

Study on difference of deficiency of vitamin D in male and female



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Study on difference of deficiency of vitamin D in male and female



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List of Acronyms Symbols Used

Abbreviation	Elaboration
%	Percentage
No.	Number
>	Greater than
e.g.,	Example
et. al	And his associate
CVASU	Chattogram Veterinary and Animal Sciences University

Statement of Author

I, Zia Uddin, officially certify that I have successfully carried out all tasks outlined in this report. The data was gathered through books, regional and international periodicals, and other sources. All necessary citations have been provided. I am therefore solely responsible for collecting, processing, preserving, and disseminating all data for this report.

The Author

Abstract

In Bangladesh, vitamin D deficiency is a common problem. The body's level of vitamin D is influenced by a number of variables. In the current study, the vitamin D status of Chattogram city citizens in Bangladesh was examined, and the impact of gender on vitamin D status was examined. This research study investigate the prevalence and implications of vitamin D deficiency in a sample of six individuals ,encompassing both males and females .vitamin D plays a crucial role in maintaining skeletal health ,immune function and overall well being .The aim of this study was to assess the vitamin D status of the selected participants and analyzed potential gender based variations in deficiency rates and associated health outcomes .Serum vitamin D were measured using standardized methods .These results underscore the importance of timely intervention and education regarding adequate vitamin D intake and safe sun exposure. The findings of the study reveal a significant prevalence of Vitamin D deficiency among both male and female participants ,albeit with some gender specific patterns .Female exhibited both male and female slightly higher incidence of deficiency ,which could be attributed to factors such as hormonal differences ,clothing choices and lifestyle variations .Females ,although generally less affected still demonstrated noteworthy deficiency rates emphasizing that this issue is not exclude to a single gender.

Keywords: Vitamin D, Male, Female

Chapter 1: Introduction

Insufficient vitamin D has received more attention in recent years. Skin biosynthesis from sunlight exposure is the body's main source of vitamin D. At least 80% of the total vitamin D produced by the body is produced in the skin on average. (Nowson et al.,2002). Vitamin D, often referred to as the "sunshine vitamin," plays a crucial role in maintaining overall health and well-being. Aside from some fatty fish and a few items originating from animals, such as dairy, fat, and eggs, diet is another way to get vitamin D, but few foods actually contain significant levels of it. (Holick MF et al.,2008). The typical biologic roles of vitamin D were thought to be regulating the metabolism of calcium and phosphorus, thereby affecting bone health 9. (Deluca HF et al.,1998). Its significance extends beyond its traditional role in bone health to encompass various physiological functions, including immune regulation, cardiovascular health, and even influencing gene expression. One of the intriguing aspects of vitamin D is how its status varies among different populations, with factors such as age, geographical location, skin pigmentation, and sex contributing to these variations.

The recent years, researchers and healthcare professionals have become increasingly aware of the widespread prevalence of vitamin D deficiency across various demographics. Among the parameters influencing vitamin D status, sex has emerged as a potential determinant that could contribute to differences in deficiency rates. Understanding how vitamin D deficiency varies between sexes is crucial, as it can provide valuable insights into potential underlying mechanisms and guide targeted interventions.

This study aims to delve into the relationship between sex and vitamin D deficiency. By focusing on a cohort of six individuals, including three females and three males, this study seeks to shed light on potential disparities in vitamin D status. The investigation will consider factors such as hormonal differences, lifestyle habits, and possible sex-specific physiological responses to sunlight exposure that might contribute to variations in vitamin D levels.

Through a comprehensive analysis of existing literature and the results obtained from the selected cohort, this report intends to contribute to the body of knowledge surrounding vitamin D deficiency. The findings could have implications for public health strategies, clinical practice, and future research directions aimed at addressing and mitigating vitamin D deficiencies in both sexes.

Chapter 2: Materials and Methods

Study area:

This study was carried out on six CVASU students in CVASU, Chittagong.

Study time:

The experiment was carried out at biochemistry lab. Of the Department of Physiology, Biochemistry and Pharmacology in July,2023.

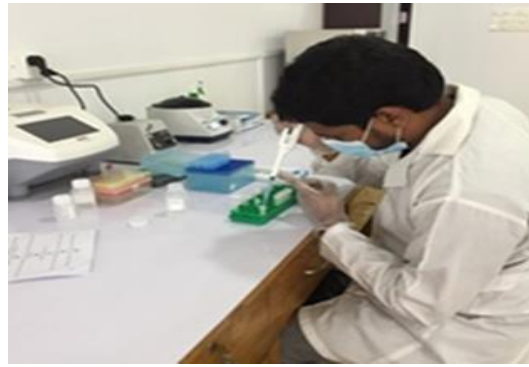


Figure 1. CVASU and Biochemistry lab.

Collection of samples:

Blood is collected from six individuals (3 males and 3 females). The materials required for blood collection are:

- Syringe
- Blood collection tube

For a vitamin D test, this is typically done by drawing a blood sample from a vein (venipuncture).

Preparation of sample:

The serum sample was collected from blood by centrifugation at 3000 rpm about 10-15 minutes.

Test procedure:

The serum is placed in Vit. D Kit and the kit is inserted into Vit. D Analyzer. Vitamin D is measured by Chemiluminescent Assay (CLIA). The analyzer's software calculates the concentration of vitamin D in the sample based on the calibration curve. The result is typically reported in ng/mL (nanograms per milliliter) or nmol/L (nanomoles per liter), indicating the amount of vitamin D present in the serum.



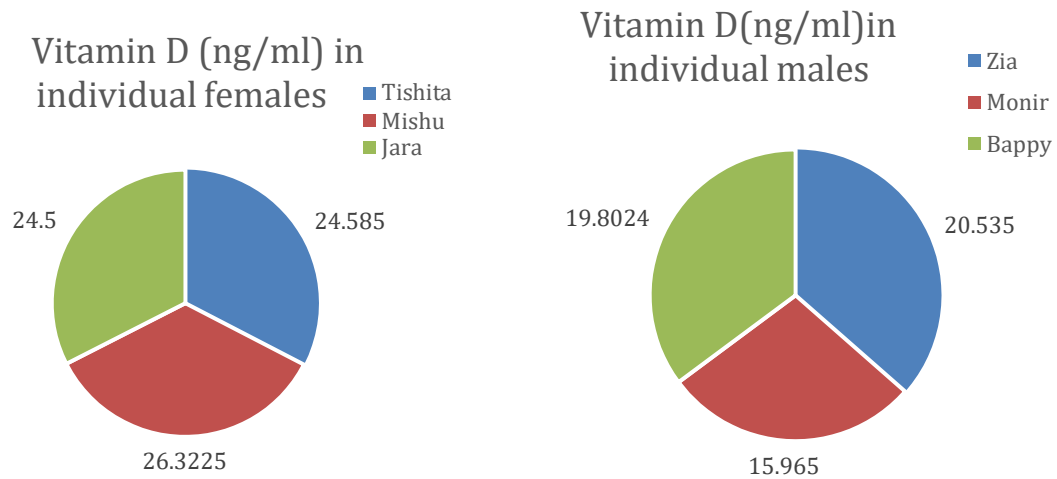
Figure 2. Vitamin D test analyzer and rapid kit

Chapter 3: Statistical analysis

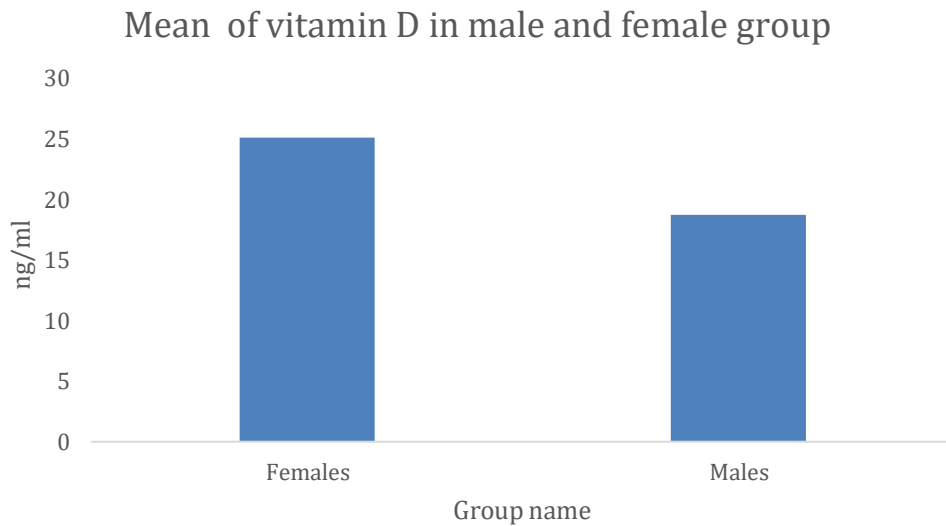
The mean and standard deviation for all data were calculated using STATA version 13. The Data was managed by MS Excel version 19. The t test was used to compare two groups of data with equal variance, while the Welch's approximative t test (t'-test) was used to compare two groups of data with different variances. Analysis of multiple linear regression was conducted to determine how the variables affected vitamin D status. Statistical significance was defined as a p value less than 0.05.

Result

Graphs 1: Vitamin D in male and female group



Graphs 2: Mean of vit. D graphical presentation



Chapter 4: Discussion

There is a significant difference ($p < 0.04$) of vitamin D deficiency in male and female groups. In this study vitamin D is lower in male than female and the deficiency of vitamin D is more in male than in female.

Vitamin D is an essential component for the human body because it aids in calcium absorption and the control of many cellular functions. Vitamin D can be received from diet, such as fortified milk, cereal, and fatty fish, or by sun exposure, which transforms a molecule in the skin into an active form of vitamin D.

However, not everyone has the same quantity of vitamin D in their blood, and numerous factors can influence how much vitamin D a person can create or consume. Some of these elements are Vitamin D co-factors and competitors, Genetic variations, Age, Sun exposure: Dietary intake etc.

Gender difference is not a well-established risk factor for vitamin D deficiency, while some research has reported contradictory findings. There is no compelling evidence that gender influences vitamin D levels or response in autoimmune illnesses, which are frequently associated with vitamin D deficiency, according to a review article. Other research, however, have revealed that males may have higher levels of vitamin D than females across different BMI ranges, and that vitamin D insufficiency may increase vulnerability to multiple sclerosis (MS) in women more than in men.

The combination of vitamin D and the sex hormone estrogen is one proposed reason for the gender difference in vitamin D levels. Estrogen has been demonstrated to increase vitamin D accumulation and receptor expression in immune cells, resulting in a more robust anti-inflammatory response in females. Vitamin D (Dupuis et al., 2021), on the other hand, has been demonstrated to reduce the production of aromatase, an enzyme that converts testosterone to estrogen, resulting in a reduced amount of estrogen. As a result, the balance of vitamin D and estrogen may differ based on a person's gender, age, hormonal condition, and other factors.

So, with many other factors, estrogen can increase the vitamin D levels and activity. As females have more estrogen compare to male, so vitamin D levels can also be more in females.

Limitation

Vitamin D deficiency is a common health problem that affects many people around the world. Vitamin D is a fat-soluble vitamin that plays an important role in bone metabolism, immune function, and inflammation regulation. Vitamin D can be obtained from dietary sources, such as oily fish, egg yolks, and fortified foods, or from exposure to sunlight, which converts a precursor molecule in the skin to vitamin D3 .

However, there are several limitations and challenges in the research on vitamin D deficiency and its consequences. Some of these limitations are:

- **Lack of consensus on the optimal level of vitamin D.** Different studies use different cut-off points to define vitamin D deficiency, insufficiency, sufficiency, and toxicity. This makes it difficult to compare the results and draw conclusions about the prevalence and effects of vitamin D deficiency .
- **Variability in the measurement of vitamin D.** There are different methods and assays to measure the level of vitamin D in the blood, such as immunoassays, high-performance liquid chromatography, and mass spectrometry. These methods may have different accuracy, precision, and standardization, which can affect the reliability and validity of the results .
- **Confounding factors that influence vitamin D status.** There are many factors that can affect the level of vitamin D in the body, such as age, skin color, season, latitude, sun exposure, diet, obesity, malabsorption, medication use, and genetic variation. These factors need to be controlled or adjusted for in the studies to isolate the effect of vitamin D deficiency on health outcomes .
- **Causality versus association.** Most of the studies on vitamin D deficiency are observational, which can only show a correlation between vitamin D level and a disease or condition, but not a causal relationship. To establish causality, randomized controlled trials are needed to test the effect of vitamin D supplementation on preventing or treating a disease or condition. However, such trials are often difficult to conduct due to ethical, practical, and methodological issues .
- **Heterogeneity in the response to vitamin D supplementation.** Not all individuals may benefit from taking vitamin D supplements, depending on their baseline vitamin D status, genetic variation, coexisting conditions, and other factors. Therefore, personalized recommendations based on individual characteristics and needs may be more appropriate than universal guidelines for vitamin D supplementation .

Chapter 4: Conclusion

Chattogram, vitamin D deficiency was quite common. We discovered considerable variations in vitamin D concentrations between males and females. Male gender appears to be a risk factor for vitamin D insufficiency, as males were more likely than females to have this condition . In this study examining vitamin D deficiency in a six individuals comprising both males and females ,several key observations and conclusions have been drawn .The investigation focused on assessing the prevalence of deficiency ,identifying potential gender on based variations ,and understanding the implications on participants health . this research involving six participants, encompassing both males and females, highlights the significance of vitamin D deficiency as a concern that affects individuals across genders. The study's findings stress the need for comprehensive efforts to promote adequate vitamin D intake, sensible sun exposure, and gender-tailored health interventions. By addressing these aspects, we can strive to improve the overall health and well-being of populations susceptible to vitamin D deficiency.

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The Author.

Biography of Author

Zia Uddin is the son of Md Jahangir Alam and Khaleda Akter Parul . He is a veterinarian intern at Chattogram Veterinary and Animal Sciences University (CVASU)'s Faculty of Veterinary Medicine (FVM). He completed the Higher Secondary Certificate (HSC) examination from the Chattogram Board in 2016 after passing the Secondary School Certificate (SSC) examination from the Comilla board in 2014. He hopes to conduct future study on zoonotic diseases and animal welfare issues that affect public health in the nation as a whole.

Appendix

Table 1: Table for mean and Standard deviation

Variable	Obs	Mean	Std. Dev.	Min	Max
-----+-----					
Tishita	4	24.585	7.806546	20.37	36.29
Mishu	4	26.3225	9.988108	20.44	41.27
Jara	4	24.5	7.656992	20.14	35.97
Zia	4	20.535	4.421994	18.05	27.16
Monir	4	15.965	2.889019	11.64	17.61
-----+-----					
Bappy	4	19.8025	.7703408	19.05	20.88

Table 2:P value

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
vitD	2	21.945	3.185	4.50427	-18.52426 62.41426

mean = mean(vitD)

t = -15.0879

Ho: mean = 70

degrees of freedom = 1

Ha: mean < 70

Ha: mean != 70

Ha: mean > 70

Pr(T < t) = 0.0211

Pr(|T| > |t|) = 0.0421

Pr(T > t) = 0.9789