OSTEOPOROSIS: A MAJOR RISK FACTOR FOR **WOMEN – A COMPREHENSIVE REVIEW**

1Insha Nashir Deshmukh, 2Dr. Sheela Akhilesh Yadav, 3Dr. Tushar Narendra Lokhande

1M.Pharm Student, 2M.Pharm, Ph.D., HOD, 3M.Pharm, Ph.D., PGDIPR, DBM, Principal

1,2,3Department of Pharmaceutics, H. K. College of Pharmacy, Jogeshwari, Mumbai, India

Abstract :

Osteoporosis is a progressive bone disease characterized by reduced bone mass and deterioration of bone tissue, leading to fragility and fracture risk. It disproportionately affects women, particularly postmenopausal women, due to hormonal changes and other gender-specific factors. This review explores both modifiable and non-modifiable risk factors contributing to the prevalence of osteoporosis in women, highlights the importance of early diagnosis, and discusses preventive strategies and treatment options. Emphasis is placed on lifestyle modifications, dietary management, and pharmacological interventions aimed at improving bone health and reducing fracture risks among women.

Index Terms - Osteoporosis, Bone disease, Women, Postmenopausal, Hormonal changes, Risk factors, Preventive strategies, Treatment options, Dietary management, Pharmacological interventions, Bone health.

INTRODUCTION

Osteoporosis has been termed the 'silent disease' because bone loss occurs without symptoms until a fracture occurs. It affects hundreds of millions, especially postmenopausal women. Understanding its pathophysiology and preventive strategies is crucial to reducing fracture incidence and improving quality of life.

EPIDEMIOLOGY

Globally, osteoporosis affects approximately 200 million women. According to the International Osteoporosis Foundation, one in three women over 50 will experience osteoporotic fractures.

PATHOPHYSIOLOGY AND HORMONAL INFLUENCE

Osteoporosis results from an imbalance between bone resorption by osteoclasts and bone formation by osteoblasts. Estrogen inhibits osteoclast activity and promotes osteoblast survival. Postmenopausal estrogen decline accelerates bone resorption, leading to rapid bone loss.

RISK FACTORS IN WOMEN

Non-modifiable: Age, Sex, Genetics. Modifiable: Calcium/Vitamin D deficiency, Physical inactivity, Smoking, Alcohol use, Corticosteroids.

CLINICAL CONSEQUENCES

The most serious consequence of osteoporosis is fracture, particularly vertebral, hip, and wrist fractures, which cause chronic pain and disability.

DIAGNOSIS

Dual-energy X-ray absorptiometry (DXA) is the gold standard for measuring bone mineral density. A T-score ≤ -2.5 indicates osteoporosis.

PREVENTION AND MANAGEMENT

Lifestyle measures include adequate calcium/vitamin D intake, exercise, and avoiding smoking/alcohol. Pharmacologic therapy includes bisphosphonates, SERMs, denosumab, parathyroid hormone analogs, and hormone replacement therapy.

ADVANCES IN THERAPEUTIC APPROACHES

New drugs such as abaloparatide and sclerostin inhibitors show promise. Emerging AI models improve risk prediction and treatment personalization.

CONCLUSION

Osteoporosis is a multifactorial disease primarily affecting postmenopausal women. Early detection, lifestyle modifications, and appropriate pharmacological interventions significantly reduce fracture risk and improve quality of life.

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