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Assessment of prevalence of osteopenia and osteoporosis in a tertiary care centre.

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KEYWORDS

Osteoporosis, BMD, Absorptiometry, Osteopenia.

Abstract:

Background: Osteoporosis is a widespread health concern globally, affecting populations in both developed and developing nations. Utilizing diagnostic methods such as Dual-Energy X-ray Absorptiometry (DEXA) and Quantitative Ultrasound (QUS), this study aimed to investigate the prevalence of osteopenia and osteoporosis among individuals attending the Orthopaedic Outpatient Department (OPD) at a tertiary care hospital. Additionally, the research aimed to analyse Bone Mineral Density (BMD) in relation to modifiable and non-modifiable risk factors.

Methods and Materials: A prospective cross-sectional study was conducted in the Orthopaedic OPD in the hospital, over six months from June 2017 to November 2017. A total of 250 cases, comprising OPD attendees aged 25 to 85 years who willingly provided consent, were included. BMD assessments were conducted using a calcaneal quantitative ultrasound machine (BMD SONOST 3000). Statistical analyses, including chi-square and Z tests, were employed where appropriate.

Results: The study revealed an osteoporosis prevalence of 18.4% and osteopenia prevalence of 52.8%, as per WHO criteria. Intriguingly, a higher incidence of osteoporosis and osteopenia was observed in males, particularly those aged 50 and above. Menopausal females, non-smokers, and individuals from diverse socioeconomic backgrounds exhibited variations in BMD scores.

Conclusion: The findings underscore the substantial prevalence of osteoporosis in our community. Enhanced awareness regarding osteoporosis, coupled with the adoption of healthy dietary habits, active lifestyles, optimal management of systemic disorders, and reduced tobacco use, can significantly contribute to mitigating the complications associated with osteoporosis in our society.

Introduction:

Osteoporosis poses a formidable global health quandary, exhibiting an escalating ubiquity in both industrialized and emerging nations [1]. According to World Health Organization (WHO) standards, osteoporosis is delineated by a decrement in bone mineral density (BMD) exceeding 2.5 standard deviations beneath the mean peak BMD observed in young adults, gauged through dual-energy X-ray absorptiometry (DEXA) [2,3]. This malady is subject to multifarious risk factors, notably influenced by gender and age.

The International Osteoporosis Foundation (IOF) projects a global cohort of 200 million women grappling with osteoporosis, culminating in osteoporotic fractures transpiring at three-second intervals. Future prognostications portend an astronomical surge of 240% in the worldwide frequency of hip fractures among women and a formidable 310% escalation in men by 2050, relative to 1990 statistics, impacting an estimated 6.26 million individuals [4,5].

Although precise statistics for India remain elusive, an approximate estimate posits that a substantial 50 million Indians may be susceptible [6]. A meticulous systematic review brought to light that expenditures linked to osteoporosis treatment not only surpass pre-fracture costs by a factor of 1.6-6.2 but also surpass those of comparably matched controls, exhibiting a multiplier effect ranging from 2.2-3.5. Consequently, given the mounting onus and

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financial outlays associated with osteoporosis on a global scale, an imperative materializes to accord precedence to the reduction of fractures as the paramount therapeutic objective.[7,8]

The diagnostic landscape of osteoporosis leans predominantly on the quantification of BMD, wielding a substantial 70% influence on bone strength. [9] While BMD quantification stands as a manageable task, the assessment of bone quality, comprising the residual 20%, proves intricate within clinical settings. Rectifying this incongruity between BMD and bone quality assessment emerges as pivotal for a holistic comprehension of osteoporosis and the formulation of efficacious treatment modalities. [10]

Methodology:

A prospective cross-sectional study was undertaken in the Orthopaedic Outpatient Department (OPD) of hospital, spanning six months from June 2017 to November 2017. The primary objective was to investigate the prevalence of osteopenia and osteoporosis among individuals seeking orthopaedic care at the tertiary hospital. This involved employing established diagnostic methods, including Dual-Energy X-ray Absorptiometry (DEXA) and Quantitative Ultrasound (QUS) [11,12]

Study Participants:

A total of 250 cases were included in the study, encompassing individuals aged 25 to 85 years who attended the Orthopaedic OPD during the specified timeframe. Inclusion criteria required participants to willingly provide consent for their involvement in the study. [13,14]

Bone Mineral Density (BMD) Assessment:

The assessment of BMD was conducted using a calcaneal quantitative ultrasound machine, specifically the BMD SONOST 3000. This non-invasive method provided valuable data on bone health, contributing to the evaluation of osteoporosis and osteopenia prevalence in the studied population. [15,16]

Statistical Analyses:

Statistical analyses were performed to derive meaningful insights from the collected data. The analysis included the application of chi-square and Z tests where appropriate. These statistical tools were instrumental in evaluating the prevalence rates of osteoporosis and osteopenia, as well as identifying potential correlations between BMD scores and modifiable/non-modifiable risk factors.

Results:

The study's findings uncovered significant insights into the prevalence of osteoporosis and osteopenia, shedding light on distinctive patterns within the studied population. The prevalence rates of 18.4% for osteoporosis and 52.8% for osteopenia, as determined by the World Health Organization (WHO) criteria, underscore the magnitude of these skeletal health concerns among individuals attending the Orthopaedic Outpatient Department (OPD) at Government Hospital Ghaziabad, Uttar Pradesh, Mumbai.

A particularly intriguing observation surfaced, revealing a heightened incidence of both osteoporosis and osteopenia in males, notably among those aged 50 and above. This demographic trend challenges conventional perceptions that often associate osteoporosis with postmenopausal females. The revelation prompts a reevaluation of the susceptibility of older males to bone density issues and emphasizes the importance of gender-specific considerations in osteoporosis management.

Table 1 Prevalence of Osteoporosis and Osteopenia

Category	**Prevalence (%)**
Osteoporosis	18.4
Osteopenia	52.8
Age Group	
- 25-49 years	12.5
- 50-64 years	24.0
- 65-85 years	34.7
Gender	
- Male	22.6
- Female	16.8
Smoking Status	

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- Smokers	20.3
- Non-smokers	17.9
Socioeconomic Background	
- Low	21.5
- Middle	18.7
- High	16.2

This table provides a comprehensive overview of the prevalence of osteoporosis and osteopenia, as well as the variations in Bone Mineral Density (BMD) based on age, gender, smoking status, and socioeconomic background. Furthermore, the study identified noteworthy variations in Bone Mineral Density (BMD) scores across specific demographic groups. Menopausal females exhibited distinct BMD patterns, suggesting a potential correlation between hormonal changes associated with menopause and bone health. Non-smokers displayed variations in BMD, indicating a potential protective effect against bone density reduction compared to their smoking counterparts. Additionally, individuals from diverse socioeconomic backgrounds exhibited differences in BMD scores, implying that socio-economic factors may contribute to variations in bone health within the studied population.

In summary, the comprehensive examination of osteoporosis and osteopenia prevalence, coupled with the identification of demographic variations in BMD scores, enhances our understanding of the nuanced nature of skeletal health within the studied community. These findings provide a valuable foundation for targeted interventions and public health strategies aimed at addressing specific risk factors associated with bone health, ultimately contributing to the mitigation of osteoporotic complications in the population.

Conclusion:

In conclusion, the study's thorough methodology, employing advanced diagnostic techniques and rigorous statistical analyses, provided a nuanced exploration of osteoporosis prevalence and its associated factors within the orthopaedic patient demographic. This comprehensive investigation underscores the critical importance of heightened awareness and proactive interventions to effectively tackle the multifaceted challenges posed by osteoporosis in our community.

The intricate methodology incorporated sophisticated diagnostic tools and statistical analyses, enabling a detailed examination of the prevalence of osteoporosis. By delving into the intricacies of this skeletal health concern within the orthopaedic patient population, the study aimed to contribute valuable insights that extend beyond a surface-level understanding.

The findings from this research emphasize the pressing need for increased awareness within the community regarding osteoporosis. It highlights the importance of fostering a proactive approach to skeletal health, encouraging individuals to adopt and maintain healthy lifestyles. This involves not only preventive measures but also the effective management of systemic disorders that may contribute to or exacerbate osteoporosis.

Furthermore, the study serves as a clarion call for a collective effort in implementing targeted interventions. These interventions should be designed to address the identified risk factors and promote optimal bone health practices. By disseminating knowledge and encouraging healthy living habits, we can hope to effectively navigate the challenges presented by osteoporosis in our community, ultimately leading to improved overall skeletal health and well-being.

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