Original Article

Association of Backache with Vitamin D Deficiency in Bangladeshi Female Garment Workers

DOI: dx.doi.org

Md Shah Nur Liton[1*], Md Sajjad Hossain[2], Muhammed Khaled Morshed[3], Mahua Mannan[4]

Received: 7 January 2024
Accepted: 23 January 2024
Published: 10 February 2024

Published by:
Sher-E-Bangla Medical College, Barishal, Bangladesh

*Corresponding Author

Editor: Prof. Dr. HN Sarker

Available Online:
https://bdjournals.org/index.php/planet/article/view/417

ABSTRACT

Introduction: *Backache is a prevalent health concern, particularly among individuals engaged in professions that involve prolonged sitting or standing, such as garment workers. Vitamin D, known for its crucial role in bone health, has been linked to various musculoskeletal disorders. However, limited research has been conducted on the association between vitamin D deficiency and backache, especially in the context of female garment workers in Bangladesh. This research investigates the association between Vitamin D deficiency and backache among indoor garment working women, focusing on sunlight deficiency as a contributing factor.* ***Methods and materials:*** *Our study was conducted at Tairunnessa Memorial Medical College and Hospital, Dhaka, Bangladesh spanning from June 2018 to December 2019. A total of 125 participants were included where the control count was 50 (non-backache) and the case count was 75 (backache) groups. The objective was to determine whether vitamin D deficiency plays a significant role in the prevalence of backache among Bangladeshi female garment workers.* ***Results:*** *In our study, insufficient vitamin D was found in 69% of low back pain patients, where the cut-off value of vitamin D was below 30ng/ml.* ***Conclusion:*** *Due to the*

(The Planet 2023; 7(1): 156-162)

1. Assistant Professor, Department of Orthopedic Surgery, Tairunnessa Memorial Medical College and Hospital, Gazipur, Bangladesh
2. Assistant Professor, Department of Orthopedic Surgery and Traumatology, Khwaja Yunus Ali Medical College & Hospital, Sirajganj, Bangladesh
3. Junior Consultant, Department of Orthopedic Surgery, United Hospital Limited, Dhaka, Bangladesh
4. Lecturer, Department of Physiology, Shaheed Tajuddin Ahmad Medical College & Hospital, Gazipur, Bangladesh

possibility of limited sunlight exposure from their jobs, the research emphasizes how important it is to treat Vitamin D insufficiency in women who work indoor garments. The findings call for targeted interventions to improve the Vitamin D status of this vulnerable population, promoting both their immediate health and long-term well-being.

Keywords: *Backache, Vitamin D, Female garments worker, Deficiency, Bangladesh*

INTRODUCTION

In every community, back pain is a widespread issue that is frequently ignored or classified as idiopathic [1]. Our diet plan and adequate sun exposure need to be concentrated on preventing this curse because low vitamin D levels could be a contributing factor. Many of the population frequently experience backaches, and sufficient statistics data need to be provided with proper research [2].

For strong bones, we need vitamin D, calcium, phosphorus, and other trace minerals [3]. The primary source of vitamin D is exposure to natural sunlight [4].

In the realm of occupational health, indoor garment workers constitute a unique demographic facing challenges associated with prolonged exposure to artificial lighting and limited access to sunlight. Vitamin D, primarily synthesized through sunlight exposure, plays a crucial role in maintaining bone health and overall well-being. Deficiency in this essential vitamin has been linked to various health issues, including musculoskeletal disorders. Among the adverse health effects, backache stands out as a prevalent concern, particularly among indoor workers with restricted sunlight exposure.

Vitamin D deficiency may result from insufficient exposure to sunlight because only a few foods, such as milk fortified with vitamin D, egg yolks, sea fish, and cod liver oil, naturally contain this nutrient [4]. One billion people globally are thought to be vitamin D deficient or insufficient [5]. Vitamin D deficiency can occur in people who work indoors or with little exposure to sunlight. Individuals' sun exposure can be influenced by socioeconomic factors such as their clothing choices and homebound lifestyle [6].

Bangladesh is a globally recognized manufacturer of clothing. About 4 million young women were employed in Bangladesh's export-oriented garment industries. Most female garment workers are from low-socioeconomic rural areas and are usually put in 9 to 10 hours a day in an overcrowded, confined workplace [7]. Patients with low vitamin D levels have been observed to experience diffuse skeletal pain that is similar to fibromyalgia syndrome, resistant musculoskeletal pain, and uncommon pain syndromes that are not relieved by analgesics or opiate derivatives [8]. Vitamin D works as a hormone to assist in maintaining bone strength by controlling the levels of minerals in bone, such as phosphorus and calcium [9]. Additionally, vitamin D controls how much calcium and phosphorus are absorbed from the intestines, which controls the mineralization and turnover of bones [10]. Reduced absorption of calcium, elevated serum parathyroid hormone concentrations, and bone loss are caused by inadequate calcium and vitamin D intake [11-12]. In clinical practice, idiopathic chronic low back pain is a very prevalent condition [13]. The purpose of this study is

to explain the relationship between backache and low vitamin D levels in the context of indoor garments working women. By exploring Vitamin D levels and backache prevalence in this specific occupational group, this study seeks to provide valuable insights into the health implications of prolonged indoor work and underscore the importance of addressing Vitamin D deficiency as a preventive measure.

METHODS AND MATERIALS

The study included 75 female garment workers from different garment factories in Gazipur and laboratory analysis was carried out at Tairunnessa Memorial Medical College and Hospital, Gazipur, Bangladesh. The participants were categorized into two groups: Group A-control group, consisting of 50 individuals without backache, and Group B-case group, comprising 75 individuals experiencing backache.

Inclusion criteria included the presence of specific backache for at least 2 months which was confirmed by clinical examination. Exclusion criteria included-patients with current or history of rheumatic or metabolic bone diseases; patients with chronic gastrointestinal, hematological, pulmonary, cardiovascular, endocrine and renal diseases; patients taking vitamins, calcium, steroids, and anticonvulsants drugs and those on diet; patients with limitation of physical activities; patients with diabetes with disease duration of higher than 2 years; and hospitalized patients.

Medical history, demographic information, and working conditions were recorded for each participant. Serum vitamin D levels were measured by using an immunofluorescence assay. Backache severity and duration were assessed through structured interviews and clinical examinations.

The statistical analysis was completed using SPSS. Data are presented as means and standard deviations. Group comparison was done by independent sample t-test. P values < 0·05 were considered significant. During the study in Bangladesh, we followed the standard ethical guidelines according to the authorized body.

RESULTS

The present study was conducted mainly on women working in garment factories from dawn to dusk six days per week in a complete indoor facility.

Table I: Vitamin D level of different age group (N=125)

Age group	Group A (n=75)	Group B (n=50)	P value
21-25	27.46±3.75	31.25±3.01	0.026
26- 30	24.84±4.51	33.75±2.38	0.000
31- 35	26.00±3.79	35.40±3.01	0.000
36-40	23.80±4.36	31.50±1.87	0.001

N= Total number of subjects, n= number of subject in each group, p <0.05 statistically significant.

Table I presents the distribution of Vitamin D levels among individuals in two distinct age groups, Group A (n=75) and Group B (n=50). The participants are categorized into four age brackets: 21-25, 26-30, 31-35, and 36-40 years. The mean Vitamin D levels, represented as mean ± standard deviation, are reported for each age category in both groups. Statistical analysis, as indicated by the P values, reveals significant differences between the two groups across all age brackets (P values: 0.026, 0.000, 0.000, and 0.001, respectively).

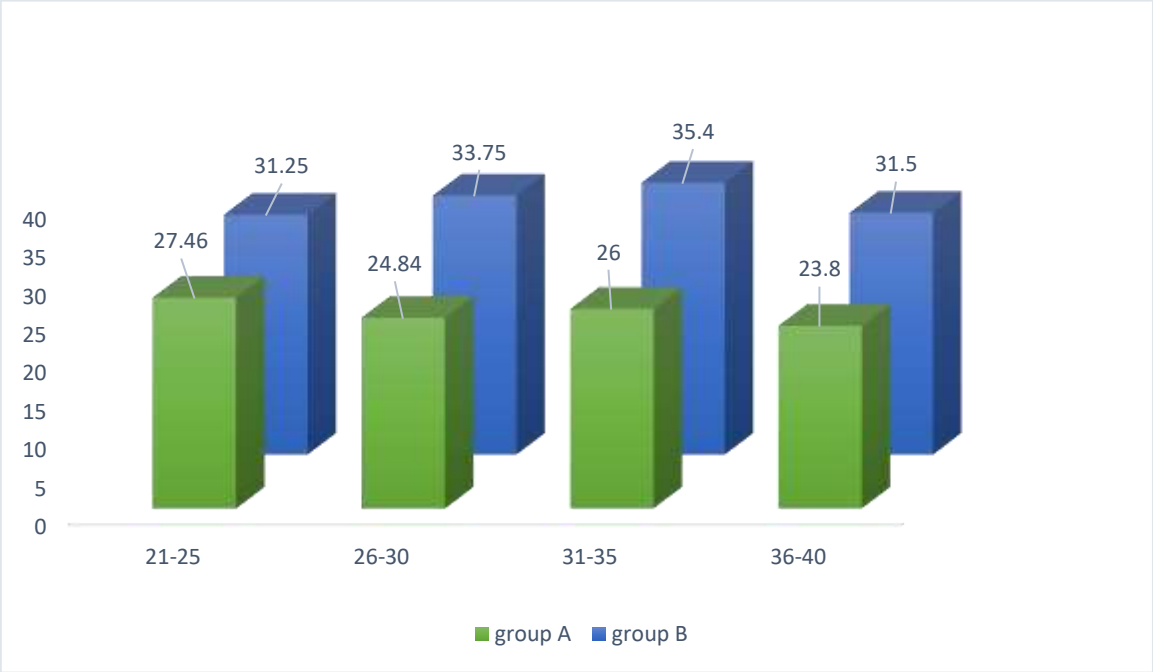

Figure 1: Graphical representation of Vitamin D level between Group A and Group B

Figure 1 presents the distribution of Vitamin D levels among individuals in two distinct age groups, Group A (n=75) and Group B (n=50). The participants are categorized into four age brackets: 21-25, 26-30, 31-35, and 36-40 years. In Group A, 24.46% were from the age group of 21-25, 24.84% were from the group of 26-30 years, 26% were from the age group of 31-35 years age group and 23.8% were from the age group of 36-40 years. In Group B, 31.285%, 33.75%, 35.4% and 31.5% participants were from the age groups of 21-25, 26-30, 31-35, and 36-40 years respectively.

Table II: Comparison of vitamin D value among groups

	Group A	Group B
Vitamin D value (ng/ml)	15-29	30-45

Frequency	52	47
%	69%	94%
Status	Insufficient Vitamin D	Sufficient Vitamin D
Reference value (ng/ml) of Vitamin D Deficient: <10 Insufficient: 10-29 Sufficient: 30-50 Toxic: >50		

Table II provides a comparative analysis of Vitamin D levels between Group A and Group B, with a focus on the distribution of participants across different Vitamin D value ranges.

DISCUSSION

The study investigates the prevalence of Vitamin D deficiency among indoor garment working women, focusing on the potential link between their occupation and sunlight deficiency.

In Group A, individuals aged 21-25 years exhibit a mean Vitamin D level of 27.46±3.75 ng/mL, while those in the 26-30 age range have a mean level of 24.84±4.51 ng/mL. For the 31-35 and 36-40 age groups in Group A, the mean Vitamin D levels are 26.00±3.79 ng/mL and 23.80±4.36 ng/mL, respectively. On the other hand, in Group B, individuals aged 21-25 years demonstrate a mean Vitamin D level of 31.25±3.01 ng/mL. The subsequent age categories, 26-30, 31-35, and 36-40 years, also display elevated mean Vitamin D levels of 33.75±2.38 ng/mL, 35.40±3.01 ng/mL, and 31.50±1.87 ng/mL, respectively. The statistical significance of the differences between the two groups is assessed using P values, and the results indicate statistically significant variations in vitamin D levels across all age groups.

The study comprehensively compares Vitamin D levels between Group A and Group B, classified into two distinct categories: 15-29 ng/mL and 30-45 ng/mL. The frequency distribution indicates that 52 individuals in Group A constitute 69% of the group. In contrast, 47 individuals in Group B account for 94% of the group. The status classification based on reference values reveals that the majority of individuals in Group A have insufficient Vitamin D levels, while the majority of individuals in Group B fall within the sufficient range.

The findings reveal a notable prevalence of Vitamin D deficiency among indoor garment working women, as evidenced by the majority falling within the insufficient Vitamin D range (15-29 ng/mL). This prevalence raises concerns about the potential health implications for this specific demographic group.

In other studies in Saudi Arabia, the United Arab Emirates, Australia, Turkey, India, and Lebanon 30 to 50% had 25-hydroxyvitamin D levels under 20 ng/ ml [13-15]. The nature of the indoor garment industry, characterized by prolonged periods of work indoors, often in environments with limited natural light exposure, suggests a potential correlation between their occupation and Vitamin D deficiency.

Vitamin D deficiency is associated with a spectrum of health issues, including weakened bone health, compromised immune function, and an increased risk of chronic diseases. In the context of indoor garment workers, whose occupation may limit their access to sunlight, the implications for their long-term health and well-being are substantial. The study also prompts considerations for intervention strategies to address Vitamin D deficiency in this specific population. The health hazards associated with prolonged indoor work may be reduced by establishing workplace rules that promote outdoor breaks, illuminated workstations, and awareness of maintaining adequate vitamin D levels.

CONCLUSION

We conclude that there is a significant association between Vitamin D deficiency and backache among indoor garment working women and emphasize the impact of sunlight deprivation in their occupational setting. The findings underscore the need for targeted health interventions, including awareness campaigns, dietary supplements, and workplace modifications, to address Vitamin D insufficiency and alleviate backache symptoms. Recognizing the intricate interplay between occupational factors, Vitamin D status, and musculoskeletal health is crucial for the development of effective strategies aimed at improving the overall well-being of indoor garment workers.

FUNDING

No funding sources

CONFLICT OF INTEREST

None declared

APPROVAL

The study was approved by the Institutional Ethics Committee

REFERENCES

1. *AM P. Osteomalacia and related disorders. Metabolic bone disease and clinically related disorders. 1990:329-96.*
2. *Thomas MK, Lloyd-Jones DM, Thadhani RI, Shaw AC, Deraska DJ, Kitch BT, Vamvakas EC, Dick IM, Prince RL, Finkelstein JS. Hypovitaminosis D in medical inpatients. New England Journal of Medicine. 1998 Mar 19;338(12):777-83.*
3. *Holick MF. High prevalence of vitamin D inadequacy and implications for health. InMayo Clinic Proceedings 2006 Mar 1 (Vol. 81, No. 3, pp. 353-373). Elsevier.*
4. *Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, Murad MH, Weaver CM. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. The Journal of clinical endocrinology & metabolism. 2011 Jul 1;96(7):1911-30.*
5. *Holick MF, Chen TC (2008) Vitamin D deficiency: a worldwide problem health consequences. Am J Clin Nutr 87(Suppl), 1080S–6S.*
6. *Islam MZ, Akhtaruzzaman M, and Lamberg-Allardt C (2006). Hypovitaminosis D is common in both veiled and nonveiled Bangladeshi women, APJCN.15: 1, 81–87.*
7. *Islam MZ, Shamim AA, Kemi V et al. (2008) Vitamin D deficiency and low bone status in adult female garment factory workers in Bangladesh.Br. J. Nutr. 99: 6;1322– 1329.*
8. *Erkal MZ, Wilde J, Bilgin Y, et al. (2006) High prevalence of vitamin D deficiency, secondary hyperparathyroidism and generalized bone pain in Turkish immigrants in Germany: identification of risk factors. Osteoporos Int 17, 1133–40.*
9. *Finch PJ, Ang L, Eastwood JB, Maxwell JD (1992) Clinical and histological spectrum of osteomalacia among Asians*

in south London. Q J Med 83(302), 439–48.

10. *Hashemipour S, Larijani B, Adibi H, et al. (2004) Vitamin D deficiency and causative factors in the population of Tehran. BMC Public Health 4, 38–42.*
11. *Hintzpeter B, Scheidt-Nave C, Müller MJ, Schenk L, Mensink GB. Higher prevalence of vitamin D deficiency is associated with immigrant background among children and adolescents in Germany. The Journal of nutrition. 2008 Aug 1;138(8):1482-90.*
12. *Lamberg-Allardt CJ, Outila TA, Ka¨rkkainen MU, Rita HJ, Valsta LM (2001) Vitamin D deficiency and bone health in healthy adults in Finland: could this be a concern in other parts of Europe? J Bone Miner Res 16, 2066–73.*
13. *Al Faraj S, Al Mutairi K. Vitamin D deficiency and chronic low back pain in Saudi Arabia. Spine. 2003 Jan 15;28(2):177-9.*
14. *Block SR. Vitamin D deficiency is not associated with nonspecific musculoskeletal pain syndromes including fibromyalgia. InMayo Clinic Proceedings 2004 Dec 1 (Vol. 79, No. 12, pp. 1585-1586). Elsevier.*
15. *Helliwell PS, Ibrahim GH, Karim Z, Sokoll K, Johnson H. Unexplained musculoskeletal pain in people of South Asian ethnic group referred to a rheumatology clinic-relationship to biochemical osteomalacia, persistence over time and response to treatment with calcium and vitamin D. Clinical and experimental rheumatology. 2006 Jul 1;24(4):424-7.*