MENOPAUSAL STATUS AND OSTEOPOROSIS: A CASE CONTROL STUDY AMONG THE PRE AND POST-MENOPAUSAL WOMEN OF ALLAHABAD DISTRICT

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ABSTRACT

Osteoporosis is the most common skeletal disorder affects both sexes, but most importantly affects female who feel more rapid loss of their bone mass during the early years following menopause. The greatest loss of bone density occurs in women during perimenopause and is related with low level of estrogen in the blood, a condition of menopause. So this study was designed to observe the strength of association between the menopausal status of the women and the prevalence of osteoporosis and relative risk of developing this disease among the pre and post-menopausal women of Allahabad District. This study was a case control study among the pre and post-menopausal women of Allahabad District aged between 35-65 years. All the respondents of the study, who came to the referral hospital's outpatient department during the free BMD check-up camps by P-DEXA scan, were purposively selected for the study. The diagnosed patients of osteoporosis were identified as cases. The controls of the study were all participants that were identified as free from less bone mineral density after undergoing the P-DEXA scan. The results of the study revealed that post-menopausal status of the women had a strong association with the occurrence of osteoporosis (**OR=8**) and they had **3.3333** times more risk to develop this disease in comparison with pre-menopausal women (**OR**=0.125). So it was concluded that post-menopausal women had greater risk of developing osteoporosis and it is recommended to pre and post-menopausal women to go through the DEXA screening of the BMD for early detection of loss of bone mineral density and adopt healthy dietary pattern and appropriate lifestyle modifications to reduce this loss.

KEYWORDS: P-DEXA Scan, Osteoporosis, Menopausal Status, Bone Mineral Density, Case-Control Study

INTRODUCTION

Osteoporosis is the most common skeletal disorder affects both sexes, but most importantly affects female who feel more rapid loss of their bone mass during the early years following menopause (**Foundation NO, 2010**). It is a bone disease characterized by reduced bone density, deficiency of bone tissue relative to the volume of biological bone and decreased bone strength. With the onset of menopause very rapid loss of bone mineral density occurs which is believed to average approximately 2-3% every year, being greatest in the early postmenopausal years. Thus for the purpose of prevention and control of osteoporosis there is great interest in conducting epidemiologic survey on prevalence of osteoporosis and related risk factors in communities. Until recently, it was believed that osteoporosis mainly affects postmenopausal women. However, recent researches indicate that osteoporosis may occur in women aged above 40 years and even in youth. The main contributing factors involve deficiency in dietary intake of calcium, vitamin D and protein.

Prevention from osteoporosis should be begin in early ages through the consumption of calcium rich foods like Milk and milk products, whole pulses and cereals, nuts and green leafy vegetables to reduce loss of bone mineral density (**Caroli***et al.,* **2011).**

OBJECTIVE

- To observe the strength of association between the menopausal status of the women and the prevalence of osteoporosis and relative risk of developing this disease among the pre and post-menopausal women of Allahabad District.

MATERIALS AND METHODS

This study was a case-control study conducted among the pre and post-menopausal women of Allahabad District aged between 35-65 years. This study was carried out in one specialized hospital named Yashlok Hospital, which provides advanced health services to the community and organized free BMD check-up camps regularly through P-DEXA machine for the general population of Allahabad district. All relatively healthy women aged between 30-60 years who came to the referral hospital outpatient department during the free BMD check-up camps were randomly and purposively approached to participate in the study and survey method was used for the collection of the information from the respondents. The diagnosed patients of osteoporosis were identified as cases **(N=84)**. The controls **(N=84)** of the study were all participants that were identified as free from less bone mineral density after undergoing the P-DEXA scan. A WHO guideline for the diagnosis of osteoporosis was used to assess the prevalence of osteoporosis and osteopenia in the selected respondents **(WHO, 1994).** The statistical representation of the data was done with the help of statistical techniques like assessment of odds ratio and relative risk.

RESULTS AND DISCUSSIONS

Estimation of Risk of Osteoporosis According to Menopausal Status of Cases and Controls

The data regarding menopausal status among the selected group of cases and controls were observed the observed data shows that among the cases, majority percentage of the women (85.7 percent) had post-menopausal status while only 14.3 percent respondents had pre-menopausal status. The data among the control group depicted that majority of the respondents (57.1 percent) had pre-menopausal status and 42.9 percent had post-menopausal status.

The data regarding estimation of odds and relative risk of osteoporosis in concern with the menopausal status of the selected women revealed that the **OR** was 8 (**95% CI**=3.7847 to 16.9104) and **RR** was 3.3333 (**95% CI**=1.9751 to 5.6256) among the post-menopausal women involved in the study which was very high in comparison with pre-menopausal women of the study (**OR**=0.125, **95% CI**=0.0591 to 0.2642 and **RR**=0.3, **95% CI**=0.1778 to 0.5063)

So the results regarding estimation of odds and relative risk shows that the post-menopausal status of the women had a strong association with the occurrence of osteoporosis (**OR=8**) and they had **3.3333** times more risk to develop this disease in comparison with pre-menopausal women (**OR=**0.125).

A similar study among the Indian women showed significant statistical association between prevalence of osteopenia and osteoporosis and attainment of menopause (**Agrawal and Verma, 2013**)**.** This might be because there is an increased imbalance between bone resorption and formation with aging, which is an important cause of osteoporosis in

elderly, especially among post-menopausal women due to absence of hormonal control in the body (**Feng*et al*., 2011**). So based on the available literature it can be concluded that attainment of menopause is significantly associated with prevalence of osteoporosis but in this study it was also revealed that the prevalence of osteopenia was high among the women aged more than 35 years, may leads to osteoporosis in later years of life.

Estimation of Risk of Osteoporosis: According to Duration of Menopause of Case and Control

The data regarding duration of menopause among the post-menopausal women (N=178) belongs to cases and controls were observed and the data shows that among the cases, majority of the women (43.1 percent) attained their menopause between 6-10 years followed by women who had attained their menopause from more than 10 years (30.5 percent) and women attained their menopause from less than 5 years (26.4 percent). The data among the control group depicted that majority of the women (60.5 percent) had attained their menopause between 6 to 10 years while 28.9 percent had attained from less than 5 years and 10.6 percent had attained their menopause from more than 10 years.

The data regarding estimation of odds and relative risk of osteoporosis in concern with the menopausal years of post-menopausal women which revealed that the **OR** was 3.1842 (**95% CI**=0.8690 to 11.6678) and **RR** was 1.336 (**95% CI**=0.9723 to 1.8359) among the women who had attained their menopause from more than 10 years which was very high in comparison with other group of respondents like women had menopausal years between 6 to 10 years (**OR**=0.2684, **95% CI**=0.0808 to 0.8918 and **RR**=0.7045, **95% CI**=0.5339 to 0.9297) and women with less than 5 years of menopausal years (**OR**=0.314, **95% CI**=0.0857 to 1.1508 and **RR**=0.7485, **95% CI**=0.5447 to 1.0285).

So the results regarding estimation of odds and relative risk shows that group of women who had attained their menopause from more than 10 years had a strong association with the occurrence of osteoporosis (**OR=3.1842**) and they had **1.336** times more risk to develop this disease in comparison with women with menopausal years between 6 to 10 years (**OR=0.2684**) and women with less than 5 years menopausal years (**OR=0.314**).

Similar results were also reported in the study conducted among the peri and post-menopausal Indian women as the prevalence of osteoporosis (53%) was highest among the women who has attained their menopause between 6-10 Years (**Aggarwal*et al*., 2011**). The higher prevalence of osteoporosis well documented among the women who had attained their menopause since eight to ten years as after menopause estrogen deficiency leads to as cascade of accelerated bone loss.

CONCLUSIONS

It was concluded in this study that menopausal status of the women was closely associated with the prevalence of osteoporosis. It was also revealed that the prevalence of osteopenia was high among the women aged more than 35 years, may leads to osteoporosis in later years of life.

RECOMMENDATIONS

The results of this study revealed that the prevalence of osteopenia/ osteoporosis increases with age in women, mainly after the attainment of menopause. It is recommended to create awareness about the risk factors of the osteoporosis as well as the preventive and curative measures related with the management of osteoporosis.

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APPENDICES

Table 1: Estimation of Risk of Osteoporosis According to Menopausal Status of Cases and Controls

S. No.	Menopausal Status	Case		Control		Estimation of Risk			
		N	%	N	%	Odds Ratio	95% CI	Relative Risk	95% CI
1.	Pre-menopause	12	14.3	48	57.1	0.125	0.0591 to 0.2642	0.3	0.1778 to 0.5063
2.	Post-menopause	72	85.7	36	42.9	**8**[*]	**3.7847 to 16.9104**	**3.3333**[*]	**1.9751 to 5.6256**
Total		**84**	**100**	**84**	**100**				

Table 2: Estimation of Risk of Osteoporosis: According to Duration of Menopause of Case and Control

S. No.	Duration of Menopause (N=178)	Case		Control		Estimation of Risk			
		N	%	N	%	Odds Ratio	95% CI	Relative Risk	95% CI
1.	≤ 5 Years	19	26.4	11	28.9	0.314	0.0857 to 1.1508	0.7485	0.5447 to 1.0285
2.	6-10 Years	31	43.1	23	60.5	0.2684	0.0808 to 0.8918	0.7045	0.5339 to 0.9297
3.	> 10 Years	22	30.5	4	10.6	3.1842[*]	0.8690 to 11.6678	1.336[*]	0.9723 to 1.8359
Total		**72**	**100**	**38**	**100**				