

Vitamin D Deficiency - A Risk Factor for Breast Cancer

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ABSTRACT

Aim: To determine the association of vit. D levels with breast cancer in female patients of district Bahawalpur.

Methods: We included 45 patients of breast cancer and 45 normal patients in this case control analysis. 45 females with diagnosis of breast cancer who presented in surgical OPD of Bahawal Victoria hospital were taken as cases, 45 healthy females who presented in medical OPD for other complains were taken as controls. The data collection was done from March-2016 to Sep-2016.

Blood samples of all patients were sent to laboratory for measurement of vit. D levels. Vit. D levels were measured using ELISA technique. Patients with vit. D levels <20ng/ml were labelled as vit. D deficient.

Results: Mean age and BMI were same between the groups. Other baseline variables such as menopause status, resident area, educational and occupational status were all comparable between cases and controls. There were 84.4% females in case group who were housewives and 93.3% females in control group were housewives (p-value 0.18). Regarding vit. D deficiency, deficiency was found in 93.3% breast cancer patients and in 75.6% control patients. Vit. D levels were optimum in only 6.7% breast cancer and 24.4% normal patients (p-value 0.02).

Conclusion: In our study, vitamin D deficiency is present in more than 90% patients, which suggests that deficiency of vit. D is a risk factor of breast cancer.

Keywords: Vitamin D, Breast cancer.

INTRODUCTION

Breast cancer is the commonest among all cancers with a prevalence rate of about 18%¹. About 1 million people are diagnosed every year. Among females, about 22% cancers are breast cancer and forty two percent cases of breast cancer are reported from developing world². Prevalence of breast cancer is very high in Pakistan and one in every five female cancer patients is diagnosed with breast cancer³. This prevalence rate is high as compared to other Asian countries. Studies have also found early onset of breast cancer in females of Pakistan as compared to the other countries⁴.

Among the various causes of cancers, Vitamin D deficiency is said to be one of them. Main sources of Vit. D are sunlight and dietary. Sunlight provide 90% requirement of vit. D while remaining 10% is from dietary products⁵. Ultra-violet light activates the precursor molecules of vit. D under the skin. Which then passes through the liver and the final activation is done in the kidneys. Vit. D main role is to maintain bone and minerals homeostasis in the bones. Along with it also anti-carcinogenic properties such as inhibition of cells proliferation, metastasis and inhibition of angiogenesis in cancer cells⁶.

The concept of the role of vit. D in breast cancer came from the studies who found lower prevalence of breast cancer among persons having longer exposure of sunlight⁷. A study from a big cancer hospital in Pakistan found vit. D deficiency in about 95% patients of breast cancer and in 77% healthy patients⁸. However, Chlebowski et al. did not found any association of vit. D deficiency with breast cancer⁹. While some other studies have found that a 50% reduction in the risk of breast cancer in patients with vit. D levels >50 ng/ml^{10,11}.

Vitamin D deficiency is highly prevalent in Pakistan even in normal population¹². Keeping in view the higher prevalence of breast cancer in Pakistani females, it can be assumed that it may be the vit. D deficiency that is responsible for such higher prevalence of breast cancer in our females. The aim of this study was to determine the association of vit. D levels with breast cancer in female patients of Pakistan.

METHODS

We included 45 patients of breast cancer and 45 normal patients in this case control analysis. 45 females with diagnosis of breast cancer who presented in surgical OPD of Bahawal Victoria hospital were taken as cases, 45 healthy females who presented in medical OPD for other complains were taken as controls. All patients signed a consent Performa after reading the conditions of study. The data collection was done from March-2016 to Sep-2016. For selection of cases we used following

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criteria; age 20-65 years, female gender, breast cancer diagnosis not more than 3 months and having grade III tumors. While age matched females having no breast cancer were selected as controls. For tumor grading we reviewed the histopathological reports of all patients. While patients receiving chemotherapy, having grade IV tumors and pregnant females were excluded.

Blood samples of all patients were sent to laboratory for measurement of vit. D levels. Vit. D levels were measured using ELISA technique. Patients with vit. D levels <20 ng/ml were labelled as vit. D deficient. A written Proforma was used to collect basic and demographic information about the patients. For statistical assistance we used SPSS v23. For comparing menopausal, residential, educational and working status, chi-square was applied. And for comparing the age and BMI Mann-Whitney test was applied.

Mean age and BMI were same between the groups. Other baseline variables such as menopause status, residential area, educational and occupational status were all comparable between cases and controls. There were 53.3% post-menopausal women among cases and 60.0% among controls (p-value 0.52). 77.8% patients among cases were from rural area and 84.4% patients among controls were from rural areas (p-value 0.42). Regarding literacy status, 86.7% females were literate among cases and 82.2% among controls (p-value 0.56).

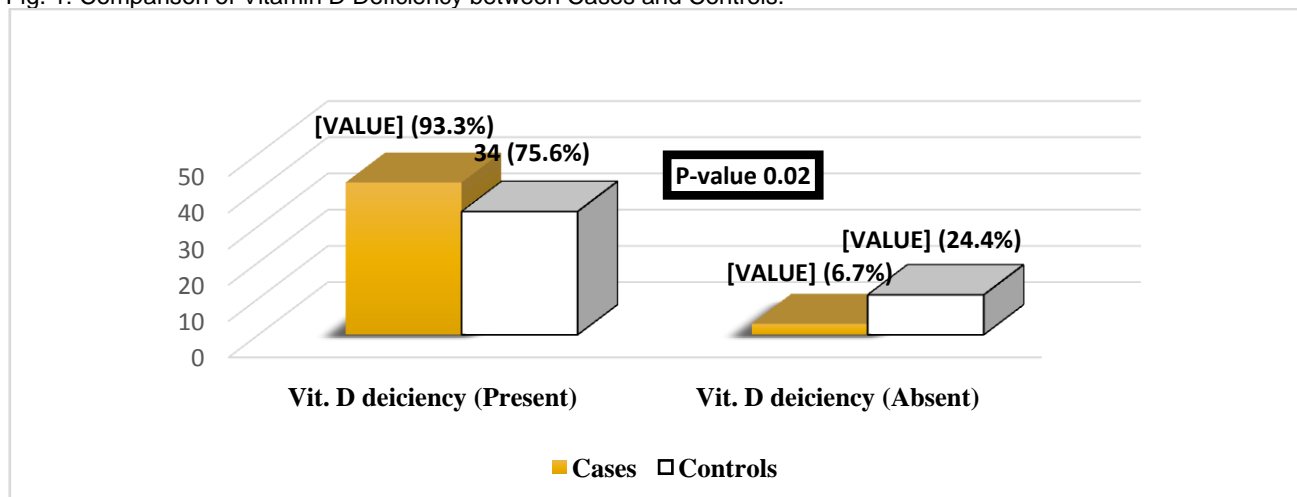
There were 84.4% females in case group who were housewives and 93.3% females in control group were housewives. While 15.6% women among cases and 6.7% among controls were housewives (p-value 0.18). Regarding vit. D deficiency, deficiency was found in 93.3% breast cancer patients and in 75.6% control patients. Vit. D levels were optimum in only 6.7% breast cancer and 24.4% normal patients (p-value 0.02).

RESULTS

Table 1: Baseline Characteristics of Participants.

Variables	Cases	Controls	P-value
Age	46.64 (10.70%)	49.91 (12.62%)	0.18
BMI	27.21 (6.72%)	26.19 (6.21%)	0.50
Menopause State			
Pre-menopausal (%)	21 (46.7%)	18 (40%)	0.52
Post-menopausal (%)	24 (53.3%)	27 (60%)	
Residential Status			
Rural (%)	35 (77.8%)	38 (84.4%)	0.42
Urban (%)	10 (22.2%)	7 (15.6%)	
Educational Status			
Illiterate (%)	6 (13.3%)	8 (17.8%)	0.56
Literate (%)	39 (86.7%)	37 (82.2%)	
Occupational Status			
House Wife (%)	38 (84.4%)	42 (93.3%)	0.18
Working Women (%)	7 (15.6%)	3 (6.7%)	

Fig. 1: Comparison of Vitamin D Deficiency between Cases and Controls.



DISCUSSION

Vitamin D deficiency is very common in South Asia. According to estimates about 70-97%, normal population of Pakistan has deficient vitamin D levels with higher prevalence in urban population¹³. In this study, In our study, 93.3% patients of breast cancer presented with vit. D deficiency and 75.6% normal patients had vit. D deficiency. Imtiaz et al. conducted an observational analysis in patients who were first time-diagnosed for breast cancer and found that 95.6% of these patients were having vit. D deficiency as compared to only 76.5% control patients⁸. Another study from Pakistan by Basharat et al. found vit. D deficiency in 92% breast cancer patients and in 62% normal patients¹⁴. A study conducted in Pakistan, found vit. D deficiency in 99% breast cancer patients and in 90.0% normal patients¹⁵. All these studies including our study, found very higher prevalence of vit. D deficiency in breast cancer as well as normal patients.

A study from Iran found vit. D deficiency in 61% patients and these authors also found a strong correlation with vit. D levels and stages of the tumors. Sadaf et al. also found a relation with vit. D levels and tumor characteristics¹⁶.

Studies from United States have reported vit. D deficiency in 50% to 74% newly diagnosed breast cancer patients¹⁷. Crew et al. found vit. D deficiency in only 33.0% breast cancer patients and in only 28% normal subjects¹⁸. A study from US metropolitan found vit. D deficiency in 78.0% breast cancer patients¹⁹. Chlebowski et al. conducted a large trial consisting of 36282 patients, these authors gave vit. D supplementation to study patients for a duration of 7 years, and they did not found any difference in development of breast cancer in study group and control group of patients⁹.

In our study, there was insignificant relationship of age, BMI, menopausal, literacy and working status on the incidence of breast carcinoma. Other studies have also found no relationship of these variables with the breast carcinoma^{15,20}. However, some studies has demonstrated low vit. D levels in premenopausal women due to childbirth and greater risk of malnourishment in this population²¹.

CONCLUSION

Vitamin D deficiency is present in more than 90% patients, which suggests that deficiency of vit. D is a risk factor of breast cancer.

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