Osteoporosis and Knowledge of Bone Decalcification in Workers of The National University of Education in Lima-Peru

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Article History	Abstract
	Objective. *to determine the relationship between osteoporosis and knowledge of bone decalcification in workers of a national university in Lima.* ***Materials and methods***. *Correlational study in workers over 40 years of age at the National University of Education in Lima-Peru. Purposive sample, a questionnaire validated by expert judgment with Cronbach's alpha of 0.926 was applied, and the participants gave their informed consent.* ***Results***. *A total of 104 workers were interviewed, of whom 36.54% (38) were male and 63.46% (66) were female, with an average age of 55.32 +/- 9.09 years and an average Body Mass Index of 26.06 +/- 4.32. Bone fractures affected 19.2% of respondents and 6% of their parents. On the other hand, 63.5% of participants had medium to high knowledge of bone decalcification. While the prevalence of osteoporosis reached 25% (n=26). The research found little or no association (Spearman's Rho=-0.085) between knowledge of bone decalcification and osteoporosis.* ***Discussion/Conclusion***: *UNE workers know bone decalcification.*
	Keywords: *Osteoporosis, Decalcification, University Workers.*

1. Introduction

Osteoporosis (OP) is a pathology that produces general alteration of the human skeleton and is characterized by a low bone tissue mass that induces a gradual deterioration and an increase in fractures and other skeletal lesions in vulnerable individuals (1).

The International Osteoporosis Foundation (IOF) (2) revealed that one-third of women and 20% of men over 50 years of age will suffer from osteoporosis in 2019. In Latin America, this pathology will increase due to unhealthy lifestyles and an aging population. In Brazil, there are 10 million with a confirmed diagnosis; in Argentina, 75% of women over 50 have osteoporosis or osteopenia; in Mexico, one in four individuals suffers from it. In Peru, the prevalence of osteoporosis ranges from 30-40% in women over 60 years of age and 14% in men. (3)

As people accumulate youth, the prevalence and incidence of osteoporosis increase, and fractures begin between 30 and 40 years of age, with a gradual loss of 0.3 to 0.5% of bone mass per year, with a maximum peak of 3 to 5 years post-menopause and associated with estrogen loss. (2)

Osteoporosis evolves without symptoms or signs that only appear in advanced stages or the occurrence of fractures. Therefore, it is difficult to detect it, hence the importance of carrying out preventive screenings to detect bone weakness in a systematic way to groups at risk to prevent the pathology. Once the fracture occurs, the most typical clinical signs of weakness are in the hip, forearm, humerus, and pelvis, among others. (9)

Bone fragility is increased by an imbalance between bone formation and bone resorption. Bone mass integrity is sequential and occurs in two stages: 1) it starts with resorption that activates osteoclasts by

various mechanisms and signalling biochemical mediators that disintegrate the bone mass, which is removed by osteoclasts, and 2) bone formation by osteoblasts rebuilds the damage done by osteoclasts, depositing collagen, calcium, and phosphorus back into the bone matrix, just as the process of "bone remodelling" occurs permanently. (11)

From childhood to 20 years of age, formation is greater than resorption, allowing the growth and development of the skeleton. In adulthood formation and resorption are in homeostasis, in people over 50 years of age resorption is higher with a significant loss of calcium and phosphorus, at this age begins the disorganization of the microarchitecture of the bone by thinning of the trabeculae and micro-fractures as a result of bone fragility. Remodelling is regulated by systemic hormones and local factors that affect the osteoclast (OC) and osteoblast (OB) cell lines, which depend on cell replication, differentiation, and recruitment. (5)

Bone is initially at rest and is stimulated by hormonal and mechanical factors and activated by pre-osteoclasts which are fed by blood circulation and then converted into osteoclasts. Likewise, bone tissue with good development and staying healthy requires a diet based on protein, calcium, and phosphorus, as well as intense physical activity among other healthy lifestyles according to Rosen. (9)

Therefore, to prevent osteoporosis, it is required that people have information and knowledge of the main factors required to maintain bone health throughout life, related to the well-being of people and to have quality of life in adulthood and the elderly. Likewise, it is required to know the evaluation of the disease such as bone densitometry.

Given the scope of this disease and its irreversible consequences, and supported by the scarce literature currently available in university classrooms and professional training centers in the national territory, the purpose of this research was to determine the relationship between the knowledge of bone decalcification and osteoporosis in workers of the National University of Education "Enrique Guzmán y Valle."201.

2. Materials And Methods

The research was of the descriptive and cross-sectional correlational type because it described the prevalence of osteoporosis and knowledge of bone decalcification and verified the association between these two main variables of the study. The research had a quantitative approach and used the deductive method.

The study population consisted of the collaborators of the National University of Education and the sample was intentional and consisted of 104 administrative workers and teachers over 40 years of age from different faculties of the National University of Education in Lima-Peru, all participants gave their informed consent. A validated and reliable questionnaire with a Cronbach's alpha of 0.926 was used for data collection.

The variable knowledge of bone decalcification was classified into three categories and was called deficient knowledge up to 6 correct answers (0-6), medium knowledge to those who obtained 7 to 13 correct answers (7-13), and high knowledge to those who obtained more than 14 correct answers (14-20). The presence of osteoporosis was by reference to the participants.

For data processing and analysis, Excel program version 2013 was used to describe the measures of central tendency and variability. SPSS 25.0 software was employed using Spearman's Rho statistical design with 95% accuracy.

3. Results and Discussion

Table 1 Characteristics *of the study population*

Characteristics	Minimum	Maximum	Average	Standard Deviation
Age (years)	41	72	55.33	9.09
Height (m.)	1.4	1.82	1.61	0.08
Weight (kg)	45	95	67.74	10.78
BMI (kg/m2	20	48	26.06	4.32

The population studied had a mean age of 55.33 -/+9.09 years and a body mass index of 26.06 -/+4.32 (Table 1).

Table 2 *Age range by gender.*

Age range	Total		Male		Female	
(years)	N°	%	N°	%	N°	%
41-51	36	34.62	8	21.05	28	42.42
52-61	38	36.54	20	52.63	18	27.27
62 to more	30	28.85	10	26.32	20	30.30
TOTAL	104	100.00	38	100.00	66	100.00

Table 2 shows that 36.54% of the population studied is in the age range of 52 to 61 years, of which 52.63% corresponds to males. While 42.42% of the women are between 41 and 51 years of age.

Table 3 *Classification of nutritional status according to sex.*

Nutritional Status	Male		Female		Total	
(Kg. /m^2)	N°	%	N°	%	N°	%
Normal	16	42.11	22	33.33	38	36.53
Overweight	16	42.11	42	63.64	58	55.76
Obese	6	15.79	2	3.03	8	7.71
TOTAL	38	100.00	66	100.00	104	100.0

42.11 + 15.79 = 57.9 %

Excess weight (overweight plus obesity) affects 57.9% of the population studied in males. Females present more than 20% more overweight (63.64%) than males (42.11%), while the prevalence of obesity affects mostly males (15.79%) compared to 3.03% of obesity in females (Table 3).

Table 4 *Personal and family background among interviewees.*

Personal and/or family history	Yes		No	
	N°	%	N°	%
Active smoker	2	1.92	102	98.08
Uses glucocorticoids	6	5.77	98	94.23
Suffers from rheumatoid arthritis	4	3.85	100	96.15
Previous fracture	20	19.23	84	80.77
Parents with hip fracture	6	5.77	98	94.23

According to Table 4, 19.23% of the participants reported having suffered fractures, followed by 5.77% of those using glucocorticoids and 5.77% reported parents with hip fractures.

Table 5 *Level of knowledge of decalcification.*

Decalcification Knowledge	N°	%
Poor (0-6)	38	36.54
Medium (7-13)	62	59.62
High (14-20)	4	3.85
TOTAL	104	100.00

In this regard, 59.62% of those interviewed had medium knowledge and only 3.85% indicated that they had a high level of knowledge about bone decalcification (Table 5).

Results similar to other studies with average knowledge[36], the same trend is observed in studies in the country[37]; the same is explained by the place of origin.[38]

Table 6 *Prevalence of osteoporosis among respondents.*

Prevalence of osteoporosis	Yes		No	
	N°	%	N°	%
With osteoporosis	20	19.23	84	80.77

The prevalence of osteoporosis among the administrative and teaching staff of the National University of Education was 19.23%.

Table 7 *Correlation between Body Mass Index and knowledge of decalcification.*

		IMC
Decalcification Knowledge	Correlation coefficient	0.357(**)
	Spearman's Rho Sig. (2-tailed)	.000 104

** The correlation is significant at the 0.05 % level (2- tailed).

According to Table 7, Spearman's Rho = 0.357 p = 0.000, there is a weak correlation between knowledge of bone decalcification and body mass index (BMI). This association was made in view of the high prevalence of overweight and obesity in the population studied.

Studies have shown that the average exercise performance among women of different ages increases with an education program [39, 40] or level of education [41]. Evidence shows that overweight women induce a higher percentage of osteopenia and osteoporosis compared to women of normal weight;[42] similar to other Peruvian studies[7] as demonstrated by Ylachoque.[38]

Table 8 *Relationship between osteoporosis and decalcification knowledge.*

		IMC
Decalcification Knowledge	Correlation coefficient	0.085
	Spearman's Rho	
	Sig. (2-tailed)	0.390
	N	104

** The correlation is significant at the 0.05 level (2-tailed).

Table 8 shows the value of Spearman's correlation coefficient (rho=-0.085) [43] little or no relationship between knowledge of decalcification and osteoporosis, but significant (p= 0.390).

4. Conclusion

The population studied was characterized by 55.76% overweight and 7.71% obese. Among the main antecedents, fractures (19.23%) in the participants and of their parents (5.77%) stand out, as well as the use of glucocorticoids and an average age of 55 years old. As for knowledge, 59.62% of respondents said they had medium knowledge of bone decalcification and (there are 19.23% and 15%) of osteoporosis. At a confidence level of 95 %, the research showed that there is a significant direct correlation.

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