

To Find Out the Incidence of Osteoporosis Among Smokers: An Institutional Based Study**Ramprakash Lohiya¹, Anandu Ranjith², Manoj Kumar³, Kusum Rathore^{4*}, Nitin Bairwa⁵, Anas Khan⁵**¹*Associate Professor & Unit Head, Department of Orthopedics, S.P. Medical College and Associated Groups of P.B.M. Hospitals, Bikaner, Rajasthan, India*²*PG Resident (IInd Year), Department of Orthopedics, S.P. Medical College and Associated Groups of P.B.M. Hospitals, Bikaner, Rajasthan, India*³*PG Resident (Ist Year), Department of Orthopedics, S.P. Medical College and Associated Groups of P.B.M. Hospitals, Bikaner, Rajasthan, India*⁴*Consultant Dental Surgeon, Dr. Kusum Dental Care, Jai Narayan Vyas Colony, Bikaner, Rajasthan, India*⁵*PG Resident (IIIrd Year), Department of Orthopedics, S.P. Medical College and Associated Groups of P.B.M. Hospitals, Bikaner, Rajasthan, India***Received: 22-11-2020 / Revised: 04-01-2020 / Accepted: 18-02-2021****Abstract**

Background: Osteoporosis is a complex heterogeneous disorder. Smoking is well known to cause various health problems, including osteoporosis and bone fracture. Hence; the present study was undertaken for assessing the incidence of osteoporosis among smokers. **Materials & Methods:** A total of 500 smokers with smoking history of minimum of 10 cigarettes per day for a minimum of past 5 years were included. Also, a total of 500 normal controls (non-smokers) were also enrolled. Complete demographic and clinical data of all the patients was obtained. Detailed medical and personal history of all the subjects was also recorded. Thorough clinical and oral examination of all the subjects was done. Incidence of osteoporosis was also recorded. **Results:** Overall incidence of osteoporosis among smokers and non-smokers was 31.6 percent and 4.2 percent respectively. Incidence of osteoporosis was significantly higher in smokers in comparison to non-smokers. In the smoker's group, 50.63 percent of the patients with osteoporosis belonged to the age group of more than 45 years while 34.81 percent of the patients belonged to the age group of 30 to 45 years. In the non-smokers group, 47.62 percent of the patients with osteoporosis belonged to the age group of more than 45 years while 38.09 percent of the patients belonged to the age group of 30 to 45 years. In the smokers and non-smokers group, 66.46 percent and 61.91 percent of the patients with osteoporosis were females. **Conclusion:** Smoking is a significant risk factor for osteoporosis.

Keywords: Osteoporosis, Smokers.

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Introduction

Osteoporosis is a complex heterogeneous disorder characterized by an imbalance in bone remodelling which culminates in reduced bone mineral density (BMD), deterioration of microarchitectural integrity of the bone, and increased risk of fracture. It has a major economic and health impact. Osteoporotic fractures are associated with increased morbidity and mortality. There is ample evidence that smoking is an independent risk factor for low BMD. Recent evidence has also shown adverse effects of passive smoking on BMD [1-3]. Smoking is well known to cause various health problems, including osteoporosis and bone fracture. Tobacco smoke contains over 4000 compounds, and little has been done to clarify which component plays a critical role in the underlying mechanism. One of these may be cadmium. Smoking is a major source of cadmium exposure in smokers, whereas in non-smokers, the exposure derives mainly from diet or occupational exposure. Cadmium has long been considered to be a risk factor for osteoporosis and fracture, especially at high-level exposure [4-6]. Hence; the present study was undertaken for assessing the incidence of osteoporosis among smokers.

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Materials & Methods

The present study was conducted at Department of Orthopedics, S.P. Medical College and Associated Groups of P.B.M. Hospitals, Bikaner, Rajasthan (India) for assessing the incidence of osteoporosis among smokers. A total of 500 smokers with smoking history of minimum of 10 cigarettes per day for a minimum of past 5 years were included. Also, a total of 500 normal controls (non-smokers) were also enrolled. Complete demographic and clinical data of all the patients was obtained. Detailed medical and personal history of all the subjects was also recorded. Thorough clinical and oral examination of all the subjects was done. Incidence of osteoporosis was also recorded. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi-square test and student t test were used for evaluation of level of significance.

Results

In the present research, analysis of a total of 500 smokers with smoking history of minimum of 10 cigarettes per day for a minimum of past 5 years was done. Also, a total of 500 normal controls (non-smokers) were also enrolled. Mean age of the patients of the smokers group and control group was 48.6 years and 49.1 years respectively. Overall incidence of osteoporosis among smokers and non-smokers was 31.6 percent and 4.2 percent respectively. Incidence of osteoporosis was significantly higher in smokers in comparison to non-smokers. In the smokers group, 50.63 percent of the patients with osteoporosis belonged to the age group of more than 45 years

while 34.81 percent of the patients belonged to the age group of 30 to 45 years. In the non-smokers group, 47.62 percent of the patients with osteoporosis belonged to the age group of more than 45 years

while 38.09 percent of the patients belonged to the age group of 30 to 45 years. In the smokers and non-smokers group, 66.46 percent and 61.91 percent of the patients with osteoporosis were females.

Table 1: Incidence of osteoporosis

Osteoporosis	Smokers	Non-smokers
Number of patients	158	21
Percentage	31.6	4.2
p- value	0.001 (Significant)	

Table 2: Age and gender wise distribution of patients with presence of osteoporosis

Parameter		Smokers		Non-smokes	
		Number	Percentage	Number	Percentage
Age group (years)	Less than 30	23	14.56	3	14.29
	30 to 45	55	34.81	8	38.09
	More than 45	80	50.63	10	47.62
Gender	Males	43	33.54	8	38.09
	Females	105	66.46	13	61.91

Discussion

The pathophysiologic mechanisms underlying osteoporosis in cigarette smokers have not been fully explored. The alteration of bone metabolism induced by cigarette smoking may occur indirectly by altered calcitropic hormone metabolism, by derangements in the production, metabolism, and binding of estradiol, alterations in adrenal cortical hormone metabolism, and/or direct effects on osteogenesis including alteration in the RANK- RANKL-OPG system, collagen metabolism, and bone angiogenesis[7-9]. Hence; the present study was undertaken for assessing the incidence of osteoporosis among smokers. In the present research, analysis of a total of 500 smokers with smoking history of minimum of 10 cigarettes per day for a minimum of past 5 years was done. Also, a total of 500 normal controls (non-smokers) were also enrolled. Mean age of the patients of the smokers group and control group was 48.6 years and 49.1 years respectively. Overall incidence of osteoporosis among smokers and non-smokers was 31.6 percent and 4.2 percent respectively. Daniell HW conducted a data search which showed seventeen females with severe idiopathic presenile osteoporosis. Among these seventeen subjects, 1 was found to be a nonsmoker, 1 smoked less than 20 cigarettes daily, and 15 had smoked 20 or more cigarettes daily for many years. The possibility that smoking may induce premature sex hormone deficiency is suggested by the observation that menopause has occurred several years earlier in smokers than nonsmokers[5]. Previous epidemiological studies and animal experiments provide evidence and plausible mechanistic explanations for cadmium-induced osteoporosis. The biological mechanism of cadmium toxicity on bone has been investigated, and several models have been suggested. An association between osteoporosis and kidney dysfunction induced by cadmium exposure was reported in a Chinese population. Moreover, the adverse effect of cadmium on bone was also found in populations where no sign of impaired kidney function was observed, indicating that cadmium acts directly on bone. Animal experiments have shown that cadmium can disturb bone metabolism both directly, via bone formation and resorption, and indirectly, via disorders in calcium and vitamin D metabolism[9-11]. Ghadimi R et al determined the influence of smoking in the elderly male smokers. They concluded that a significant association exists between low bone mass and bone fracture in the elderly male smokers[12].

In the present study, incidence of osteoporosis was significantly higher in smokers in comparison to non-smokers. In the smoker's group, 50.63 percent of the patients with osteoporosis belonged to the age group of more than 45 years while 34.81 percent of the patients belonged to the age group of 30 to 45 years. In the non-smokers group, 47.62 percent of the patients with osteoporosis belonged to the age group of more than 45 years while 38.09 percent of the patients belonged to the age group of 30 to 45 years. In the smokers and non-

smokers group, 66.46 percent and 61.91 percent of the patients with osteoporosis were females. In female smokers, menopause occurs up to 2 years earlier than that in nonsmokers, suggesting premenopausal ovarian dysfunction, but not in secondhand smokers. Smokers also show lower 25-OH vitamin D3 levels and decreased calcium absorption[13,14]. Previous studies classifying men by smoking characteristics have shown a decrease in bone mass with the number of smoking years and pack years. Regarding the number of cigarettes smoked per day, results with men have shown inconsistent positive and negative findings. Smokers with 20 or more cigarettes per day generally revealed significant lower BMD compared with that in never smokers[15-17].

Conclusion

From results of present study; authors concluded that smoking is a significant risk factor for osteoporosis.

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