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Analysis of the bone density of women aged 60 to 70 referred to the bone densitometry department of a clinic in the Vale do Mucuri (MG)

Análise da densidade óssea de mulheres de 60 a 70 anos encaminhadas ao setor de densitometria óssea de uma clínica do Vale do Mucuri (MG)

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ABSTRACT

Introduction: Osteoporosis is one of the main public health problems that affect the elderly (age over 60 years), which is characterized by the reduction of bone mineral density (BMD) along with the deteriozation of the microarchitecture of the bone tissue, which causes the elevation of skeletal fragility and the probability and risk of fractures. Objective: Therefore, this study aims to analyze the bone density of women between 60 and 70 years of age referred to the bone densiometry sector of a clinic in the Mucuri valley, in Nanuque (MG). Methodology: The research used in this study is classified as a documentary research because it aims to analyze bone density in a group of women aged 60 to 70 years who underwent bone densiometry in a clinic in Nanuque Minas Gerais. Results: In addition, it is worth mentioning that one third of women with sixty-five years of age have osteoporosis and 50% of women over 75 years of age have the diagnosis of this pathology, that is, the evaluation of the patient's age is fundamental for the analysis of the diagnosis, treatment and evolution of the pathology Conclusion: After the end of the study conducted in the city of Nanuque identified that the objectives present in the article were achieved, Since it was possible to analyze the bone density of women aged 60 to 70 years in this municipality, the age group, the diagnosis after the test result and ethnicity were also identified.

Keywords: Osteoporosis, Bone density, Women.

1 INTRODUCTION

Aging is a natural and physiological process that causes several biological and physiological changes in our body, which can cause considerable limitations preventing most of the time from performing activities of daily living, such as brushing teeth, going to the bathroom,

eating, among others (BANDEIRA, 2007).

These changes encompass the muscoskeletal system, with the reduction of muscle mass, degenerative joint changes, weight gain, reduction of balance and bone mass, which can cause osteoporosis and ostenia (RODRIGUES and BARROS, 2016).

Osteoporosis is one of the main public health problems that affect the idados (age over 60 years), which is characterized by the reduction of bone mineral density (BMD) along with the deteriozation of the microarchitecture of the bone tissue, which causes the elevation of skeletal fragility and the probability and risk of fractures (CARVALHO, 2004).

Currently this pathology affects approximately more than 200 million people worldwide, where in Brazil alone it is estimated that approximately 10 million people are diagnosed with this disease, causing more than 2,000 deaths due to falls and fractures from osteoporosis. In addition, it is estimated that this disease affects 10 times more women when compared to men (BRAZIL, 2014).

Thus, due to the relevance, high incidence rate and making this pathology a public health problem not only in Brazil and in the world, there was a need to conduct research and studies on the subject. Bone density decreases as age progresses, reaching women with high frequency. Given this, the concern in the problem has been growing (CARVALHO *et al*, 2022).

One of the ways to know and diagnose this pathology is through the evaluation of bone density, so this study aims to analyze the bone density of women between 60 and 70 years of age referred to the bone densiometry sector of a clinic in the Mucuri valley, in Nanuque (MG).

2 THEORETICAL FOUNDATION

2.1 CONCEPT AND EPIDEMIOLOGY OF OSTEOPOROSIS

Osteoporosis is a systemic and progressive pathology, which is characterized by the reduction of bone mass and deterioration of the microarchitecture, causing it to happen to the fragility of the bone and increasing the likelihood of fractures. In fact, there is the existence of mass, but when present it is normal (GUARNIERO and OLIVEIRA, 2004).

In the normal physiology of bone is often deposited by osteoblasts and absorbed in the places where the osteoclasts are activated, so when functioning normally, except in the growing bones, there is stabilization between destitution and bone assimilation, however, in osteoporosis there is disproportion between osteoblastic and osteoclastic activity, with preponderance of the latter (GALI, 2001).

To better understand, the formation of bone and muscle mass is up to 35 years of age, with bone mass being greater in men than in women, and from that age begins to lose. Bone loss is around 0.3% per year, where in women the loss is even higher in the first 10 postmenopausal years, reaching 3% per year, being even higher in women who do not practice physical activity (BRAZIL, 2014).

Osteoporosis is something that can happen in the life mainly of women, because, according to the WHO (World Health Organization) a third of white women over 65 years of age develop osteoporosis, reaching more than 50% for women over 75 years of age, and may suffer from osteoporotic fracture (BRAZIL, 2014).

In men, it is estimated that most hip fractures originate due to osteoporosis, and 25% of white men have the probability of developing the chance of having another type of fracture developed due to osteoporosis (CARVALHO, 2004).

In Brazil, according to data from 2021, approximately 10 million people live with osteoporosis, however, only 20% have the diagnosis of the disease, with a high rate of deaths in the country, reaching 200 thousand per year (BRASIL, 2021).

2.2 CLASSIFICATION OF OSTEOPOROSIS

The disease osteoporosis can be classified in two ways, the first called primary or also idiopathic, and the second called secondary. The primary subdivides into two subtypes, type I and type II (BANDEIRA, 2007).

In primary osteoporosis type I, also called postmenopausal osteoporosis, there is accelerated loss of bone part being sudden after the beginning of the menopause phase, reaching the trabecular bone and is associated with fractures of the vertebrae and distal radius. In type II also known as senile, this type is linked to aging and emerges by chronic calcium deficiency, increased parathyroid hormone activity and reduced bone formation (GALI, 2001).

Secondary osteoporosis occurs due to inflammatory processes, among them, such as rheumatoid arthritis, endocrine changes such as hyperthyroidism and adrenal confusions, multiple myeloma and disuse, such as users of drugs such as heparin, alcohol, vitamin A and corticosteroids. Corticosteroids block intestinal inhalation of calcium and increase its urinary elimination, reduce osteoblastic formation and increase osteoclastic reabsorption (GALI, 2001).

2.3 RISK FACTORS FOR THE DEVELOPMENT OF OSTEOPOROSIS

The risk factors linked to osteoporosis be related to two situations, the first related to the person also called individual and others linked to the environment he resides also called environmental. Individual risk factors are considered the history of cases of osteoporosis in the family, white woman, presence of scoliosis, thin individuals, small constitutional type and premature appearance of white hair (RODRIGUES and BARROS, 2016).

Environmental factors are linked to alcohol use and smoking, which inhibit the multiplication of osteoblasts, caffeine, which increases calcium excretion, sedentary lifestyle, inadequate nutrition, diet rich in fiber, proteins and sodium, which reduce calcium absorption, women who do not have children, amenorrhea by exercise, early menopause and endocrinopathies (RODRIGUES and BARROS, 2016).

2.4 DIAGNOSIS AND TREATMENT

Osteoporosis like other pathologies has its diagnosis based on clinical history, physical examination and secondary examinations, however, in most cases osteoporosis only manifests through fracture or complaint low back pain, in addition to that more common symptoms such as muscle spasm, microfractures and compression fractures may arise (CARVALHO *et al*, 2022).

In laboratory tests, the following are requested: blood count, ESR, protein electrophoresis, renal function tests, calcium and phosphorus measurements, alkaline phosphatase and 24-hour calciuria. In addition, if necessary always requests the markers of bone formation and resorption, which bone alkaline phosphatase, osteocalcin and procollagen type I C-Terminal Peptide (PICP), hydroxyproline, pyridinoline, deoxypyridinoline and Ntx. Finally, special tests may also be requested, among them, the dosage of 25 OH vitamin D and 1.25 di OH vitamin D (GUARNIERO and OLIVEIRA, 2004).

With regard to diagnostic imaging, radiographs and bone densitometry may be requested. In the x-ray is identified the reduction of bone density, which can vary by up to 30%, however, the x-ray there is no possibility of measuring the amount of bone loss, but one can find vertebral collapse or shyness, biconcave compression of the discs, Schrmol nodules and thinning of the corticals (GUARNIERO and OLIVEIRA, 2004).

In bone densitometry, a serial study is used to diagnose the extent of the reduction and to identify the effectiveness of prevention or treatment, being the most indicated test to be a predictor of fractures, regardless of the site evaluated, the greater the osteoporosis the greater the chance of hip fracture (GALI, 2001).

Although there are forms of treatment, the main way is prevention, being indispensable the control of bone mass that depends on the caloric intake, the intake of calcium and vitamin D, normal menstrual function and physical activity, most of the therapeutic agents act on bone resorption, as antiresorptive (GALI, 2001).

Methods of preventing osteoporosis should begin in adolescence with the adjustment of adequate physical exercise, appropriate diet and the employment of a healthy standard of living. In drug therapy is recommended the intake of calcium and supplemental administration of vitamin D (GUARNIERO and OLIVEIRA, 2004).

3 METHODOLOGICAL PROCEDURES

The research used in this study is classified as documentary research because it aims to analyze bone mineral density in a group of women aged 60 to 70 years who were referred to the bone densiometry sector in a clinic in Vale do Mucri.

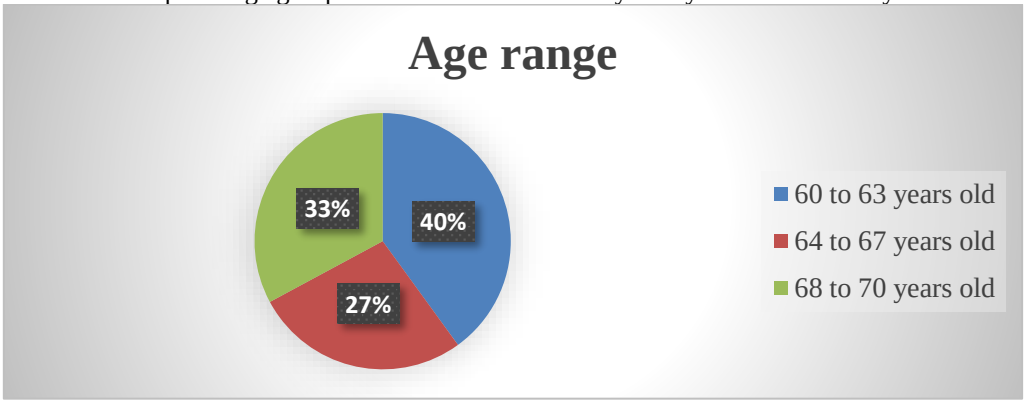
The documentary research took place through a sample of 100% of the results of hip and femur bone densiometry tests of women aged between 60 and 70 years in a clinic in the city of Nanuque, in the state of Minas Gerais. In addition to this sampling, a survey was conducted with the following data: age, ethnicity, and bone mineral density.

The clinic granted the authorization for the length of the scientific research, through a term of commitment, allowing access to the files of medical records and data of the results of the bone densitometry exams, since the names of the patients who performed the examinations were kept confidential.

4 RESULTS AND DISCUSSION

The purpose of this applied research was to analyze the bone density of women aged 60 to 70 years in the municipality of Nanuque, in the state of Minas Gerais. In this research, 70 women were analyzed, where 40% of them are aged between 60 and 63 years; 27% 64 to 67 years old and 33% of the medical records analyzed are from women aged 68 to 70 years, according to Graph 1:

Graph 1: Age group of women who were analyzed by bone densiometry.



Source: Research data

It is understood that as described in the literature, that age is a primary factor for the analysis of the possibility of the emergence of osteroporosis and osteopenia, because, after 30 years of age, the individual begins to lose 0.3% per year, and after menopause this loss can reach up to 10% per year (BRAZIL, 2014).

It is worth mentioning that one third of women with sixty-five years of age have osteoporosis and 50% of women over 75 years of age have the diagnosis of this pathology, that is, the evaluation of the patient's age is fundamental for the analysis of the diagnosis, treatment, and evolution of the pathology (BRASIL, 2021).

Osteoporosis is a condition characterized by decreased bone mineral density and deterioration of the microarchitecture of bone tissue, resulting in an increased risk of fractures. The early diagnosis of this disease is essential for the implementation of appropriate prevention and treatment strategies. In this context, bone densitometry emerges as an essential diagnostic tool (SMITH JR. *et. al*, 2020)

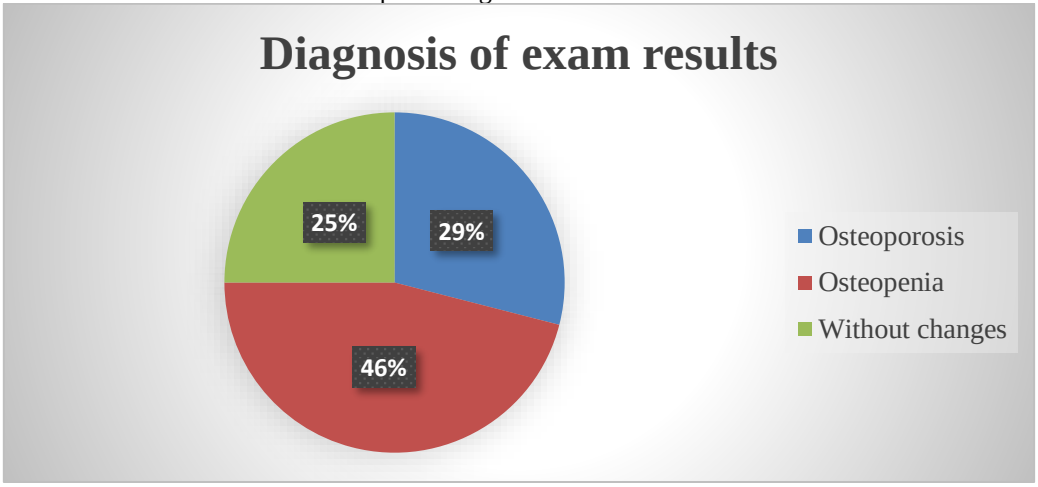
For Silva *et. al* (2021), bone densitometry is a noninvasive test that uses ionizing radiation to measure bone mineral density in specific regions of the body, such as the lumbar spine, hip and forearm. The results of bone densitometry are expressed as T-score and Z-score values. The T-score compares the patient's bone mineral density with that of a healthy young adult of the same sex and race, while the Z-score compares with the average of individuals of the same age, sex, and race.

The World Health Organization (WHO) has established criteria for the diagnosis of osteoporosis based on the T-score values obtained in bone densitometry. According to WHO guidelines, a T-score equal to or less than -2.5 standard deviations below the peak bone mass of a young adult is diagnosed as osteoporosis. A T-score between -1 and -2.5 is classified as osteopenia, which represents an intermediate stage of bone loss. It is worth mentioning that these criteria are

mainly applicable to postmenopausal women and men over the age of 50 years (SILVA *et. al*, 2018).

Graph 2 illustrates the diagnosis found in the Bone Densitometry exams, and 46% of the women have osteopenia, 29% osteoporosis and 25% of the medical records are of women who did not present alteration in the result of the examination.

Graph 2: Diagnoses of test results



Source: Research data

Osteoporosis is a health condition that primarily affects older women and is marked by a reduction in bone mineral density, increasing the risk of fractures. Bone densitometry, a widely used test to assess bone mineral density, is of paramount importance for women over 60 years of age, a period in which the risk of osteoporosis and fractures is significantly high.

As highlighted by Pereira *et al*. (2019), bone densitometry is an effective tool to identify changes in bone mineral density, allowing for early and targeted intervention. In this way, women in the age group above 60 years can benefit enormously when performing this examination, since bone loss accelerates significantly after menopause.

Silva and Santos (2018) state that performing bone densitometry in this population group is a fundamental preventive strategy. Through the early detection of changes in bone mineral density, it is possible to implement preventive measures, such as the adoption of a diet rich in calcium, regular exercise and, if necessary, drug therapy.

Importantly, osteoporosis is often asymptomatic until a fracture occurs, which makes bone densitometry even more crucial (PEREIRA *et al.*, 2019). By identifying decreased bone density before fractures occur, it is possible to significantly reduce the risk of complications and improve the quality of life of older women.

The appearance of these changes in bone densiometry, causing osteopenia (the loss of bone

massea naturally and gradually) and osteoperose (excessive loss of bone mass) is linked to postmenopause, aging and chronic calcium deficiency over the years (GALI, 2001).

The distinction between osteopenia and osteoporosis is of great clinical importance, as it helps to understand the progression of conditions and directs appropriate medical interventions. As highlighted by Silva *et al.* (2019), osteopenia and osteoporosis are related to decreased bone mineral density, but differ in severity and risk of fractures.

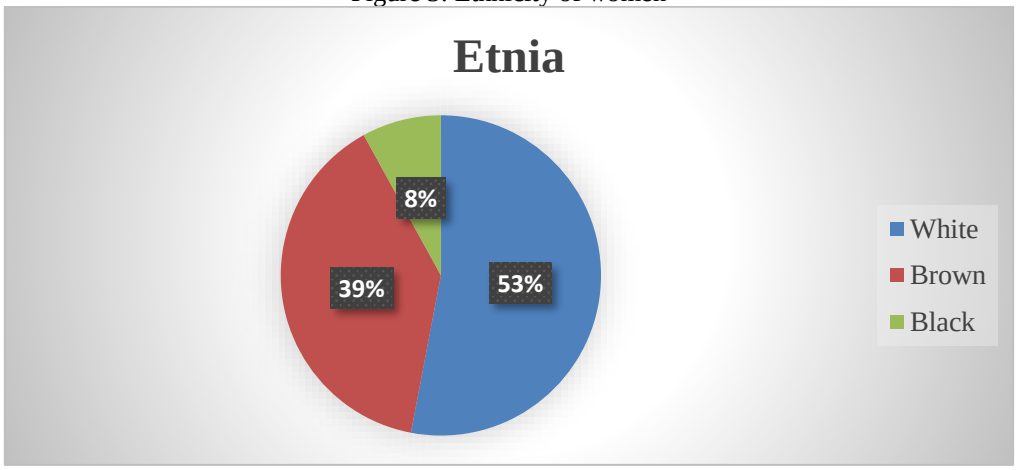
Osteopenia is often considered an intermediate stage between normal bone density and osteoporosis (SANTOS and PEREIRA, 2018). Silva *et al.* (2019) define osteopenia as a moderate reduction in bone mineral density, but that has not reached the diagnostic threshold of osteoporosis. Patients with osteopenia have an increased risk of developing osteoporosis and fractures, which reinforces the importance of early detection.

On the other hand, osteoporosis is characterized by a greatly reduced bone mineral density and a deteriorated bone microarchitecture, leading to a significantly increased risk of fractures (OLIVEIRA and RODRIGUES, 2020). According to these authors, osteoporosis is clinically diagnosed when bone mineral density reaches or exceeds a T-score of -2.5.

Therefore, it is essential to recognize the nuances between osteopenia and osteoporosis to implement prevention and treatment approaches appropriate for each situation (SANTOS and PEREIRA, 2018). By assessing bone mineral density through bone densitometry, healthcare professionals can determine which intervention is appropriate for the patient, whether through lifestyle changes, drug therapies, or other therapeutic strategies.

In graph 3, the ethnicity of the 70 women interviewed was analyzed, that is, the three ethnicities were analyzed, which are white, brown and black, obtaining the second result presented in graph 3:

Figure 3: Ethnicity of women



Source: Research data

Osteoporosis affects approximately more than 10 million people in Brazil, where it is estimated that this disease affects more than 10 times in white women than when compared to the others, so skin color is fundamental to identify the likelihood of developing changes in densiometry (RODRIGUES and BARROS, 2016).

The relationship between osteoporosis and ethnicity has been the object of study, since genetic differences and cultural characteristics may influence the incidence and severity of the disease. According to Carvalho *et al.* (2017), ethnicity plays an important role in variations in bone mineral density and the prevalence of osteoporosis.

Several epidemiological studies have indicated marked differences in the incidence of osteoporosis among different ethnic groups. In a study conducted in Brazil, Silva et al. (2018) observed a higher prevalence of osteoporosis in individuals of Asian and Caucasian descent compared to individuals of African descent.

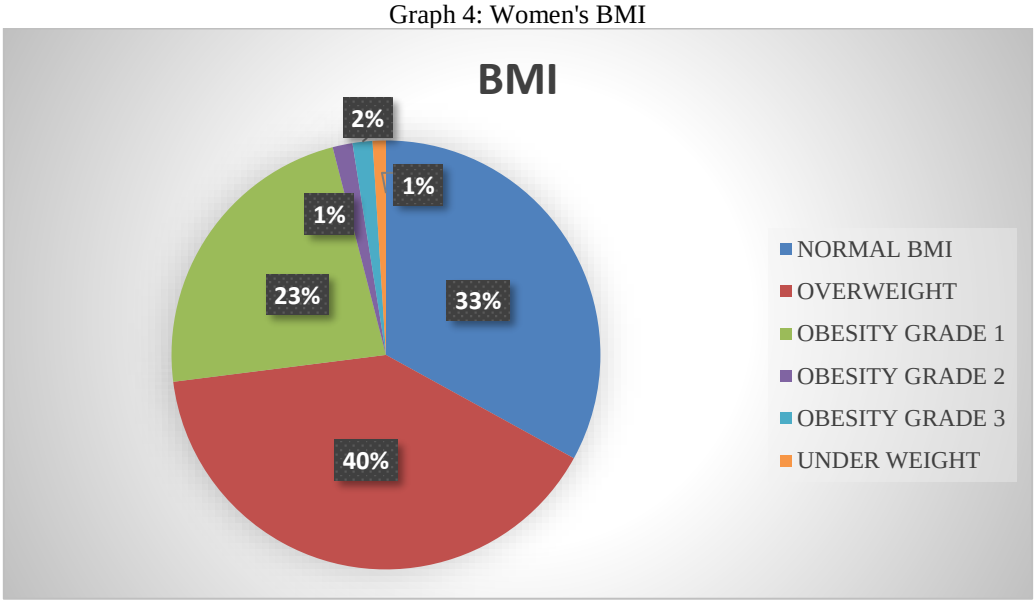
Genetic factors play a key role in this correlation. Carvalho *et al.* (2017) explain that variation in genes related to bone density and mineral metabolism can influence an individual's predisposition to osteoporosis. These authors also highlight that differences in calcium and vitamin D absorption rates, influenced by genetic factors, can directly impact bone health.

It is also worth noting that this disease is more frequent in white women due to the presence of lower levels of vitamin D found in these people with less melanin, and it is essential to replace this vitamin throughout life, however, white hair is not the only risk factor for the emergence of this disease (GUARNIERO and OLIVEIRA, 2004).

It is important to note, however, that the correlation between ethnicity and osteoporosis is not definitive, but rather a risk factor that interacts with other determinants such as age, sex, lifestyle, and family history (SILVA *et al.*, 2018). Therefore, individuals belonging to ethnic groups with a higher genetic predisposition to osteoporosis should be closely monitored and adopt preventive strategies to maintain bone health.

Finally, in graph 4, the Body Mass Index (BMI) of the women was addressed, which presented the following form: 40% overweight women, 33% with normal BMI, 23% with grade 1 obesity, 1% with grade 2 obesity, 2% with grade 3 obesity, and 1% with underweight women.

Graph 4: Women's BMI



Source: Research data

The graph points out the high rate of overweight and obese patients, representing more than 50%, which proves the link between body weight and osteoporosis index, as important as it is to perform weight control for the control of this pathology.

It is worth noting that this disease is more frequent in white women due to the presence of lower levels of vitamin D found in these people with less melanin, and it is essential to replace this vitamin throughout life, however, white skin is not the only risk factor for the emergence of this disease (GUARNIERO and OLIVEIRA, 2004).

5 FINAL CONSIDERATIONS

After the end of the study carried out in the city of Nanuque identified that the objectives present in the article were achieved, since it was possible to analyze the bone density of women in the age group of 60 to 70 years old in this municipality, in addition, identified the age group, the diagnosis after the result of the examination and the ethnicity.

In this research the reader had the opportunity to know better also about osteoporosis, its concept, epidemiology, diagnosis, prevention, risk factors, classification and treatment.

The data collected through the bibliographic research were evidenced in the documentary research, which served to give sustainability to the documentary study, being possible to prove that osteoporosis is more advanced in the pacietes over 65 years of age, and also in the white ethnicity

It is suggested for this study that in the next research be carried out the survey of not only these risk factors (age, sex and ethnicity), are also evaluated others, such as the use of alcohol and

drugs, the period of menopause, the woman who does not have children, among others that are relevant.

REFERENCES

BANDEIRA, E. C. Prevalência de osteoporose e fraturas vertebrais em mulheres na pós-menopausa atendidas em serviços de referência. Rev Bras Epidemiol. 2007;10:86-98.

BRASIL. Ministério da Saúde. Agir para a Saúde Óssea": 20/10 – Dia Mundial e Nacional da Osteoporose. 2021. Disponível em: <https://bvsms.saude.gov.br/agir-para-a-saude-ossea-20-10-dia-mundial-e-nacional-da-osteoporose/>. Acesso em: 01 de mai. 2023.

BRASIL. SECRETARIA DE ESTADO DA SAÚDE DA BAHIA. Protocolo Clínico e Diretrizes Terapêuticas: Osteoporose. 2014. Disponível em: <https://www.saude.ba.gov.br/wp-content/uploads/2020/03/PROTOCOLO-CL%C3%8DNICO-E-DIRETRIZES-TERAP%C3%8AUTICAS-OSTEOPOROSE.pdf>. Acesso em: 18 de abr. 2023.

CARVALHO, C.M; FONSECA, CC., PEDROSA, J. I. Educação para a saúde em osteoporose com idosos de um programa universitário: repercussões. Cad Saude Publica. 2004;20:719-726.

CARVALHO *et al*, Lanna do Carmo. As principais considerações clínicas da osteoporose para a saúde pública. 2022. Disponível em: <https://rsdjournal.org/index.php/rsd/article/download/30215/25954/344737>. Acesso em: 18 de abr. 2023.

CARVALHO K, SANTOS M, OLIVEIRA R. Correlação entre Etnia e Osteoporose. Revista Brasileira de Epidemiologia, v. 20, n. 4, p. 789-796, 2017.

GALI, Júlio César. Osteoporose. 2001. Disponível em: <https://www.scielo.br/j/aob/a/HrYxqDxKjnYTHnVxFySk6dn/?lang=pt>. Acesso em: 18 de abr. 2023.

GUARNIERO, Roberto; OLIVEIRA, Lindomar Guimarães. OSTEOPOROSE: ATUALIZAÇÃO NO DIAGNÓSTICO E PRINCÍPIOS BÁSICOS PARA O TRATAMENTO. 2004. Disponível em: <https://www.rbo.org.br/detalhes/24/pt-BR/osteoporose--atualizacao-no-diagnostico-e-principios-basicos-para-o-tratamento>. Acesso em: 18 de abr. 2023.

PEREIRA M, OLIVEIRA A, RODRIGUES L. Importância da Densitometria Óssea em Mulheres Acima de 60 Anos. Revista Brasileira de Geriatria e Gerontologia, v. 22, n. 1, p. 123-130, 2019.

RODRIGUES, Iara Guimarães; BARROS, Marilisa Berti de Azevedo. Osteoporose autorreferida em população idosa: pesquisa de base populacional no município de Campinas, São Paulo. 2016. Disponível em: <https://scielosp.org/article/rbepid/2016.v19n2/294-306/pt/>. Acesso em: 18 de abr. 2023.

SANTOS D, PEREIRA E. Osteoporose e Osteopenia: Uma Revisão. Revista de Medicina Interna Brasileira, v. 14, n. 3, p. 112-118, 2018.

SILVA A, *et al*. Correlation between age and bone mineral density in postmenopausal women: a population-based study. Rev Bras Reumatol. 2018;58(5):426-31.

SILVA A, SANTOS B, PEREIRA C. Diagnóstico da Osteoporose através da Densitometria Óssea. Revista de Saúde Óssea, Rio de Janeiro, v. 15, n. 3, p. 123-135, 2021.

SILVA A, SANTOS B, PEREIRA C. Diferenças entre Osteopenia e Osteoporose. Revista Brasileira de Saúde Óssea, v. 20, n. 2, p. 56-65, 2019.

SILVA A, SOUZA B, PEREIRA L. Diferenças na Prevalência de Osteoporose entre Diferentes Grupos Étnicos no Brasil. Revista de Saúde Pública, v. 22, n. 3, p. 432-439, 2018.

SILVA B, SANTOS D. Densitometria Óssea como Ferramenta Preventiva para Mulheres Idosas. Revista de Saúde Feminina, v. 15, n. 2, p. 56-64, 2018.

SMITH JR, SILVA A, PEREIRA M. Diagnóstico e Tratamento da Osteoporose. 2ª ed. São Paulo: Editora ABC, 2020.

OLIVEIRA F, RODRIGUES G. Características Clínicas da Osteoporose. Revista de Reumatologia Brasileira, v. 25, n. 1, p. 32-38, 2020.