25TH NATIONAL & 11TH INTERNATIONAL ANNUAL CONGRESS
ON RESEARCH AND TECHNOLOGY OF IRANIAN MEDICAL SCIENCES STUDENTS
URMIA UNIVERSITY OF MEDICAL SCIENCES, URMIA, IRAN

Relationship Between Vitamin D Level and DNA Breakage Index of Sperm in Men Referred to Omid Infertility Center in Hamedan, 2021-2023

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Citation:
Holakouie M, Pilehvari S. Relationship Between Vitamin D Level and DNA Breakage Index of Sperm in Men Referred to Omid Infertility Center in Hamedan, 2021-2023. *Iranian biomedical journal*. Supplementary (12-2024): 413.

ABSTRACT

Introduction: The prevalence of infertility is rising both in Iran and globally. This trend not only leads to psychological complications but also imposes significant annual costs on the Ministry of Health. Limited research has been conducted on the relationship between vitamin D and DNA fragmentation index (DFI), which measures DNA damage in sperm cells and is used to evaluate male fertility. Some studies suggest that vitamin D may influence sperm health and fertility. Vitamin D receptors have been identified in the testes, indicating that vitamin D deficiency could be linked to impaired sperm quality, including increased DNA damage. However, the evidence for a direct connection between vitamin D and DFI remains inconclusive, necessitating further research to establish a clear relationship. It is essential to recognize that male fertility is influenced by various factors, with vitamin D being just one of many potential contributors to DFI. If vitamin D is found to impact male fertility, it could be prescribed to enhance sperm quality and improve fertility chances.

Methods and Materials: In this descriptive-analytical cross-sectional study using the census sampling method, 789 men referred to Hamedan Omid Infertility Clinic Center in 2021-2023 were included. Vitamin D serum level, DFI, program indices, and demographic characteristics (occupation, age, and body mass index) were collected by interviewing and reading records. Data were analyzed using SPSS version 27 software.

Results: Among men who referred to the above-mentioned clinic, 7.7% had DFI15% (abnormal). Increasing age has been associated with increasing DFI 95% CI: 1.06-3.03; OR = 1.79; p = 0.05) The relationship between the increase in DFI and the decrease in normal sperm morphology was observed (95% CI: 1.43-4.20; p = 0.01; OR = 2.45) and the relationship between the increase in DFI and the decrease in the progressive movement of sperm was seen (95% CI: 1.66-4.87; p = 0.05; OR = 2.85) and also the relationship between DFI and the decrease in sperm count after removing the effect Confounding variables were observed (95%CI: 1.06-8.38; p = 0.05; OR = 2.98). There is a significant relationship between DFI and vitamin D insufficient serum level (20 ≤ vitD30 ng/mL) and serum level having vitamin D deficiency (vit D20 ng/mL) before and after removing the effect of confounding variables.

Conclusion and Discussion: The relationship between DFI and independent variables can differ depending on the specific conditions and research study. Of note, the relationship between DFI and these independent variables may not be consistent across studies, and more research is needed to fully understand this relationship. In this study, considering the role of demographic characteristics and program indicators, no correlation exists between DFI and vitamin.

Keywords: DNA, Iran, Vitamin D

[DOI: 10.61186/ibj.25th-11th-IACRTIMSS]