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**ORIGINAL ARTICLE**

# Assessment of Vitamin D Deficiency and its Possible Risk with Breast Cancer in Pakistan

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## ABSTRACT

**Aim:** To assess the vitamin D deficiency as a possible risk factor in breast cancer.
**Study design:** Cross-sectional study
**Place and duration of study:** Surgical Unit-II, Ward 5, Liaquat University of Medical & Health Sciences Jamshoro from 1st January 2022 to 31st December 2022.
**Methodology:** One hundred and twenty-seven patients with the complaints of lump/mass in the breast or nipple discharge ≥6-week duration and diagnosed as breast cancer regardless of stage/grade presented were enrolled.
**Results:** 59.8% while the illiterate, primary, middle, secondary and higher were 36.2%, 14.2%, 17.3%, 20.5% and 11.8%. The statistical significance was observed for vitamin D deficiency in accordance with residence (p=0.03), duration of disease (p=0.05), educational status (p=0.05), hypertension (p=0.01), smoking (p=0.00), obesity (p=0.02), diabetes mellitus (p=0.04), raised CRP (p=0.00), hypocalcemia (p=0.00), ER/PR positive (p=0.01) and family history of breast cancer (p=0.04).
**Conclusion:** Vitamin D deficiency is more prevalent in patients with breast cancer with rural population predominance.
**Keywords:** Breast cancer, breast carcinoma, and vitamin D deficiency.

## INTRODUCTION

Breast malignant growth represents a serious well-being risk for ladies all through the world and is a widely recognized disease among ladies in the USA[1]. Breast malignant growth is likewise the most common disease of females in Pakistan, especially in southern and northern parts and has been viewed as well-known malignant growth among the ladies in 161 nations besides being the common reason for cancer death[2]. Genes of vitamin D receptor play significant parts in the mammary gland by regulating calcium transport, hormone differentiation, and secretion of milk.[3] Efforts have been coordinated toward distinguishing vitamin D as a breast malignant growth risk variable to be focused on for the prevention of the disease[4].

This is on the grounds that adequate vitamin D levels might safeguard against breast malignant growth and furthermore on the grounds that breast malignant growth chemopreventive medicines have high poison levels and are not powerful in the forceful estrogen receptor-negative breast malignant growth[5].

For the enormous occurrence of breast malignant growth, endeavours are being made to recognize risk factors that can be changed to forestall the disease.[6] Vitamin D assumes a significant part in calcium and bone homeostasis, it has displayed to reinforce our bones as well as can tweak a few elements of cancer[7].

It's hostile to cancer-causing properties that incorporate hindrance of cell multiplication, attack, metastasis, angiogenesis, and enlistment of apoptosis and differentiation.[8] Literature shows that 95.6% patients of with breast cancer treated at Shaukat Khanum Memorial Cancer Hospital, Pakistan suffered a deficiency of vitamin D[9], According to another study by Alco et al[10] the deficiency is noted as 70% while the research study by Trukova et al[11] observed 77%.

Our research with respect to the lack of vitamin D in breast malignant growth is scant and restricted. Hence this study was engaged to create the local data by investigating the extent of lack of vitamin D in patients with breast malignant growth in our populace so patients can be tentatively legitimized and overseen right on time according to perceptions of this review while the findings of this study could have partaken in different medical care seminars and conferences worldwide level as far lack of vitamin D and breast malignant growth are concerned on the grounds that the early investigation of the vitamin D in bosom disease populace can save the patients to get different perilous complications. There is contention in the literature about this relationship as literature uncovered that breast malignant growth is related to low degrees of vitamin D[12].

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## MATERIALS AND METHODS

After permission from Institutional Ethical Committee, this cross-sectional study was conducted in Surgical Unit-II, Ward 5, Liaquat University of Medical & Health Sciences Jamshoro. The data was collected from 1st January 2022 to 31st December 2022. One hundred twenty seven patients with breast cancer were enrolled. The women of 20-60 years of age having lump/mass in the breast or nipple discharge ≥6-weeks were included. The pregnant/lactating women were excluded. All the patients with breast cancer diagnosed through biopsy and histopathology were explored for serum vitamin D levels by taking 2 venous blood samples in a sterilized 5cc disposable syringe. The effect of modifiers and other explanatory variables such as age, gender and residence (urban or rural), duration of breast cancer, hypertension, smoking, obesity (BMI), iron deficiency, folic acid deficiency, anaemia, diabetes mellitus, raised CRP, hypocalcemia, hypomagnesemia, hypoalbuminemia, raised ESR and ER/PR positive and educational status were also explored. The data of all patients were analyzed in SPSS-22.0.

## RESULTS

The clinical presentation of vitamin D levels in the study population is shown in Table 1, when we look at the association between age and the deficiency of the vitamin D, there statistically non-significant association. However, age group 40-50 is more prone to develop the deficiency (34.9%) and age group 20-29 is less prone to develop the deficiency (13.3%). The vitamin D deficiency in accordance with the age is statistically non-significant (P=0.68) [Table 2].

Table 1: Frequency of vitamin D levels (n=127)

| Vitamin D deficiency | No. | % |
|---|---|---|
| Yes | 83 | 65.3 |
| No | 44 | 34.6 |

The vitamin D deficiency in accordance with the duration of disease among breast cancer patients is presented in Table 3 with (p=0.05), while in context to age it has been observed to be statistically non-significant (p=0.68) respectively. The vitamin D

deficiency in accordance with the duration of disease is statistically significant (p=0.05). The duration of the disease has statistically significant (*P=0.05) effect on the deficiency of vitamin D. The group 24-48 weeks has the most sever deficiency (36.1%).

Table 2: Vitamin D deficiency in accordance with age among breast cancer patient

| Age (years) | Vitamin D deficiency | | Total |
|---|---|---|---|
| | Yes | No | |
| 20-29 | 11 (13.3%) | 3 (6.8%) | 14 (11%) |
| 30-39 | 18 (21.7%) | 12 (27.3%) | 30 (23.6%) |
| 40-49 | 29 (34.9%) | 16 (36.4%) | 45 (35.4%) |
| 50-60 | 25 (30.1%) | 13 (29.5%) | 38 (29.9%) |
| Total | 83 (100%) | 44 (100%) | 127 (100%) |

Table 3: Vitamin D deficiency in accordance with duration of disease among breast cancer patient

| Duration (weeks) | Vitamin D deficiency | | Total |
|---|---|---|---|
| | Yes | No | |
| 6-12 | 8 (9.6%) | 10 (22.7%) | 18 (14.2%) |
| 12-24 | 20 (24.1%) | 7 (15.9%) | 27(21.3%) |
| 24-48 | 30 (36.1%) | 9 (20.5%) | 39 (30.7%) |
| > 48 | 25 (30.15) | 18 (40.9%) | 43 (33.9%) |
| Total | 83 (100%) | 44 (100%) | 127 (100%) |

## DISCUSSION

In South East Asia, low values of vitamin D are the standard as opposed to a special case In Pakistan, the predominance of lack of vitamin D in individuals is accounted for seventy to ninety-seven per cent of the metropolitan populace. The occurrence is two times that in the western populace. Postmenopausal ladies suffering from bone diseases are particularly prone to display the lack. Literature from the US exhibits fifty to seventy-four per cent lack of vitamin D in recently diagnosed premenopausal females suffering from breast malignant growth. In our investigation, we discovered 65.3% of breast malignant growth females were vitamin D inadequate vitamin D was fundamentally inadequate in breast malignant growth patients. Subsequently, the relationship between breast malignant growth hazard and vitamin D level is in accordance with different investigations from the developed world. Seventy-five, 59.1%, ladies of the breast malignant growth were fat, uncovering a little, however, an evil causal connection of inadequate levels of vitamin D in breast malignant growth patients[13].

Epidemiological research has shown that inadequate vitamin D values are related to obesity and lower active work. As late Kim et al[11] from Korea revealed more unfortunate results of vitamin D lacking patients with breast malignant growth. Additionally, there is information recommending that triple-negative breast malignant growth women have noteworthy inadequacy of vitamin D[14]. It has been shown by studies, that vitamin D inadequacy has a common connection with both premenopausal and postmenopausal female populace. However, in comparison to postmenopausal women, premenopausal women have more inadequate levels of vitamin D. Based on different research findings, vitamin D values might be a gamble or potentially an important prognostic point in breast malignant growth patients. However, information from larger randomized trials is as yet meagre[15].

The ideal vitamin D levels for lessening the risk for breast malignant growth or decreasing the chances of re-occurrence of breast malignant growth presently can't seem to be characterized.

Likewise, there are variations in vitamin D values in different ethnic and racial groups.[16] People in Asia, pass limited time in daylight, there is a high predominance of different malabsorption conditions, and utilization of supplementary vitamin D is uncommon. Only a few epidemiological endeavours have examined the relationship between vitamin D values and breast malignant growth risk in Asian ladies. The findings of this study are practically predictable with our findings.

Nonetheless, remarkable variation occurs in our observations when contrasted with an investigation of Crew et al. which displayed a lack of vitamin D in twenty-eight per cent (control) and thirty-three per cent (cases)[17].

Numerous observational and cross-sectional examinations show that vitamin D inadequacy is common in patients with malignant growth of the breast. Literature likewise exhibited a defensive impact of vitamin D on malignant growth. A negative connection between daylight exposure and breast malignant growth risk has been exhibited in a few examinations[13-14].

In the present study, body mass index, home, smoking, diabetes mellitus and educational status showed a measurably huge relationship with breast malignant growth. The review finding of the relationship of vitamin D inadequacy with breast malignant growth is steady with the findings of an observational Mediterranean review, where lacking values were related to high-grade breast malignant growth. Another new pooled cohort exhibited that vitamin D values >60ng/ml brought down the gamble of breast malignant growth by eighty per cent contrasted with ladies with values of < 20 ng/ml[18].

In China, research findings of twenty-one studies likewise propose that vitamin D might be beneficial in the malignant growth of the breast. A review among the Caucasian populace in the UK likewise revealed that low convergences of vitamin D for example under 20 ng/ml might build the hazard of breast cancer[19].

Notwithstanding, in a medical caretakers' wellbeing study cohort, high levels of serum vitamin D were related to insignificant diminished chances of breast malignant growth in elderly women.[18] A study conducted on Indian women has exhibited that the risk of breast malignant growth is increased in women having low (<20ng/ml) vitamin D levels[20].

In another investigation of Pakistani ladies, there was a comparative relationship between vitamin D inadequacy and an expanded chance of malignant growth of the breast. Likewise, Kim et al[21] observed a decreased risk of breast malignant growth with increased vitamin D levels, and emphatically connected with better breast malignant growth survival.

Vitamin D has a remarkable role in the immune system. It has a role in transcription. In vitro and in vivo mice models of mammary tumour cells have shown that vitamin D significantly reduces the growth of tumours.[22] Additionally, a survey recommends actuation or reclamation of the vitamin D directed pathways can possibly act as a road for human breast disease prevention[23,24].

The somewhat restricted facilities and little size of the study populace hindered the ability to recognize statistically significant patterns of lack of vitamin D for histopathological attributes of breast cancer. The limited facilities and sample size of our study hindered to find of a significant pattern of vitamin D inadequacy for histopathological attributes. Vitamin D deficiency is frequent in Pakistan. The pertinent period during which vitamin D might influence breast malignant growth event or endurance is as of now obscure. The relationship between vitamin D inadequacy with breast cancer is yet to be established. The oncologists have to perceive, treat, and forestall deficiency of vitamin D.

## CONCLUSION

The high recurrence of lack of vitamin D in the Pakistani populace with its unfavorable effect on wellbeing and further bigotry to breast malignant growth, makes it significant for the oncologists to timely identify, treat, and forestall the deficiency of vitamin D.

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**Conflict of interest:** Nothing to declare

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