Foi realizada análise estatística descritiva e inferencial usando Infostat®. **RESULTADOS:** Um total de 16.056 idosos hospitalizados tinham diagnóstico de osteoartrite. A frequência foi maior em mulheres (64%) do que em homens (36%). A idade mediana foi de 69,67; 40,10% dos pacientes estavam acima do peso; 54,74% obtiveram atendimento médico; 52,16% foram internados por consulta externa; 93,21% dos pacientes idosos receberam alta por melhora clínica; e o período mediano de internação foi de três dias. A principal OA em 78,16% dos casos foi osteoartrite de joelho. **CONCLUSÃO:** No México, a osteoartrite é mais comum no início da idade adulta e tem diferenças de gênero. Lacunas nos cuidados de saúde podem prejudicar o envelhecimento bem-sucedido e agravar os problemas de saúde dos idosos.

PALAVRAS-CHAVE: Osteoartrite. Idoso. Hospitalização. Estudo Observacional.

Submitted Aug. 28th, 2024, Accepted Oct. 28th, 2024,
Published Nov. 28th, 2024
J. Physiother. Res., Salvador, 2024;14:e5901
http://dx.doi.org/10.17267/2238-2704rpf.2024.e5901 | ISSN: 2238-2704
Assigned editors: Ana Lúcia Goes, Bruno Goes

How to cite this article: Cueva-G.Cantón A, Triay-Novelo I, Suárez-Sánchez M, Huchim-Lara O. Osteoarthritis among elderly: cross-sectional study of hospitalization between 2010 and 2022. J Physiother Res. 2024;14:e5901. http://dx.doi.org/10.17267/2238-2704rpf.2024.e5901

1. Introduction

Osteoarthritis (OA) is one of the most common joint diseases, characterized by chronic pain and eventual disability due to gradual loss of function. OA and musculoskeletal diseases accounted for 21.3% of years lived with disability (YLDs) and 6.7% of disability-adjusted life years (DALYs)[1], and together with diabetes, they were responsible for significant increases in years lived with disability (YLDs).[2] Globally, in 2020, about 8% of the world's population has lived with osteoarthritis.[3] However, the prevalence could be higher, as reported in a study that compared radiological criteria with clinical criteria alone for OA diagnosis.[4]

OA susceptibility is due to a multifactorial etiology where the different risk factors are related to the person and the joint.[5] The elderly population is a vulnerable group considering that changes proper of aging increase the OA propensity, such as old age, sex, musculoskeletal changes, comorbidities (obesity), and lifestyle, among others; all of it will decrease the quality of life over time, and cause functionality limitations or disability.[5-7] Therapeutic management of the OA is based on symptomatology and generally includes surgery and pharmacological and non-pharmacological approaches. Surgical interventions, although mostly successful, also generate costs and complications that can promote an increase in patient mortality.[8] Pharmacological consists of oral, topical, and intra-articular analgesic prescription, but it was described as inadequate pain relief among the elderly and obese knee and hip OA patients.[8,9] Physiotherapy is non-pharmacological, with few adverse effects, and a low-cost treatment strategy based on exercise, but also on patient education.[8,10]

In the United States, OA is considered one of the leading causes of health service visits and one of the most expensive diseases, with the highest hospitalization rates due to the need for surgical interventions.[11] Also, the loss of productivity due to absenteeism from work and its monetary value must be added.[12] Based on the above, OA health care represents significant costs for health services and society.

In Mexico, there are some OA studies in terms of diagnosis, treatment, and clinical features of hand and knee OA. Still, there are no studies regarding the trends of hospitalizations of OA patients.[4,7,9] Considering a population aging due to the increase in life expectancy in recent years, the exceptionally high prevalence of OA together with musculoskeletal diseases and the demand for health services, specifically surgical and rehabilitation services,[1,11] it is relevant to address OA hospitalizations in the Mexican health services. Therefore, the study aimed to describe the hospitalization characteristics of older adults diagnosed with osteoarthritis in Mexico between 2010 and 2022.

2. Material and methods

Study setting: An observational cross-sectional study was undertaken with all the hospitalization records of older adults with a diagnosis of OA in Mexico that occurred between 2010 and 2022. The open database analyzed contains publicly available and anonymous information; therefore, it does not require a review by an ethics committee.

Participants: Participants were selected from the open-access databases of the General Directorate of Health Information (DGIS by the acronym in Spanish).[13] These public databases contain the records of the hospital units of the Ministry of Health at the national level. An older adult was any patient aged 60 years or older.[14] The OA cases were selected using the alphanumeric code conformed by the letter M and the number between 15 and 19, which corresponds to polyarthritis, coxarthrosis, knee OA (KOA), osteoarthritis of the first carpometacarpal joint, and other osteoarthritis; the above is by the International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10).[15]

Procedure: From August to December 2023, the databases from each year (2010-2022) were downloaded in .txt format and converted to .xls. Subsequently, it was filtered by pathology and by age. Gynecological-obstetric variables, administrative codes, and those not related to OA were excluded. The variables available and collected were regarding the geographic and temporal distribution of OA (state of patient residence and year and month of hospitalization), patients' characteristics (sex, weight,

height, whether the patient considered himself as Indigenous, if the patient spoke any indigenous language, and type of health insurance), the hospital care (provenance service [emergency room, outpatient clinic, referred patient, not specified], admission service [surgery, internal medicine, other], type of admission [first time or subsequent], reasons for hospital discharge, infections during stay [yes or no], and days of hospital stay), and type of OA. The body mass index (BMI) was calculated from weight and height using the formula weight (kg)/ height^2; subsequently, the World Health Organization classification was used to determine the nutritional status of the participants. The geographic distribution of hospitalizations by the state of residence in Mexico was performed with the Q-Gis® map software. The male-female ratio was obtained by multiplying the ratio of the number of males discharged from hospital with OA by the number of females discharged from hospital with OA by 100.

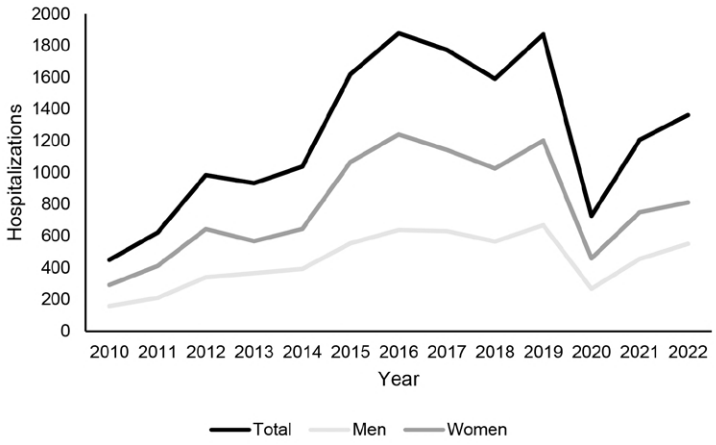
Statistical analysis: Descriptive and inferential statistical analysis was conducted using Microsoft Excel® spreadsheets and Infostat®. For categorical variables, frequencies and percentages were used, and the medians and interquartile ranges for quantitative variables. The distribution of the data was determined using the Kolmogorov-Smirnov normality test. For the comparison of age and days of hospital stay medians, older adults were categorized by sex to perform the Mann-Whitney U test (considering significant results if $p<0.05$). The Pearson correlation coefficient was accomplished to determine the correlation between age and days of hospital stay. This analysis was conducted only with patients having complete data on the variables of interest.

3. Results

3.1 Geographic and temporal distribution of OA

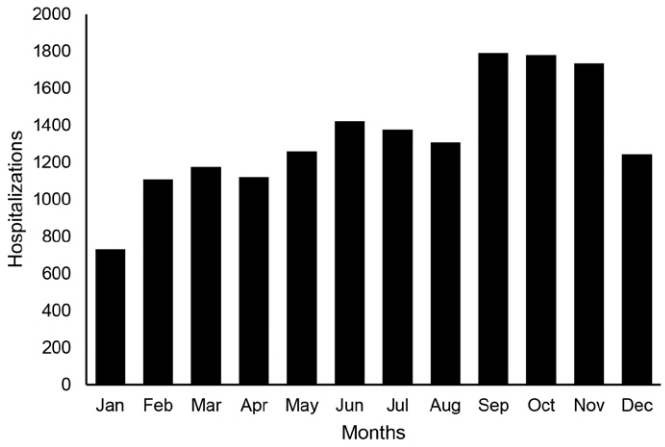
There were 16,058 older adults hospitalized with a diagnosis of OA between 2010 and 2022. 35% of cases occurred in three of the 13 years, 2016 (1,879), 2019 (1,871), and 2017 (1,774); since 2014, the frequency of discharges exceeded the 1,000 (median 1026; CI 970.5-1499.9; 95%) cases until the drastic decrease in 2020 (727); by sex, the highest number of cases among women occurred in 2016, while among men it was in 2019 (Figure 1). The trend of cases by month of the year showed a fluctuating trend between January and August, with an increase in September (11.1%), October (11.0%), and November (10.8%), which were the months with the highest number of hospitalizations. The month with the lowest admissions was January (4.5% of the cases) (Figure 2). In 2020, only 16 cases were registered during the second quarter, two of those cases occurring in May. By state of residence, Mexico City (1,939), Jalisco (1,685), and Guanajuato (1,599) were those with the highest hospitalizations; on the contrary, Tlaxcala, Campeche, and Quintana Roo had fewer discharges with 72, 52, and 39, respectively. Except for Guanajuato, whose median was two, the median hospital stay among the 32 Mexican states was three days. The median age by the state of residence was 68 (Guanajuato and Tlaxcala), 69 (Jalisco and Quintana Roo), 70 (Mexico City), and 71 (Campeche). Therefore, no marked differences were observed between the entities with the highest and lowest number of cases (Figure 3).

Figure 1. Distribution of osteoarthritis hospitalizations by year



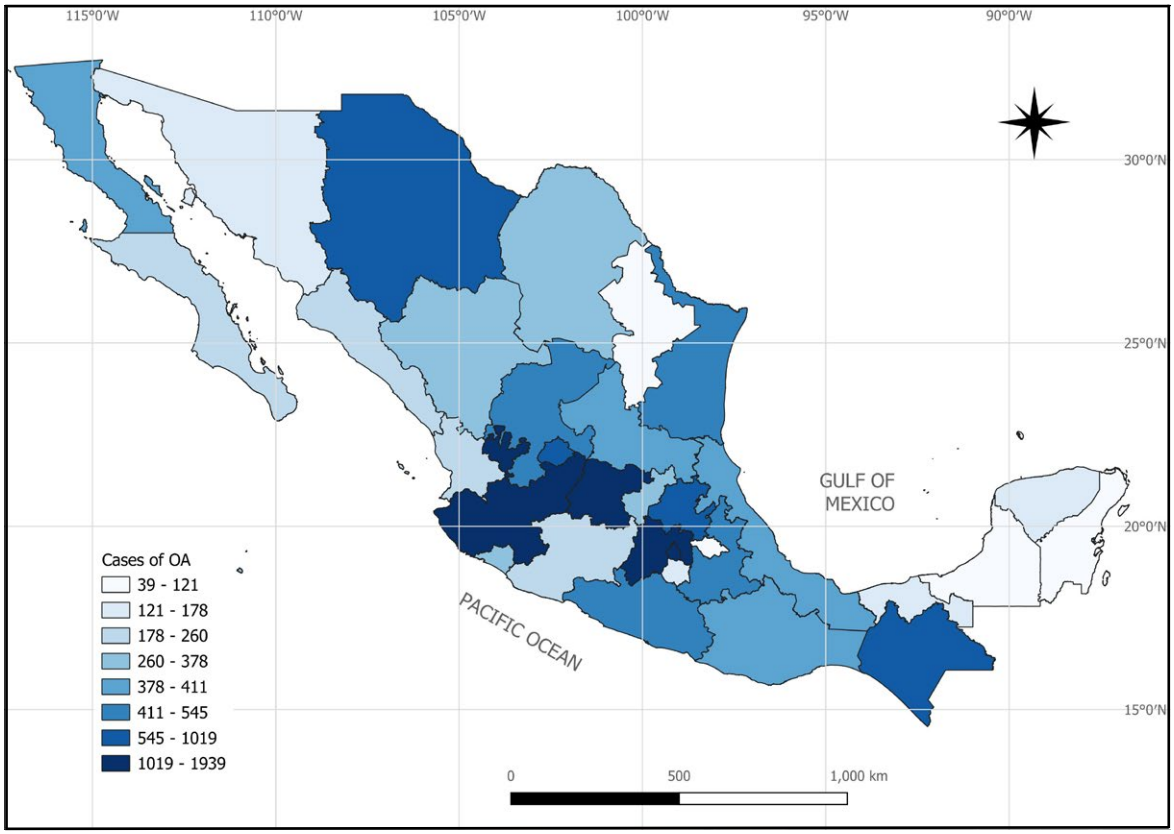
Source: the authors (2024).

Figure 2. Distribution of osteoarthritis hospitalizations by month of the year



Source: the authors (2024).

Figure 3. Geographic distribution of osteoarthritis hospitalizations by Mexican states



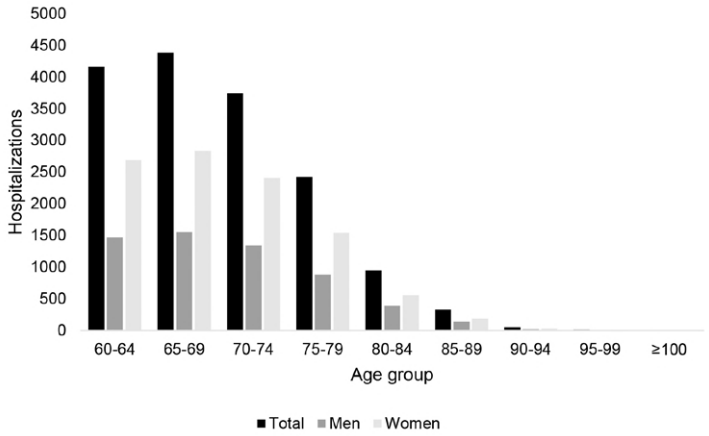
Source: the authors (2024).

3.2 Patients' characteristics

The frequency of OA was higher in women (10,256 cases; 64%) than in men (5,799; 36%), with a male-female ratio of 56 men per 100 women. Regarding age, the median for the total number of cases and by sex was 69 (CI 69.5-69.7; 95%) years. By age group, for both men and women, the five years with the highest number of cases were 65-69. The age between men and women had a statistically significant difference ($p>0.05$) (Figure 4).

Only 0.8% (141 older adults) considered themselves Indigenous, of which 60% were men, and the rest were women (40%). Only 1% (110 older adults) reported speaking an indigenous language. Regarding BMI (n=8,727), it was found that overweight predominated (42.8%), followed by obesity (32.4%), optimum range (24.1%), and underweight (0.4%). 54.7% (8,770) of older adults had health insurance, 25.2% (4,051) did not have any, the affiliation was ignored for 17.9%, and it was not specified for 2.0% of older adults. The main type of health insurance for 8,292 (94.5%) older adults was the one granted by the federal government, currently named IMSS Bienestar. Of those hospitalizations without health insurance, 63.5% were among women and 36.4% among men. Those without insurance were treated more frequently in 2021 (15.9%) and 2022 (11.7%). The states of residence with the most hospitalizations of older adults without insurance were Mexico City (17.3%), Jalisco (16.4%), Hidalgo (8.2%), and the State of Mexico (7.8%).

Figure 4. Osteoarthritis hospitalizations by sex and age group



Source: the authors (2024).

3.3 Hospital care characteristics

Older adults were hospitalized mainly from outpatient clinics (52.1%) and emergency services (41.8%), and referrals from other medical units were only 0.3%. 84.5% of hospitalizations were admitted for the first time, and the remaining 15.4% were subsequent visits. 16.9% were from the surgery service, 3.9% from the internal medicine service, and was not specified for 78.9% of the cases. It is relevant to mention that only 0.1% of patients had infections during their hospital stay. Discharge due to improvement represented 93.2% of the reasons for hospital discharge, 2.7% for other reasons, 1.8% discharged due to healing, 1.2% due to escape, and 0.9% divided between voluntary discharge, transfer, death, and unspecified. The days of hospital stay for the total and by sex had a median of 3 (CI 3.5-3.3; 95%). However, statistical differences were found in the days of stay between men and women ($p>0.05$); the correlation coefficient between age and days of hospital stay was positive and weak ($r= 0.02$, $p=0.01$).

3.4 Type of Osteoarthritis

The five types of OA recorded among older adults were KOA with 78.1% of cases, hip osteoarthritis (coxarthrosis) with 15.2% of cases, other osteoarthritis with 5.2%, osteoarthritis of the first carpometacarpal joint with 0.7%, and polyarthrosis with 0.6% of cases. By sex, KOA was predominant in both groups, representing 27.6% of cases in the male sex and 50.4% in the female sex.

4. Discussion

The objective of this study was to describe the characteristics of hospitalizations for osteoarthritis among older adults in Mexico. Except for 2020 (COVID-19 pandemic period), more than 1,000 hospitalizations were recorded during the period studied. The cases were frequent in women, in a range between 65-69, in overweight or obese individuals. Patients do not remain hospitalized for long and were discharged due to improvement, but a quarter of the participants do not have health insurance. The most common type of OA was gonarthrosis.

The study's observation of hospitalizations aligns with the global trend. In the last three decades, worldwide, the number of people with OA has doubled, rising from 256 million in 1990 to 595 million in 2020, and YLDs increased by 10%.[3] This trend can be attributed partly, among other factors, to the aging population, which results in life expectancy expansion. In Mexico, between 1980 and 2020, this indicator grew by almost ten years; therefore, an increase in prevalence would be expected and might explain the thousands of hospitalizations on average observed in the period studied. The drop in 2020 could be related to the COVID-19 pandemic, a year in which hospital admissions decreased significantly. This is because of the difficulties experienced by older adults getting access to medical care or the attempted avoidance of getting infected, even though their underlying pathologies could worsen.[16]

Mexico City, Jalisco, and Guanajuato were the entities with the most cases of OA. The first two occupy the second and third positions regarding population density, while the third is the sixth. In these entities, the percentage of the population over 60 years is 16.19%, 11.03%, and 11.96%, respectively. In all, the aging index has increased almost threefold since the 1990s. The growth of this indicator would affect the population with disabilities or limitations, which is about 50% and 34%, respectively.[17] With season and weather variables in regard, a higher frequency of hospitalizations for OA has been reported among older adults more than among the general population during winter and in minor cases in spring; also, humidity has been associated with an increase in joint pain.[18] Among older adults in Mexico, most cases occur between September and November. September and October represent the last months of the rainy season, and in September, the cold front season begins. Possibly, the humidity generated in these months could contribute to the presence of pain and the search for medical attention; however, more studies are needed in Mexico that correlate these variables with cases of OA.

Most of the cases in this study were among women, and the most frequent type was KOA. That is consistent with the global report of OA prevalence in 2020, which was 8058.9 and 5780 per 100,000 for women and men, respectively.[3] In Beijing, 60% of the cases of KOA were in women.[19] In studies conducted in Mexico regarding the inadequate pain treatment and epidemiology of KOA, the percentages were higher than 70%.[7,9] Differences in OA by sex have been associated with different risk factors like high BMI, alcohol consumption, atherosclerosis, high levels of vitamin E, and low education, which has a higher impact on women in comparison to men, while in the latter, tobacco consumption, high physical activity, and abdominal obesity.[20] Based on the difference in the disease burden between women and men, the hormonal role in the development of OA has been studied. However, despite numerous studies on the subject, there are no definitive results.[21]

Age is one of the main risk factors for OA. The prevalence of symptomatic OA increases with each decade of life.[5] Worldwide, the prevalence is higher in the 70 and older group, followed by the 50-69[3]; another study states that the period with important affectation is between 55 and 64 years of age.[22] The median age reported in this study was 69, and the average of other studies was between 63 and 65 years.[7,9] In this country, 12% of the population is over 60 years old.[17] Given that the elderly population has grown and will continue to grow, as well as the increase in life expectancy and chronic diseases not only among older adults, the scenario shortly will also increase the prevalence of OA.[23,24] Despite these conditions, there is a lack of prioritization in policies focused on this type of pathology[1], especially in young adults.

Three-quarters of the hospitalized older adults were overweight or obese. Another study in Mexico described a BMI of 29.2 on average, and 19.3% already had obesity.[7] Obesity prevalence has doubled since 1980, reaching more than 600 million people, is a predictor of KOA, and increases the risk up to 2.9 times compared to those subjects without obesity.[2,3,5] OA and obesity contribute to the 2.67 million YLDs worldwide, with a remarkable impact on the age group between 60 and 74 years and on women.[25]

Half of the elderly patients in the study had health insurance. Among those with insurance, the IMSS (51%) and INSABI (35.5%) were the predominant public health services. Seguro Popular, active from 2004 to 2020, was replaced by the INSABI, but this one was extinguished in 2022, and patients were absorbed by the IMSS Bienestar, a branch of the IMSS.[17] All of these changes generated uncertainty among the patients because of the lack of clarity in the operation rules.

Despite this coverage, it was reported a decrease in health care in public institutions and an increase in the demand for private services and drugstores, due to the difficulty in accessing outpatient services in the public health systems.[26] This reflects the need to improve not only accessibility for a vulnerable group, such as the elderly, but also the quality of care, prevention, and reduction of disability in a growing age group.[23] With the expected increase in demand for health care, the costs involved, and a health system with a membership system that has changed not only in name but also in operating rules, a challenging scenario is looming in public health in Mexico. The older adults included in the study had a short hospital stay (median of three days); half had health insurance, and a quarter reported not having one.

OA is one of the main diseases causing pain and disability.[6] It has been reported that 53% of knee and hip OA patients had inadequate pain relief with analgesic therapy.[9] Also, more than half of patients already have a significant progression of the disease at the time of the onset of symptoms, making them candidates for surgical intervention.[22] The interventions for total hip and knee replacements have been increased by 30% and 20%, respectively.[27] Although total knee and hip arthroplasty are two of the most successful procedures, there is a risk of recurrence of pain, thromboembolic and cardiac events, need for re-operation, and death.[28] Given the symptomatology of the disease and the need for surgical intervention, an increase in the demand for health care for the population with OA is estimated to increase up to about four times compared to those without OA, as well as the requirement for hospitalization.[29] In this regard, in the United States, OA was among the first four most common causes of hospitalization.[30] Therefore, it is expected that an increase in healthcare costs will represent a significant percentage of the health budget. [29]

Despite the multiple risk factors, the diversity of therapeutic options, and the need for early therapeutic intervention due to the slow progression of OA, there are no early diagnostic criteria available or the use of images for the prediction and choice of treatment.[24] Other authors mention that the problem lies in disseminating and implementing the guidelines beyond the lack of these, mainly in primary care.[8]

Since some of the risk factors for presenting OA are modifiable, the benefits of patient education, nutritional support, and the promising development of physical therapy become relevant.[8,10] This will not only help reduce the impact of OA in both older and younger adults but can also contribute to reducing risk factors for other chronic diseases and increasing the quality of life and functionality.

The outlook does not look encouraging, so multidisciplinary collaboration is necessary for comprehensive care of the patient with OA, improvement in disease prevention, and health services in terms of infrastructure and budget.

Limitations: The analyzed databases lacked important variables described in the literature, such as smoking, menopause in women, family history of OA, occupation of the person, practice of physical activity, presence of comorbidities, and surgical intervention. This absence represents a limitation to a more comprehensive understanding of OA. It is important to mention that to evaluate the nutritional status, the Body Mass Index was used based on the weight in kilograms and height in meters obtained from the database. However, it has been described in the literature that this index is not the most suitable to determine the nutritional status among older adults; therefore, the findings should be taken with caution. Notwithstanding the limitations described, this is an overview of a pathology that shows a tendency towards increase and will be a public health problem in Mexico in the coming years.

5. Conclusion

The patient and pathology characteristics were similar to those reported in the literature, but it was found that many older adults lack health insurance, and the hospitalization trend has been increasing in the last decade, as the prevalence reported in many studies. This is important for consideration by health professionals and physiotherapists. In Mexico, some studies already report the epidemiology of knee and hand OA, the pain outcomes therapy, and the prevalence based on clinical and radiological criteria. However, to our understanding, there are no studies describing the hospitalizations of elderly patients with OA.

Acknowledgments

The authors thank Dr. Alfonso Cuevas for his support with mapping.

Authors' contributions

The authors declared that they have made substantial contributions to the work in terms of the conception or design of the research; the acquisition, analysis or interpretation of data for the work; and the writing or critical review for relevant intellectual content. All authors approved the final version to be published and agreed to take public responsibility for all aspects of the study.

Conflicts of interest

No financial, legal, or political conflicts involving third parties (government, private companies, and foundations, etc.) were declared for any aspect of the submitted work (including but not limited to grants and funding, advisory board participation, study design, manuscript preparation, statistical analysis, etc.).

Indexers

The Journal of Physiotherapy Research is indexed by DOAJ, EBSCO, LILACS and Scopus.

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