ORIGINAL ARTICLE

Chronic pain in long-lived elderly: prevalence, characteristics, measurements and correlation with serum vitamin D level*

Dor crônica em idosos longevos: prevalência, características, mensurações e correlação com nível sérico de vitamina D

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic pain considerably worsens quality of life of the elderly, giving relevance to studies addressing it in such individuals, especially those long-lived. Recently, vitamin D deficiency, very prevalent among the elderly, has been correlated to chronic pain. This study aimed at estimating the prevalence of chronic pain among community long-lived elderly with functional independence, at evaluating its characteristics and at correlating this pain to serum vitamin D levels.

METHODS: Cross-sectional study of the "Long-Lived Project", with elderly aged 80 years or above, of both genders, with functional independence. Socio-demographic data were collected, referred chronic pains were measured and serum vitamin D levels were obtained.

RESULTS: We have evaluated 330 participants of the "Long-Lived Project" and pain prevalence was 20.9%, especially nociceptive, continuous, moderate to severe and lumbar pain. Among pain intensity measurement tools, faces and verbal numeric scales were preferred. There has been high prevalence of vitamin D deficiency among long-lived elderly with chronic pain (87%); deficiency and insufficiency levels were 49 and 38%, respectively, however such levels were not significantly correlated to chronic pain.

CONCLUSION: There has been high prevalence of chronic pain among the elderly. Moderate to severe and low back pain were the most frequent. There has been high prevalence of vitamin D deficiency among studied long-lived elderly; however there has been no significant correlation between low serum vitamin D levels and chronic pain.

Keywords: Chronic pain, Elderly, Measurement tool, Pain evaluation, Vitamin D.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor crônica diminui consideravelmente a qualidade de vida dos idosos, dando relevância aos estudos que a abordam nesses indivíduos, sobretudo nos longevos. Recentemente, a hipovitaminose D, muito prevalente entre idosos, tem sido relacionada à dor crônica. O objetivo deste estudo foi estimar a prevalência de dor crônica entre os longevos da comunidade com independência funcional, avaliar suas características e correlacionar essa dor com os níveis séricos de vitamina D.

MÉTODOS: Estudo transversal do "Projeto Longevos", com idosos de 80 anos ou mais, de ambos os gêneros, com independência funcional. Foram apurados os dados sócio-demográficos, avaliadas e mensuradas as dores crônicas apresentadas e obtidos os níveis séricos da vitamina D.

RESULTADOS: Foram avaliados 330 participantes do "Projeto Longevos", e encontrada prevalência de 20,9% de dor crônica, sendo essa principalmente do tipo nociceptiva, contínua, de intensidade moderada a intensa, de localização lombar. Dentre os instrumentos de mensuração da intensidade dolorosa, os preferidos foram as escalas de faces e numérica verbal. Observou-se alta prevalência de hipovitaminose D nos longevos com dor crônica (87%); níveis de deficiência e insuficiência em 49 e 38%, respectivamente, porém tais níveis não se correlacionaram significativamente com a presença de dor crônica.

CONCLUSÃO: A prevalência de dor crônica entre os longevos foi alta. Intensidade moderada e intensa e localização lombar foram as mais frequentes. Houve alta prevalência de hipovitaminose D entre os longevos estudados, porém não se observou correlação significativa entre baixos níveis séricos de vitamina D e dor crônica.

Descritores: Avaliação da dor, Dor crônica, Idoso, Instrumento de mensuração, Vitamina D.

INTRODUCTION

Population aging is a worldwide phenomenon caused by low mortality and birth rates and increased life expectancy as result of major scientific and technological advances of recent decades[1,2]. With increased life expectancy there is increased prevalence of chronic (CD) and degenerative diseases. Many of such presentations are followed by CP, a major public heal-

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th problem which has been recently highlighted[1,2].

Pain is a multifactorial phenomenon, involving physical, emotional, socio-cultural and environmental aspects, being defined by the International Association for the Study of Pain (IASP) as unpleasant sensory and emotional experience described in terms of real or potential tissue injuries. It is always subjective and related to previous experiences[3,4].

CP is pain persisting beyond a reasonable period for injury healing or that associated with chronic pathological processes which cause continuous or recurrent pain in intervals of months or years. CP affects not only individuals but also their families and society since it orients and limits patients' conditions and behavior, increasing morbidity and burdening the health system[5]. This pain may be associated with depression, physical and functional incapacity, social isolation, family dynamics changes and hopelessness. It may also induce fatigue, anorexia, sleep disorders, constipation and difficult concentration. The inability to control pain brings major physical and psychical distress variably affecting their daily activities[6-9]. Bio-psycho-social consequences of CP emphasize the magnitude of this problem, especially among the elderly where its prevalence is higher. Nevertheless, there are still few studies addressing its prevalence among the elderly, especially those considered long-lived elderly living in the community.

The correlation between CP and vitamin D deficiency has been recently questioned, especially considering pain related to musculoskeletal syndromes[7]. Osteomalacia has already been proposed as the link between vitamin D deficiency and generalized and persistent musculoskeletal pain, but also decreased muscle strength and fatigue were suggested as being such link[10].

These aspects are highly relevant for the planning of measures to control and manage CP in the elderly, especially long-lived elderly, because they could contribute to minimize morbidity and functional dependence and to improve their QL. The scarcity of information about CP in long-lived elderly makes difficult the sensitization of health professionals to an emerging problem, since population is increasingly reaching higher age groups.

This study aimed at estimating the prevalence of CP in community long-lived elderly, at evaluating its peculiarities, even by observing measurement tools preferred by the elderly, and also at evaluating whether there is correlation between CP and vitamin D deficiency.

METHODS

This was a descriptive, analytical, cross-sectional study part of the "Long-lived Project". This is a longitudinal epidemiologic study coordinated by a team of researchers of the Discipline of Geriatrics and Gerontology (DIGG) – Federal University of São Paulo (UNIFESP). Such project was started in April 2010 and is still ongoing; it includes elderly aged 80 years or above, of both genders and independent to walk. Exclusion criteria were elderly with diagnosis of dementia (by means of clinical evaluation together with the Mental State Mini Exam); severe acute or chronic uncompensated disease; dialysis, chemotherapy or radiotherapy treatment; living in long-term care facilities; history of stroke or myocardial infarction with severe limitations; limiting visual or auditory deficit, not allowing them to answer the questionnaire; not walking independently outside home.

Patients were evaluated from February 2011 to December 2013 and have met the following inclusion criteria: pain lasting for at least 6 months and intensity equal to or higher than 3 according to the pain verbal numeric scale (VerbalNS). Exclusion criteria were cancer pain.

Data related to socio-demographic conditions and pain, such as location, frequency, character, triggering and attenuating factors, nature according to physipatogeny (nociceptive, neuropathic, mixed or psychogenic) were collected. Pain intensity was measured using the following one-dimension tools:

- Verbal description scale with 4 scores (VDS): four verbal descriptors indicate different perceived pain magnitudes. Zero means "no pain", 1 means "mild pain", 2 "moderate pain" and 3 "severe pain"[11].
- Verbal numeric scale (VerbalNS): with numeric verbalization from zero to 10. Zero means "no pain" and 10 "the worst imaginable pain"[11].
- Visual numeric scale (VNS): with scores from zero to 10 being zero "no pain" and 10 "the worst imaginable pain"[11].
- Visual analog scale (VAS): represented by a 10-cm line with anchors on both edges with verbal descriptors "no pain" and "unbearable pain". A point is marked on the line indicating pain magnitude and the line is measured with a 0-100mm ruler[11].
- Pain faces scale (PF) adapted for the elderly: initially used for children it was adapted and validated for the elderly. A series of faces are shown to patients, which progressively represent the level of distress caused by pain and the face best expressing the pain is chosen (faces representing no, mild, moderate and severe pain)[12].

Then, patients were asked which, in their opinion, the best tool to evaluate pain intensity was.

Peripheral blood samples were collected for vitamin D measurement and levels obtained were classified in deficiency when <20ng/dL, insufficiency when between 20 and 30ng/dL, normal when >30ng/dL, and above normal when >100ng/dL[13].

Statistical analysis

The statistical program SPSS version 11.5 was used, and Chi-square and Two Proportions equality tests were performed and p value was calculated. Significance level was 5%.

This study was approved by UNIFESP Ethics Committee under n. 493019/2010 and all participants have read and signed the Free and Informed Consent Term (FICT).

RESULTS

From 330 elderly participating in the "Long-lived Project", 69 had CP, with prevalence of 20.9%.

The sample was made up of elderly people with mean age of 86.3 years, varying from 80 to 100 years, mostly females (87.8%), Caucasian (72.2%), widow/er (57.9%) and with

mean education level of 4 years (Table 1). According to health self-evaluation, most elderly have referred regular or good health, 44.3 and 43.6%, respectively (Table 1).

Table 1. Sample characterization according to socio-demographic data and health self-evaluation

	n	%
Gender		
Male	11	15.9
Female	58	84.0
Race		
Caucasian	48	69.0
African	2	2.89
Oriental	4	5.7
Mulatto	15	21.7
Marital status		
Married	14	20.2
Divorced	3	4.3
Widow/er	40	57.9
Stable union	5	7.2
Single	7	10.4
Education (years)		
Illiterate	11	15.9
1 to 4	33	47.8
5 to 8	8	11.5
9 to 11	11	15.9
>11	6	8.6
Health self-evaluation		
Excellent	5	7.2
Good	28	40.5
Regular	29	42.0
Poor	7	10.1

Pain was evaluated and measured in 61 individuals (8 of them have not stayed for pain evaluation/measurement). According to characteristics, most of them had continuous pain (59%), followed by intermittent (36%), incidental (9.8%) and paroxysmal (2%) (Table 2). With regard to location, most had low back pain (32.7%) and lower limbs pain (24.5%), especially knees (32.6%) and shoulders (8.1%) (Table 2). Primary triggering factors were ambulation and/or affected region movement (69%). And among pain attenuating factors, rest was the most prevalent (21%), followed by rest plus analgesics (16%), by analgesics alone (16%), rest associated to physical measures such as heat or ice (5%) and by physical measures alone (5%) (Table 2). As to nature, nociceptive pain was the most common (80%), followed by neuropathic (10%) and mixed (10%) pain (Table 2).

With regard to pain intensity, moderate to severe pain were the most common according to all applied scales (Table 2). No pain measures were obtained with VAS for most elderly because they had major difficulty to understand it. Preferred pain scales by the elderly were FS (49.1%) and VNS (18.0%) (Table 2).

Table 2. Chronic pain characterization and measurement in long-lived elderly

	n	%
Frequency		
Continuous/constant	37	53.6
Incidental	07	10.1
Paroxysmal	02	2.8
Intermittent	23	33.3
Location		
Low back	20	32.7
Knee	15	24.5
Shoulder	8	13.1
Whole lower limb	5	8.1
Others	13	21.3
Triggering factors		
Ambulation/movement	42	69.0
Others	19	31.0
Attenuating factors		
Rest	16	27.5
Analgesics	11	18.6
Rest/analgesics	11	18.6
Physical measure	05	8.4
Rest/physical measure/analgesics	10	16.9
Others	02	3.3
No attenuating factor	03	5.0
Types of pain		
Nociceptive	49	80.3
Neuropathic	6	9.8
Mixed	6	9.8
Intensity (FS)		
No pain	02	3.2
Mild	14	22.9
Moderate	26	42.6
Severe	19	31.1
Intensity (VerbalNS)		
Mild	05	8.1
Moderate	26	42.6
Severe	30	49.1
Intensity (VNS)		
No pain	03	4.9
Mild	06	9.8
Moderate	24	39.3
Severe	28	45.9
Intensity (VDS)		
No pain	01	16
Mild	05	8.2
Moderate	35	57.4
Severe	25	41.0
Preferred scales		
FS	30	49.1
VNS	11	18.0
VerbalNS	04	6.5
VAS	07	11.4

FS = faces scale adapted for the elderly; VNS = visual numeric scale; VerbalNS = verbal numeric scale; VDS = verbal descriptive scale; VAS = visual analog scale.

With regard to vitamin D levels, 49.2% of chronic pain elderly had vitamin D deficiency, 37.7% insufficiency, 11.5% normal levels, and 1.8% excessive levels (Figure 1). There has been no statistically significant association between CP and vitamin D serum levels.

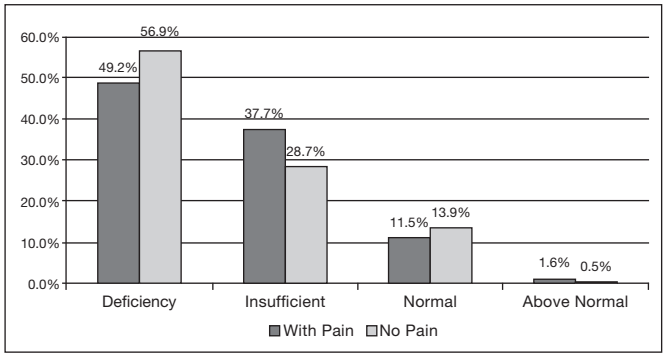

Figure 1. Correlation between chronic pain and vitamin D serum levels in the elderly

Deficiency (<20ng/mL) p=0.284, Insufficiency (20-30ng/mL) p=0.18, Normal (30-70ng/mL) p=0.628; above normal (>150ng/mL) p=0.352.

DISCUSSION

Our study has found high prevalence of CP among evaluated long-lived elderly (20.9%). According to the literature, its prevalence in the elderly varies between 28.9 and 85%[14-20]. This variation depends on several factors: established definition to characterize CP, regional socio-demographic differences and pain evaluation method. There is higher CP prevalence with increased age, with institutionalization or when the elderly are link to health services[14-16].

CP prevalence might have been underestimated since most elderly were already being regularly followed up by the geriatrics ambulatory and so CP could already have been controlled or minimized at evaluation time.

Although the number of long-lived elderly addressed by this study was not very high, no other studies were found in Brazil about CP prevalence, characteristics and measurements in specifically very old population and with functional independence. This fact has prevented the establishment of comparisons between pain characteristics and pain intensity measurements.

Higher prevalence of CP among elderly females is in line with the literature and may be related to the fact that females develop more musculoskeletal problems due to their anatomic and functional uniqueness, such as low stature, less muscle mass and bone density, more joint laxity and lower level of adaptation to physical effort as compared to males[14]. According to Croft, Blyth and van der Windt[21], the difference in pain prevalence between genders may be explained by three theories: gender, exposure and vulnerability theories. The first states that it is more socially accepted for females to report pain, and that males have higher pain threshold as compared to females. The exposure theory states that females are more exposed to risk factors for musculoskeletal pain, such as domestic activities. And according to the vulnerability theory, females are more prone to develop musculoskeletal pain due to psychological aspects related to sexual hormones. Global statistics involving elderly with CP have also observed higher frequency of pain among Caucasoids[18,19].

For marital status, some authors have suggested that loneliness feelings, such as in widowhood, could cause distress, vulnerability, loss of control and, consequently, could worse or perpetuate pain[15,16,18]. However, a study by Lacerda et al.[19] has observed predominance of CP among married elderly or those living in the community. In our studied population there has been predominance of widowhood (57.9%).

As to education, some authors suggest that this might be an important factor for pain control, since the level of education could contribute for adequate understanding and adhesion to pain-related recommendations[19]. Our study has observed pain predominance among long-lived elderly with low education level (mean of 4 years), which could point to inadequate adhesion to analgesic therapies, maybe for not understanding pain control recommendations.

Low back pain was the most prevalent among studied long-lived elderly, followed by lower limbs pain, especially knees. A systematic review on musculoskeletal CP in Brazilian elderly people has found similar results[14]. Urwin et al.[22], studying the prevalence of musculoskeletal disorders in 5 thousand individuals from Manchester, United Kingdom, have found higher prevalence of low back pain in adults and knee pain in elderly aged 65 years or above. It has been emphasized that low back pain is one of the most common causes of incapacity among the elderly and also that the presence of lower limbs pain may lead to gait disorders and falls[23], which would contribute for the negative impact on the health of such individuals.

Our study has found that affected region movement and/or ambulation were the most common CP triggering factors among the elderly (69%). According Dellaroza, pepper and Matsuo[18], physical activities such as walking, climbing stairs and do some exercise, were the factors that triggered DC in the elderly.

Martinez et al.[20], addressing the same factors, have pointed physical effort and weather as the most important pain triggering factors among the elderly. It is important to recognize such factors when studying pain in elderly populations because this may cooperate for better CP control in those individuals[20,23-25].

With regard to pain intensity measurement, few tools were already standardized to be used with the elderly[25,26]. Literature points to lack of standardization in the use of scales to measure pain intensity which makes difficult comparisons among studies. In our study we decided for most common one-dimension tools used in Brazil, even for comparison purposes. Pain verbal scales are valid and reliable to measure pain in the elderly, but some of them are not adequate for people with cognitive disability or difficulty to understand words[25-27].

Most evaluated long-lived elderly had moderate to severe pain, according to all scales used. Moderate to severe pain tends to be disabling, affecting QL, decreasing social interaction and impairing daily life and leisure activities. A study carried out in Spain has reported prevalence of moderate to severe pain of 86.4% among the elderly[28]. In Brazil, a study carried out in Goiânia has observed high prevalence of severe

pain among the elderly (severe or worst possible in 54.6%)[15]. In a study carried out in Londrina, 16 (38.4%) of the elderly have reported moderate pain, and 10% severe pain, being that pain was measured by a scale from zero to 10, with scores 1 to 3 considered mild, 4 to 6 moderate and 7 to 10 severe.

As to preferred pain evaluation tools, FS and NVS were preferred by long-lived elderly in 49.1% and 18.0% of cases, respectively. Searching the literature for the best one-dimension tools for pain measurement in the elderly, it was found that VerbalNS was preferred by the elderly, including those with mild to moderate cognitive deficits who could have found some difficulties due to inadequate mastering of arithmetic properties[26,28]. According to Herr & Garand[25], FS, originally developed for pediatrics, has shown to be a reliable alternative to measure pain in individuals with low education level and without cognitive changes or with mild changes. In our sample, still with regard to pain measurement tools, most were unable to report pain intensity according to VAS, which is widely used worldwide. Gagliese & Melzack[28] have also observed that approximately 30% of the elderly without cognitive deficits are unable to understand this pain measurement visual analog tool.

By analyzing vitamin D, we have found serum levels compatible with vitamin D deficiency in 87% of long-lived elderly and such vitamin deficit was not significantly correlated to chronic pain. A recent literature review on CP and vitamin D in the elderly has suggested association between vitamin D deficit and pain, however just considering musculoskeletal pain[29]. Turner et al.[30], studying individuals looking for treatment for CP, have observed inadequate vitamin D levels in 26% of patients, in whom opioid analgesia needs were also significantly higher. In a study by Atherton et al.[31] CP was more prevalent among middle-aged females with vitamin D deficiency, but the same was not observed with regard to males. Similarly, a different study has found that vitamin D deficiency was significantly associated to back pain in females, but not in males[32].

It is not clear whether vitamin D deficiency is cause, effect or simply epiphenomenon in situations of pain, so more studies are needed on the subject, especially considering the elderly population, whose growth is associated to increased estimates of chronic pain and vitamin D deficiency. Studies addressing chronic pain and vitamin D serum levels in the elderly are still scarce.

CONCLUSION

There has been high prevalence of CP among long-lived elderly living in the community, often of moderate to severe intensity, located on lumbar spine and lower limbs. Preferred tool by the elderly to measure pain was FS. There has been no significant correlation between CP and vitamin D serum levels among studied patients; however one should stress the need for further studies on this subject since vitamin D deficiency has been pointed by current literature as a factor associated to pain.

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