# Sex-Specific Associations Between Serum Vitamin D Levels and Health Status in Chinese Individuals with Obesity: A Cross-Sectional Study

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**I have no potential conflict of interest to report**

# Background:

- Increasing evidence suggests that serum vitamin D (VD) levels are associated with metabolic indicators and body composition. However, findings remain inconsistent across different populations. This study aims to investigate the relationship between VD levels and health status, encompassing metabolic health and body composition, among Chinese individuals with obesity

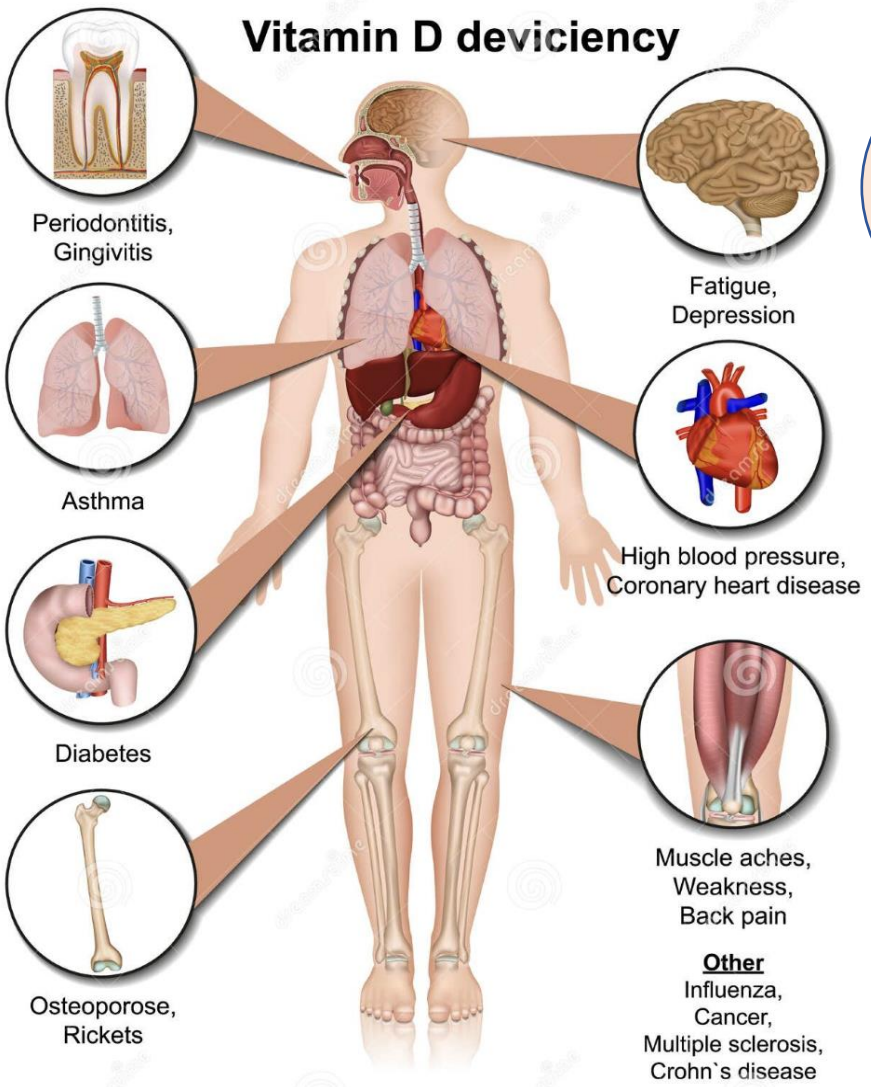
- The main sources of VD in the body are endogenous and exogenous pathways,Endogenous VD comes from synthesis by the skin under sunlight exposure, which is the main source of VD in the human body

- Approximately 30%~60% of children and adults worldwide have a deficiency or insufficiency of VD. Obese individuals have a 35% higher risk of having a deficiency compared to normal-weight individuals and a 24% higher risk compared to overweight individuals

| Main Diagnostic Criteria（Serum 25-（OH）D Concentration） | |
|---|---|
| Concentration | Status |
| Severe deficiency | <10 μg/L (<25nmol/L) |
| Deficiency | <20 μg/lL (<50nmol/L) |
| Insufficient | 20~30 μg/lL (50~75nmol/L) |
| Sufficient | ≥30 μg/lL (≥75nmol/L) |
| **Secondary Diagnostic Criteria (Serum PTH Level)** | |
| Comprehensive Assessment of Vitamin D Deficiency in Adult Patients | |

- Approximately 30%~60% of children and adults worldwide have a deficiency or insufficiency of VD. Obese individuals have a 35% higher risk of having a deficiency compared to normal-weight individuals and a 24% higher risk compared to overweight individuals

- VD receptor (VDR) is widely distributed in tissues such as the intestines, kidneys, bones, immune cells, heart, brain, etc., so besides regulating calcium-phosphate metabolism and maintaining bone health, VD also has multiple extra-skeletal effects including： inhibiting cell proliferation, angiogenesis, parathyroid hormone (PTH) synthesis and renin synthesis, as well as stimulating cell differentiation, antimicrobial peptide synthesis within macrophages and insulin synthesis




**VD**

**VDR**

- Participates in the expression of genes in numerous processes such as
- Cellular homeostasis
- Calcium and phosphorus regulation bone formation
- Cell growth and differentiation
- Immunity

**Osteoporosis, hair loss, diabetes, heart disease and Cancer(mammary tumors, leukemia)**

- Supplementing with VD does not significantly increase bone mass in the obese individuals, and there is no significant increase in osteoporosis or fracture incidence rate among those who are VD deficient

- Adipocytes from insulin-resistant obese people might have impaired release of vitamin D

- There are differences in VD levels between obese patients and normal-weight individuals

# Conclusion

- VD is primarily stored in visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT), which increases the level of VDR in these adipocyte tissues; this subsequently leads to a downregulation of UCPs expression and enhancement of adipogenesis
- VD supplementation at a dose of 4000 IU/day can markedly lower the HBA1c, FBG, and HOMA-IR index
- Our findings suggest that serum VD levels are inversely associated with certain body composition indicators, implicating that VD supplementation could potentially reduce BMI, body fat mass, and body circumference

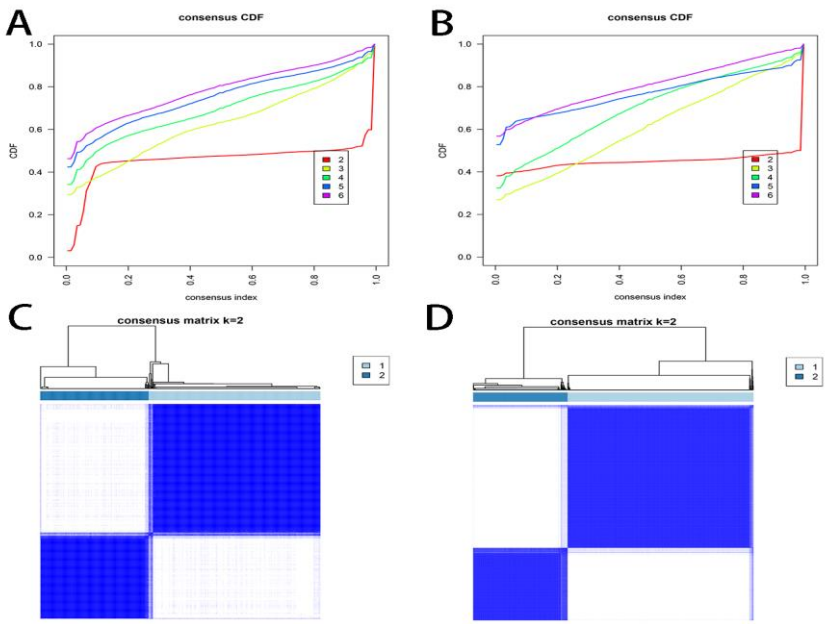
# Conclusion

- In male patients

VD exhibited a significant inverse correlation with HBA1c, Cp, TG, FBG, and HOMA-IR positive relationship with albumin and TP

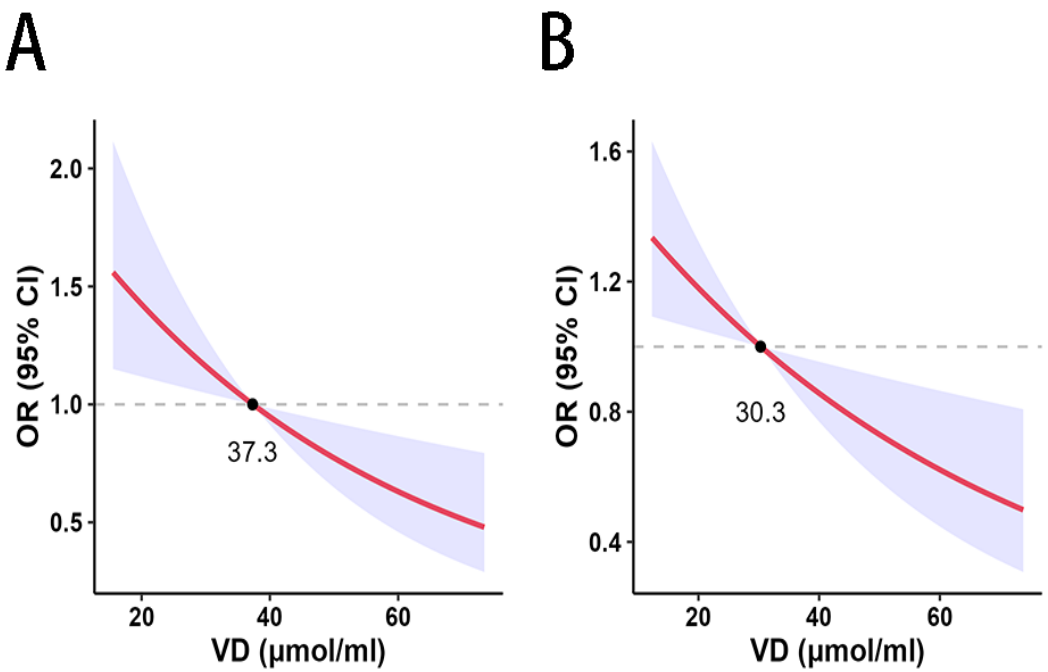
- In female patients

VD exhibited a negative correlation with TG, and a positive correlation with albumin, TP, and HDL-C



# Conclusion

- Serum VD concentrations exceeding 30.3 μmol/ml for female and 37.3 μmol/ml for male significantly diminished the health risk and obese subjects



# Discussion

- VD has a salutary effect on human health, with implications for liver, skin, heart, kidney, and nervous system diseases . Moreover, VD has the potential to ameliorate chronic metabolic diseases such as diabetes, obesity, and cardiovascular diseases. Individuals with poor metabolic health and adverse body composition, typically characterized by higher HBA1c and a lower SMM/body fat mass ratio, often exhibit lower serum VD levels

- VD drives the expression of genes that participate in cellular homeostasis, calcium and phosphate regulation, bone formation, cell growth and differentiation, immunity, and many more.Our understanding of the functions of VD continues to evolve.

# THANKS