

Importance of Raising Awareness in People in Charge of Old Age Homes About Metabolic Bone Diseases and Their Prevention for the Elderly

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Disclose and conflicts of interest: none to be declared by all authors

ABSTRACT

Introduction: vitamin deficiency, lack of sun exposure, and a sedentary lifestyle are factors that make the elderly susceptible to comorbidities, such as metabolic bone diseases. Thus, people in charge of nursing homes must be aware of such habits in favor of a better quality of life for the elderly. The present study aimed to analyze the habits adopted by nursing homes in Ribeirão Preto, state of São Paulo, as well as to bring knowledge to professionals about the importance of maintaining such habits for a healthy life.

Methods and Results: when administering questionnaires to those in charge about the institutional habits, together with the explanation of an informative folder, it was noticeable that concerning food and exposure to sunlight, most homes were doing very well, with some divergences just in terms of physical exercise. However, in the promotion of knowledge about the prevention of metabolic bone diseases, both for those in charge and for the residents, the result was not satisfactory.

Conclusion: in this way, it was possible to study the knowledge of the team involved on this subject and especially to make them aware of the importance of maintaining such habits for a good quality of life for the elderly.

Keywords: Metabolic Bone Diseases; Elderly; Sedentary lifestyle; Food; Sun light.

Introduction

According to data from the Brazilian Institute of Geography and Statistics¹, in the last decade, Brazil has undergone an inversion of the pyramid related to its population characteristics. According to Meireles (2007)², the term “aging” is no longer limited to developed countries and has also started to characterize developing countries.

With the decrease in the birth and mortality rate, there was a demographic change regarding the increase in the population from the age group over 35 years to 80 years or more, characterizing an aging population^{1,2}.

The aging process refers to the progression from adulthood to the end of life, with physiological, morphological, biochemical and psychological changes². These characteristics, combined with vitamin deficiency through diet, as well as lack of exposure to sunlight and a sedentary lifestyle, can make the elderly more susceptible to comorbidities, increase the mortality rate and impair psychosocial health³⁻⁵.

Among the physiological changes of aging, endocrine, gastrointestinal and renal alterations can be mentioned, which may require a greater nutritional

need for the maintenance of bone and muscle tissues⁶. In the case of systemic diseases affecting the bone, osteoporosis, rickets, osteomalacia, primary hyperparathyroidism and Paget's disease⁷⁻⁹ stand out.

Osteoporosis is a metabolic bone disease, resulting from reduced bone mass and bone tissue microarchitecture, and is considered a global public health issue due to its high incidence in individuals over 60 years of age⁷⁻⁹.

The main factors that cause osteoporosis include previous pathological fractures, a sedentary lifestyle, lack of calcium and vitamin D, hyperparathyroidism, use of medications (corticosteroids, anticonvulsants, and diuretics), and lifestyle (alcoholism and smoking)⁹.

The decrease in proprioception in the elderly, together with the lack of calcium and vitamin D, can contribute to an increase in falls, mainly leading to fractures of the hip, femur and/or vertebrae⁷. According to the World Health Organization (2014), osteoporosis is one of the main causes of morbidity, loss of functional capacity and mortality in the elderly^{10,11}.

In addition to the great clinical impact, osteoporosis also affects the socioeconomic scope of those who have the disease, as treatment after a fall usually requires surgical intervention^{10,11}.

Exposure to sunlight, and a balanced diet associated with the regular practice of physical exercises (with intensity compatible with age), act in the maintenance of vitamin D levels and serum levels of calcium available for the bone turnover process. A low vitamin B12, B6 and folate hinders some enzymatic reactions. Such deficiency raises the level of homocysteine, which interferes with collagen cross-links, leading to lower bone strength⁴.

Thus, it is extremely important to disseminate knowledge about the metabolism of bone tissue, along with good eating habits and frequent physical activity among those in charge of nursing homes - directors, coordinators, and collaborators - through a multidisciplinary team. Such cooperation between health professionals and home care professionals should contribute to a better quality of life for the elderly, preventing falls and the development of diseases, and optimizing the conditions inherent to this stage of life.

Aiming at this, we analyzed the habits adopted by nursing homes in the city of Ribeirão Preto, state of São Paulo. Also, we developed a program to make those in charge aware of the possibilities, through a didactic folder, designed by the project participants, about the importance of maintaining habits to prevent metabolic bone diseases.

Material and Methods

The present study was approved by the Research Ethics Committee of the School of Dentistry of Ribeirão Preto, University of São Paulo, approval number CAAE 52964021.7.0000.5419.

Through an internet search, 30 (thirty) nursing homes were located. First, an initial contact was made, via telephone, to contextualize the objective of the project and, thus, those in charge of the institutions were invited to participate in the research, through an invitation letter sent via email. From the 30 institutions contacted, only 12 (twelve) nursing homes agreed to participate in this project. The research was based on the following questions about the habits of each institution:

1. Does the institution have nutritionists? () Yes () No
2. Do the residents have access to soft drinks, fried foods, snacks and/or sweets? () Yes () No
3. Is the diet varied throughout the week? () Yes () No
4. Do residents perform physical activities in the sun? () Yes () No
5. Are any areas of the institution exposed to sunlight? () Yes () No
6. Do the residents perform physical activity with the accompaniment of a physical educator? () Yes () No
7. If yes, what types of materials are physical activities developed with (ball, rope, broomsticks, etc)?
8. How many days a week is a physical activity

offered?

9. Regarding knowledge about metabolic bone diseases and prevention, does the institution promote knowledge about diseases and preventive activities (awareness of smoking, alcoholism, the importance of eating well and participating in physical activities)? () Yes () No

When the visits were carried out, those in charge (directors, coordinators, nurses and/or employees) were informed about the purpose of the project, and, upon consenting to participate, they signed an Informed Consent Term. Only after that, they answered the questionnaire, which was mediated and coordinated by an undergraduate student. The visits happened between April and July of 2022.

The questionnaire was designed from references and scientific articles found in the scientific literature and was based on aspects that were positively correlated with a good lifestyle and bone quality in the elderly.

After collecting the data from the questionnaire of the present study, an informative folder was presented to those in charge educating about the prevention of metabolic bone diseases and the importance of such habits in the lives of the elderly. At the end of the visit, the folder was explained by an undergraduate student to those in charge and then displayed in a visible place at the institutions, such as in cafeterias, kitchens, outdoor areas or living rooms.

Research data were tabulated in an Excel[®] spreadsheet (Microsoft Corp., Redmond, WA, USA) and subjected to descriptive statistics.

Results

Regarding food, among the 12 (twelve) nursing homes that answered the questionnaire, all of them had nutritionists in their list of professionals. Of these, 5 (41.7%) institutions had a monthly variation, 5 (41.7%) had a weekly variation, and only 2 (16.6%) had a biweekly variation of the menu prepared for the residents.

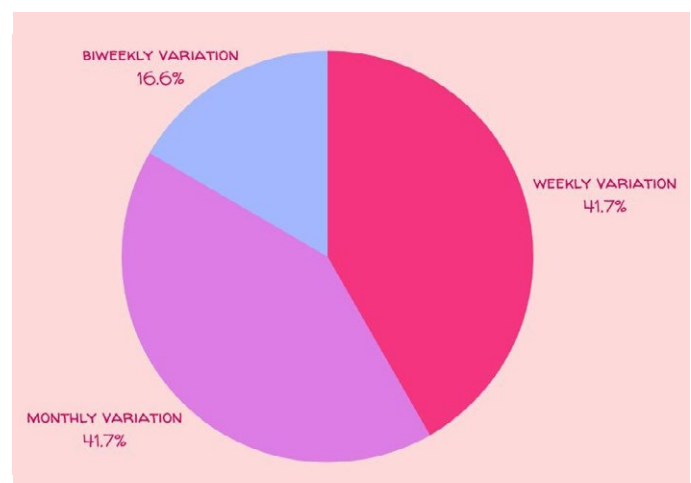


Figure 1. Diversified diet. Food data regarding diversification in biweekly, weekly and monthly variations in nursing homes. Source: research data.

Still, concerning food, 9 (75%) allowed the consumption of sweets, fried foods, soft drinks and snacks only on special occasions or events. Meanwhile, in 3 (25%) nursing homes this food group was offered on demand.

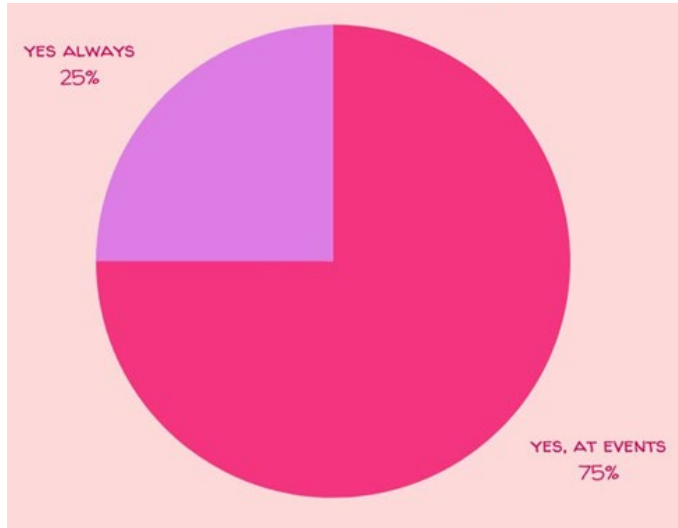


Figure 2. Data on access to soft drinks, sweets, fried foods and/or snacks. Source: research data.

As for physical activities, 100% of institutions had the support of professionals, such as physical educators, occupational therapists, and physical therapists. As well as the use of materials such as balls, ropes, broomsticks, and others, to assist in physical activity.

However, very divergent results were obtained between the institutions regarding the number of days in which the activities are offered and the total number of weekly hours in which the residents practice the exercises. Only 3 (25%) indicated the amount of physical activity between 4 and 6 days a week. For 2 to 3 days a week, 7 (58%) institutions were identified; and, for 1 day a week, only 2 (16.7%). Data are illustrated in Figure 3.

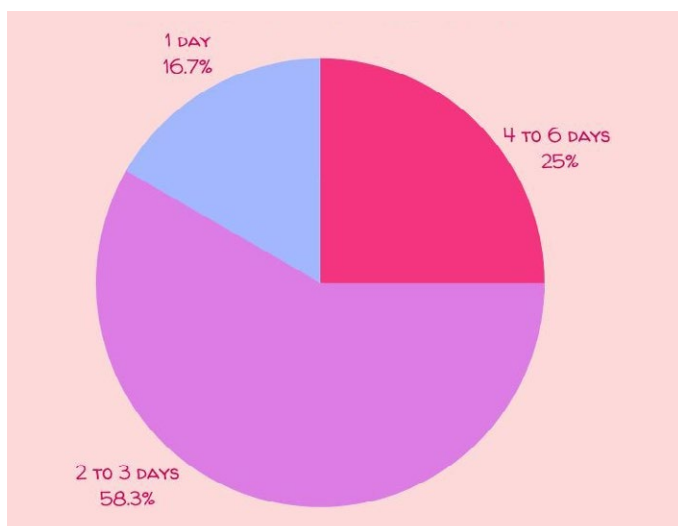


Figure 3. Data on the days of the week dedicated to physical exercise. Source: research data.

For sunlight exposure, only one nursing home had neither space nor time for the elderly to obtain vitamin D through the sun. However, this institution, which does not have an environment with exposure to sunlight in its infrastructure, promotes physical activity in the sun through group walking. Regarding the practice of physical activities in sunlight, 9 (75%) nursing homes promoted this activity.

Finally, 7 (58.3%) of the nursing homes did not promote knowledge about metabolic bone diseases among their residents (Figure 4). And yet, only one (8.3%) received external institutions to explain this matter.

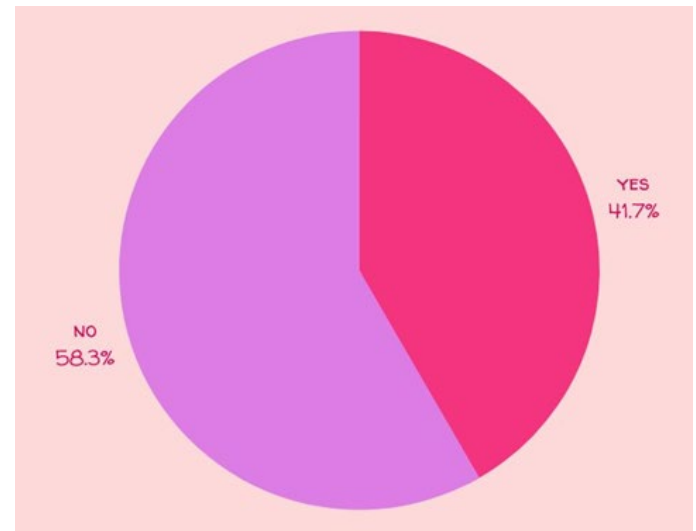


Figure 4. Promotion of knowledge about metabolic bone diseases and prevention. Data regarding the promotion of knowledge about metabolic bone diseases and prevention. Source: research data.

Discussion

According to Morais and Burgos (2007)¹², nutrition is a key factor in the development and maintenance of bone mass, as well as in the prevention of osteoporosis. In the present study, positive results were obtained with the professional exercise of nutritionists involved in the care of the diet of the nursing homes residents.

The fact that all the institutions participating in the research have these professionals in their list of employees demonstrates a concern of those in charge of the adequate nutrition of the elderly, with monthly, biweekly, and even weekly variations in the menu¹².

According to Marchini and Ferriolli (2014)⁶, a diet rich in calcium should be encouraged for all the elderly, as well as foods with high sodium contents should be prevented. Regarding the consumption of sweets, soft drinks, fried foods, and snacks - considered unhealthy -, only 25% of all nursing homes offer them on demand for their residents. Most have shown to present these types of foods only on special occasions, such as special events and birthdays. These data indicate the concern and willingness of the institutions to take care of the resident's diet, allowing the consumption of such foods only in moments of leisure.

According to Carvalho et al. (2003)¹³, nutrition, in combination with other measures, increases life expectancy with quality, acting in the prevention and control of various diseases. Because of this, the monthly, biweekly and/or weekly variations of the menu prepared by professional nutritionists, as seen in the present study, help in the adequate consumption of vitamins, vegetables, carbohydrates, proteins, etc., which may help in the prevention and control of degenerative diseases and disorders associated with aging¹³.

Regarding sun exposure, according to Yazbek and Neto (2008)⁹, vitamin D is essential to maintain a healthy skeleton and improve calcium reabsorption. According to the authors, sunlight is the main source of vitamin D absorption, which in turn is essential for bone health.

In the present research, only 1 (one) institution showed no exposure to sunlight, and the other 11 (eleven) guaranteed in their infrastructure an adequate environment for the maintenance of such a habit. These data reinforce bone maintenance by caregivers, since exposure to sunlight, combined with physical activities, assists in the absorption of calcium in the body, which is important for the growth and strengthening of bones, which, consequently, prevents metabolic bone diseases⁹.

Considering physical activities, 100% of nursing homes in the present study had specialized professionals to help the elderly, such as physical educators, physical therapists and occupational therapists, who use materials such as balls, broomsticks, ropes, etc., to assist in exercise performance.

In agreement with Tartaruga et al. (2015)⁵, there are numerous studies analyzing the influence of strength training on hormone and calcium production as a way of prevent bone cracks and fractures. That said, the regular practice of physical exercises by elderly individuals is essential, so that they can strengthen

their bones, in a way that prevents the incidence of metabolic bone diseases.

The fact that 75% of participating nursing homes promote the habit of physical exercises in the sun demonstrates a commitment on the part of those in charge to prevent certain diseases, not only metabolic bone ones, and guarantee a good quality of life for their residents since that unites two healthy habits in a single activity.

Finally, according to the Culture and Extension Project designed by the State University of Londrina - UEL, on "Oral health promotion for elderly patients"¹⁴, it is noted a movement of awareness and care for the elderly, given that the project aimed to promote quality of life in the elderly by developing health promotion actions, to inform the elderly about the necessary care and making the community aware of the importance of preventing oral diseases.

Therefore, in the present research, only 5 (41.7%) institutions were involved in the promotion of knowledge about metabolic bone diseases and their prevention, while more than half of the sample was not involved with this practice. Concerning metabolic bone diseases and their prevention, this indicates that although there are awareness programs and initiatives aimed at the elderly niche, such initiatives did not reach in their entirety the participating nursing homes.

Conclusion

In conclusion, this study analyzed the knowledge of the health team involved in the care of the elderly and the prevention measures adopted by the home care institutions through questionnaires administered to those in charge of the participating nursing homes. Also, it was possible to bring knowledge about this subject to professionals and also to residents, alerting those in charge about the importance of maintaining habits to prevent metabolic bone diseases through the folder developed for the present study.

References

1. Instituto Brasileiro de Geografia e Estatística. 2022. Disponível em: <https://www.ibge.gov.br/apps/populacao/projecao/>
2. Meireles V, Matsuda L, Coimbra J, Mathias T. Características dos Idosos em Área de abrangência do Programa Saúde da Família na região noroeste do Paraná: contribuições para a gestão do cuidado em enfermagem. Rev Saude Soc. 2007; 16 (1): 69-80. Disponível em: <https://doi.org/10.1590/S0104-12902007000100007>
3. McKenna M, Freaney R, Meade A, Muldowney F. Prevention of hypovitaminosis D in the elderly. Calcif Tissue Int. 1985; 37 (2): 112 - 116. Disponível em: <https://doi.org/10.1007/BF02554828>
4. Coussirat C, Batista C, Schneider R, Resende T, Schwanke C. Vitaminas B12, B6, B9 e homocisteína e sua relação com a massa óssea em idosos. Rev Bras Geriatr Gerontol. 2012; 15 (3) 577-585. Disponível em: <https://doi.org/10.1590/S1809-98232012000300018>
5. Tartaruga M, Ambrosini A, Mello A, Severo C. Strength training in older: a multidisciplinary perspective. EFDeportes.com - Rev Digital (Buenos Aires). 2005; 10(82). Disponível em: <http://www.efdeportes.com/efd82/treinam.htm>
6. Marchine J, Ferriolli E, Moriguti J. Suporte nutricional no paciente idoso: definição, diagnóstico, avaliação e intervenção. 1998; 31 (1): 54-61. Disponível em: <https://doi.org/10.11606/issn.2176-7262.v31i1p54-61>
7. Gali, J. Osteoporose. Acta Ortopédica Brasileira. 2001; 9 (2): 3-12. Disponível em: <https://doi.org/10.1590/S1413-78522001000200007>
8. Carvalho C, Fonseca C, Pedrosa J. Educação para a saúde em osteoporose com idosos de um programa universitário. Cad. Saúde Pública. 2004; 20(3):719-726. Disponível em: <https://doi.org/10.1590/S0102-311X2004000300008>
9. Yazbek M, Neto J. Osteoporose e outras doenças osteometabólicas no idoso. Einstein. 2008; 6 (Supl 1):S74-S8. Disponível em: <http://apps.einstein.br/revista/arquivos/PDF/749-Einstein%20Suplemento%20v6n1%20pS74-78.pdf>
10. Jaime C, Felicíssimo P, Monteiro J. A epidemiologia e o impacto socioeconômico das fracturas da extremidade proximal do fêmur. Acta Reumatol Port. 2009 Jul-Sep;34(3):475-85. Disponível em: <http://hdl.handle.net/10400.10/41>

11. Ministério da Saúde Brasileiro. 2014. Disponível em: <<https://portal.arquivos.saude.gov.br/images/pdf/2014/abril/02/pcdt-osteoporose-2014.pdf>>.
12. Moraes G, Burgos M. Impacto dos nutrientes na saúde óssea: novas tendências. *Rev Bras Ortop.* 2007; 42 (7): 189-94. Disponível em: <https://doi.org/10.1590/S0102-36162007000700002>
13. Carvalho E, Silva F, Melo M, Carvalho C. Avaliação da qualidade nutricional das refeições servidas aos idosos em instituição asilar. *Estud Interdiscip Envelhec.* 5. Disponível em: <https://doi.org/10.22456/2316-2171.4732>
14. Ursi W, Barbosa C, Silva C, Silva L, Ferraresso L, Higasi M, Casemiro S. Promoção de saúde bucal para pacientes da terceira idade. *Anais 37º SEURS - Saúde.* Disponível em: <https://repositorio.ufsc.br/handle/123456789/199285>

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Received: October 25, 2022
Accepted: November 23, 2022

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