

Vitamin D and chronic pain in the elderly*

Vitamina D e dor crônica em idosos

Wellington Saraiva de Oliveira¹, Niele Moraes¹, Fania Cristina Santos¹

*Received from the Department of Pain and Osteoarticular Diseases of the Discipline of Geriatrics and Gerontology (DIGG), Federal University of São Paulo (UNIFESP), São Paulo, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic pain is a frequent complaint during medical visits, especially among the elderly. In the attempt to find more effective therapies with less adverse effects in this population, especially considering elderly people with neuropathic and musculoskeletal pain, there are studies relating vitamin D to pain, which could propose it as an analgesic alternative. This study aimed at reviewing in the literature the role of vitamin D in chronic musculoskeletal pain in the elderly.

CONTENTS: Pubmed, Medline, LILACS, Cochrane Library and Scielo databases were queried for the last ten years, looking for studies in Portuguese and English. Initial search keywords were “*vitamin D*” and “*chronic pain*”, resulting in 220 articles, of which only those addressing musculoskeletal pain in the elderly were selected. From those, only ten met established criteria and were analyzed, resulting in: one systematic review, five transversal analytical studies, two case-series retrospective studies, one prospective observational study and one randomized and controlled clinical trial. Five studies have shown significant relationship between vitamin D deficit and chronic musculoskeletal pain; three studies have shown pain improvement after vitamin D supplementation and two have not observed pain improvement with such supplementation.

CONCLUSION: Studies relating vitamin D to chronic pain in the elderly are still scarce and highly heterogeneous. The evaluation of vitamin D deficit should be more frequent during geriatric consultations, because this has been correlated to some painful syndromes and its correction could bring therapeutic benefits in some cases.

Keywords: Chronic pain, Elderly, Musculoskeletal pain, Neuralgia, Vitamin D.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor crônica é queixa muito frequente nas consultas, principalmente entre os idosos. Na tentativa de buscar terapêuticas mais eficazes e com menos efeitos adversos, nessa população, especialmente considerando idosos com dor neuropática e musculoesquelética, tem-se observado estudos que vêm relacionando a vitamina D a quadros dolorosos, o que poderia propô-la como uma alternativa analgésica. O objetivo deste estudo foi rever, na literatura, o papel da vitamina D na dor crônica neuromusculoesquelética em idosos.

CONTEÚDO: Realizada a revisão bibliográfica na base de dados do Pubmed, Medline, LILACS, Biblioteca Cochrane e Scielo, contemplando os últimos 10 anos, títulos em português e inglês. Os descritores usados na busca inicial foram “*vitamina D*” e “*dor crônica*”, resultando 220 artigos, dos quais apenas os que se tratavam de dor neuromusculoesquelética em idosos foram utilizados. Destes, somente 10 preenchem os critérios estabelecidos e foram analisados, resultando: um estudo de revisão sistemática, cinco estudos analíticos transversais, dois estudos retrospectivos do tipo série de casos, um estudo observacional prospectivo e um *trial* clínico randomizado e controlado. Observou-se em cinco estudos uma relação significativa entre a hipovitaminose D e dor crônica musculoesquelética, em três estudos uma melhora da dor após suplementação com vitamina D, e, em outros dois, não haver melhora da dor com esta suplementação.

CONCLUSÃO: Os estudos relacionando a vitamina D e a dor crônica em idosos ainda são escassos e bastante heterogêneos. A avaliação do déficit de vitamina D deveria estar mais presente nas consultas geriátricas, pois este tem sido correlacionado com certas síndromes dolorosas e sua adequação poderia trazer benefício terapêutico em alguns casos.

Descritores: Dor crônica, Dor musculoesquelética, Idoso, Neuralgia, Vitamina D.

INTRODUCTION

Ageing is a worldwide phenomenon, due to low mortality and birth rates and increased life expectancy, resulting from major scientific and technological advances in the last decades^{1,2}. According to the demographic census of the Brazilian Institute of Geography and Statistics (IBGE), current population living in Brazil with 65 years of age or above, who were 4.8% in 1991, went to 5.9% in 2000 and reached 7.4% in 2010³.

With increased life expectancy, there is increased prevalence of

1. Federal University of São Paulo. São Paulo, SP, Brazil.

Submitted in February 07, 2013.
Accepted for publication in July 24, 2013.
Conflict of interests: None.

Correspondence to:
Wellington Saraiva de Oliveira, M.D.
Rua Potengi, 60/32
04139-020 São Paulo, SP.
E-mail: wellington_so09@hotmail.com

chronic and degenerative diseases. Many of these presentations are followed by chronic pain, important public health problem, which has recently received attention^{1,2}.

Chronic pain, described as “*that lasting more than a reasonable period of time for the healing of an injury*”, may be associated to several factors, such as depression, physical and functional incapacity, social isolation, changes in family dynamics and hopelessness. It may induce fatigue, anorexia, sleep disorders, constipation and concentration difficulties. The inability to control it brings severe physical and psychological distress and may significantly interfere with the quality of life of the elderly, affecting their daily activities in variable ways⁴⁻⁶.

In the attempt to find more effective therapies with less side-effects, especially for the elderly, several studies were observed, which bring vitamin D as alternative for the management of chronic pain.

This study aimed at reviewing in the literature the role of vitamin D for chronic musculoskeletal pain in the elderly.

CONTENTS

Pubmed, Medline, LILACS, Cochrane Library and Scielo databases were queried for the last ten years, looking for studies in Portuguese and English. Search keywords were “*vitamin D*” and “*chronic pain*”, resulting in 220 articles, of which only those addressing musculoskeletal pain in the elderly (aged 60 years or above) were selected, even if not exclusively. A total of 65 articles were selected. We have also directly looked for related articles, which have not appeared in the initial search: three publications.

From those, only ten met established criteria: vitamin D and chronic musculoskeletal pain involving the elderly. So, included and analyzed papers were: one systematic review, five transversal analytical studies, two case-series retrospective studies, one prospective observational study and one randomized and controlled clinical trial. Table 1 is a summary of selected articles and their major results.

Table 1 – Summary of analyzed articles.

Authors	Types of Studies/Method	Result / Conclusion
Straube et al. ⁷	Systematic review / Evaluation of efficacy and adverse effects of vitamin D in chronic pain (adults/elderly)	Four studies analyzed and only one has shown benefits of vitamin D supplementation for chronic pain. Other results were also positive for vitamin D supplementation, however without statistical significance. Evidence of vitamin D for chronic pain management was considered low.
McBeth et al. ⁸	Transversal analytical study / Evaluation of the association of musculoskeletal pain and vitamin D. Males between 40 and 79 years of age were evaluated about pain and lifestyle and also tested for physical performance and 25(OH)D3 serum levels. Total of 3075 individuals.	It was observed 41% of males with no pain, 50.4% with pain not considered chronic widespread pain (“other pain”) and 8.6% with CWP. After adjusting for age, the elderly with CWP had higher chance of 25(OH)D3 deficiency (50% of cases), while the elderly with “other pain” had lower chance (30% of cases).
Atherton et al. ⁹	Transversal analytical study / Evaluation of the association of vitamin D (25[OH]D3) levels and the presence of CWP in a British population sample of Caucasian elderly people.	CWP was more prevalent in females with 25(OH)D3 deficit and has varied according to the level of such vitamin in females, but not in males. Among females with CWP, 14.4% had vitamin D levels < 25 nmol/L, 14.8% between 25-49 nmol/L, 11.6% between 50 and 74 nmol/L, 8.2% between 75 and 99 nmol/L and 9.8% levels >= 100 nmol/L.
Turner et al. ¹⁰	Case-series retrospective study / To determine the prevalence and clinical correlations of vitamin D deficit in individuals looking for chronic pain management in a multidisciplinary pain rehabilitation center / Total of 267 patients and 25(OH)D3 serum level considered inadequate when <= 20 ng/mL.	Prevalence of vitamin D deficit was 26%. Mean morphine dose in the presence of inadequate levels of vitamin D was 133.5 mg/day and, for adequate levels, 70 mg/day. Mean usage time for the opioid was 71.1 and 43.8 months for inadequate and adequate vitamin D levels, respectively. It was observed the need for analgesia in the presence of vitamin D deficit.
Hicks et al. ¹¹	Analytical transversal study / Evaluation of the associations of vitamin D levels and musculoskeletal pain and whether there are differences by gender / 958 elderly selected >= 65 years of age. Vitamin D deficit when levels < 25 nmol/L.	A total of 58% of females had moderate pain versus 27% of males. Vitamin D deficiency was significantly associated to higher prevalence of back pain in females, but not in males.
Björkman, Sorva and Tilvi ¹²	Controlled randomized clinical trial / Evaluation of vitamin D supplementation for pain in institutionalized elderly and checking the correlation of pain with vitamin D deficiency / Total of 202 elderly with pain were randomized to receive 400 IU/day or 1200 IU/day of cholecalciferol or placebo (3 groups).	High prevalence of pain in the institution, between 38.4% and 83.8% depending on pain evaluation tools. Low 25(OH)D3 levels (< 50 nmol/L) were observed in 98.1%. There has been no significant decrease in pain perception after any vitamin D supplementation and there has also been no change in pain intensity.
Bartley ¹³	Transversal analytical study / To estimate the prevalence of vitamin D deficiency in a multidisciplinary pain clinic / included 177 individuals and evaluation of serum vitamin D.	From individuals included, 3% had 25(OH)D3 <= 17.5 nmol/L (level associated to osteomalacia), 32% level of 50 nmol/L (vitamin D deficiency) and 73% level of 80 nmol/L (normal). Vitamin D deficiency seemed to be important in chronic pain.
Knutsen et al. ¹⁴	Transversal analytical study / Evaluation of vitamin D levels in individuals with nonspecific musculoskeletal pain, with headache or fatigue / Total of 572 patients submitted to 25(OH)D3 dosage.	There has been high prevalence of vitamin D deficit in patients with nonspecific musculoskeletal pain, headache and fatigue (prevalence of 58% when level < 50 nmol/L). Vitamin D level was lower in those with headache. Approximately 20% of those with low vitamin D levels have reported headache as compared to 5% with normal levels.
Lee and Chen ¹⁵	Prospective observational study / Supplementation of diabetic patients with painful neuropathy with 2000 IU/day cholecalciferol for 3 months.	50% decrease in pain intensity and 67% increase in mean 25(OH)D3 levels. Vitamin D supplementation was effective to treat neuropathic diabetic pain.
Huang et al. ¹⁶	Case-series study / Evaluation of vitamin D in American veterans with multiple chronic pains and low 25(OH)D3 (< 30 ng/mL) / Pain and related aspects were addressed in 28 veterans receiving 1200 IU/day of vitamin D (when level 20-29 ng/mL) or 50000 IU/week (< 20 ng/mL).	Statistically significant improvement in pain intensity (p < 0.001), sleep onset (p = 0.019), sleep duration (p = 0.012), body pain (p = 0.014), general health status (p = 0.006), vitality (p = 0.048) and social functionality (p = 0.017).

CWP = chronic widespread pain.

DISCUSSION

Analyzing the articles of this review, it was observed that the association of vitamin D deficit and chronic pain seems to be frequent, but other points are still unclear and deserve consideration, such as a possible action of vitamin D on mood disorders, such as anxiety and depression which usually follow chronic pain presentations. It is also suggested that vitamin D has anti-inflammatory activity decreasing some pro-inflammatory cytokines, thus decreasing pain¹⁷.

Not all people with vitamin D deficit will develop musculoskeletal pain but the probability for such increases with decreased vitamin D levels. One could expect that vitamin D would be of major value for the management of chronic pain syndrome in the elderly. But, analyzing the studies selected for this review, some have reached this conclusion, while others have not.

It is not clear whether vitamin D is cause effect or simply an epiphenomenon in painful situations.

More recently, authors have also suggested that vitamin D deficit may induce several neurological disorders, such as epilepsy¹⁸. So, once more, we propose the need for additional consideration of vitamin D status in elderly patients, who often present neurological disorders.

In looking for the dose of vitamin D to be used for chronic pain, there is also no standard among studies. The suggestion is to use higher doses of vitamin D aiming not only at increasing the deposits of such vitamin, especially in fatty tissues, but also aiming at improving chronic pain. A total daily vitamin D supplementation of 2300 to 2800 IU, to start, would be potentially beneficial for patients with chronic musculoskeletal pain and fatigue syndromes¹⁹. It is worth stressing the report that it may take up to nine months for the maximum effects of such supplementation to be reached¹⁹.

CONCLUSION

Existing studies on vitamin D and chronic pain in the elderly are still scarce, and those using vitamin D to manage chronic pain, especially neuromusculoskeletal pain, are even scarcer, in addition to being highly heterogeneous.

Our review has observed a high prevalence of chronic pain in individuals with vitamin D deficiency, especially females, and its supplementation was beneficial for some cases, but not for oth-

ers. So, there is the need for further studies, with better defined objectives and criteria, to reach further conclusions about the subject.

Vitamin D deficit evaluation should be more present during geriatric medical visits, especially those with chronic neuropathic and musculoskeletal pain complaints, through its dosage and supplementation, considering that it has low cost and could be beneficial for pain management, in addition to being well tolerated in standard doses.

REFERENCES

1. Ferrell BA. Pain Management. *Clin Geriatr Med*. 2000;16(4):853-74.
2. Rabelo DF, Neri AL. Recursos psicológicos e ajustamento pessoal frente a incapacidade funcional na velhice. *Psicologia em Estudo*. 2005;10(3):403-12.
3. Censo Demográfico; Instituto Brasileiro de Geografia e Estatística. 2010.
4. Merskey NB. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms prepared by the International Association for the Study of Pain 2nd ed. Seattle: IASP Press; 1994.
5. Yu HY, Tang FI, Kuo BI, et al. Prevalence, interference, and risk factors for chronic pain among Taicinese community older people. *Pain Manag Nurs*. 2006;7(1):2-11.
6. Martinez JE, Macedo AC, Pinheiro DFC, et al. Perfil clínico e demográfico dos pacientes com dor músculo-esquelética crônica acompanhados nos três níveis de atendimento de saúde de Sorocaba. *Act Fisiatr*. 2004;11(2):67-71.
7. Straube S, Derry S, Moore RA, et al. Vitamin D for the treatment of chronic painful conditions in adults; *Cochrane Database Syst Rev*. 2010;20(1):CD007771.
8. McBeth J, Pye SR, O'Neill TW, et al. Musculoskeletal pain is associated with very low levels of vitamin D in men: results from the European Male Ageing Study. *Ann Rheum Dis*. 2010;69(8):1448-52.
9. Atherton K, Berry DJ, Parsons T, et al. Vitamin D and chronic widespread pain in a white middle-aged British population: evidence from a cross-sectional population survey. *Ann Rheum Dis*. 2009;68(6):817-22.
10. Turner MK, Hooten WM, Schmidt JE, et al. Prevalence and clinical correlates of vitamin D inadequacy among patients with chronic pain. *Pain Med*. 2008;9(8):979-84.
11. Hicks GE, Shardell M, Miller RR, et al. Associations between vitamin D status and pain in older adults: the Invecchiare in Chianti study. *J Am Geriatr Soc*. 2008;56(5):785-91.
12. Björkman M, Sorva A, Tilvis R. Vitamin D supplementation has no major effect on pain or pain behavior in bedridden geriatric patients with advanced dementia. *Aging Clin Exp Res*. 2008;20(4):316-21.
13. Bartley J. Prevalence of vitamin D deficiency among patients attending a multidisciplinary tertiary pain clinic. *N Z Med J*. 2008;121(1286):57-62.
14. Knutsen KV, Brekke M, Gjelstad S, et al. Vitamin D status in patients with musculoskeletal pain, fatigue and headache: a cross-sectional descriptive study in a multi-ethnic general practice in Norway. *J Escandin C S Prim*. 2010;28(3):166-71.
15. Lee P, Chen R. Vitamin D as an analgesic for patients with type 2 diabetes and neuropathic pain. *Arch Intern Med*. 2008;168(7):771-2.
16. Huang W, Shah S, Long Q, et al. Improvement of pain, sleep, and quality of life in chronic pain patients with vitamin D supplementation. *Clin J Pain*. 2013;29(4):341-7.
17. Boxer RS, Dauser RA, Walsh SJ, et al. The association between vitamin D and inflammation with the 6-minute walk and frailty in patients with heart failure. *J Am Geriatr Soc*. 2008;56(3):454-61.
18. Holló A, Clemens Z, Kamondi A, et al. Correction of vitamin D deficiency improves seizure control in epilepsy: a pilot study. *Epilepsy Behav*. 2012;24(1):131-3.
19. Leavitt SB. Vitamin D – a neglected 'Analgesic' for chronic musculoskeletal pain; editorial an evidence-based Review & Clinical Practice Guidance. *Pain Treat Top*. 2008;6(1):2-50.