

## Vitamin D deficiency (Review Article)

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### **Abstract:**

**Background:** Vitamin D is an extremely important vitamin that has powerful effects on several systems, vitamin D deficiency is very common, it estimated that about 1 billion people worldwide

**Objectives:(Aim )** To identify the prevalence of Vitamin D deficiency among the medical students. The aim of this study to evaluate the sun exposure in the vitamin D deficiency.

**Patients and methods:-** This study was done in Al-Hussein teaching hospital and Al- Murtadha lab , the total number of cases was 95. From the period of 3 November of 2022 to 1 March of 2023.. A study sample include students attending college of medicine . Out of total number of students, the convenient sample of 95 ( 60 female, 35 male )students were selected and agreed to participate in the study. The data was collected using online self - administered questionnaire form. Statistical analysis was done by using IBM/SPSS version 21(Statistical Package for social science) computer software. For sample description, a number and percentage were presented of tables and graphs. Also, chi square was used to describe the association between related variables.

**Results:** The overall prevalence of Vitamin D deficiency was 69.5% among students. The gender is significantly associated with Vitamin D deficiency symptoms . The highest percentage of Vitamin D deficiency was 84.2% among females ,15.8% males .

**Conclusion :-** The vitamin D deficiency is very common , there is a high rate of vitamin D deficiency in women and increase with age ,and with prevent exposure to sun and low diet of vitamin D .

**Key Word: Vitamin D, Vitamin D deficiency .**

### **Introduction:**

#### **Definition of vitamins**

Vitamins are a group of substances that are needed for normal cell function, growth, and development.

Vitamins are grouped into two categories:

Fat-soluble vitamins are stored in the body's liver, fatty tissue, and muscles. The four fat-soluble vitamins are vitamins A, D, E, and K.

Water-soluble vitamins are not stored in the body. The nine water-soluble vitamins are vitamin C and all the B vitamins. Any leftover or excess amounts of these leave the body through the urine. They have to be consumed on a regular basis to prevent shortages or deficiencies in the body. The exception to this is vitamin B12, which can be stored in the liver for many years.

#### **Definition of vitamin D**

Vitamin D is a fat-soluble vitamin that acts as a steroid hormone. Vitamin D influences the bones, intestines, immune and cardiovascular systems, pancreas, muscles, brain, and the control of cell cycles.

Vitamin D is responsible for increasing intestinal absorption of calcium, magnesium, and phosphate, and many other biological effects. In humans, the most important compounds in this group are vitamin D3 (also known as cholecalciferol) and vitamin D2 (ergocalciferol).(1,3)

#### **Source of vitamin D**

## Food Sources

Few foods are naturally rich in vitamin D3. The best sources are the flesh of fatty fish and fish liver oils. Smaller amounts are found in egg yolks, cheese, and beef liver. Certain mushrooms contain some vitamin D2; Many foods and supplements are fortified with vitamin D like dairy products and cereals.

## Ultraviolet Light

Vitamin D3 can be formed when a chemical reaction occurs in human skin, when a steroid called 7-dehydrocholesterol is broken down by the sun's UVB light or so-called "tanning" rays. The amount of the vitamin absorbed can vary widely.

## Role of Vitamin D

Vitamin D—nicknamed the "sunshine vitamin" is a major player in keeping the human body healthy. Its main job, according to the National Institutes of Health's Office of Dietary Supplements, is to promote calcium absorption. Because of that, a lack of vitamin D can lead to thin, brittle, or misshapen bones. **Here are some roles of vitamin D:**

1-Role of Vitamin D in bones mineralization vitamin D promotes absorption of calcium in our gut, which ultimately allows for normal mineralization of bones.

2-Role of Vitamin D in muscles Vitamin D is increasingly recognised to play an important role in normal muscle function. Low vitamin D status is associated with an increased risk of impaired skeletal mineralisation and muscle atrophy.

3-Role of Vitamin D in the immune system this role in possibly preventing infections has become a critical concern during COVID-19 pandemic, as researchers are interested in its potential role in infection outcomes. There is particular interest in its role in viral infections such as influenza and coronavirus.

4-Role of Vitamin D in diabetes Studies aren't conclusive, vitamin D may be helpful for preventing both type 1 and type 2 diabetes. Vitamin D on its own did not effectively lower the risk of an overabundance of sugar in the blood.

5-Role of Vitamin D in hypertension vitamin D may play a role in treatment of high blood pressure, one of the markers of cardiovascular disease, even short-term vitamin D deficiency may directly raise BP [blood pressure] and promote target organ damage. vitamin D supplementation therapy may be a new insight in the treatment of hypertension.

6-Role of Vitamin D in weight Obesity is a known risk factor for low vitamin D levels, which means more vitamin D may help with weight loss. In overweight or obese women with low calcium levels, those who took a daily dose of calcium paired with vitamin D were more successful shedding pounds than those who took a placebo supplement, due to an "appetite-suppressing effect" of the combination.

7-Role of Vitamin D in depression .

## Reference range of Vitamin D

Ideal level of vitamin D is **30-50 ng/ml**, less than these levels will lead to deficiency, and more will lead to toxicity.

## Vitamin D Deficiency

People can develop vitamin D deficiency when usual intakes are lower over time than recommended levels, exposure to sunlight is limited, the kidneys cannot convert 25(OH)D to its active form, or absorption of vitamin D from the digestive tract is inadequate. Diets low in vitamin D are more common in people who have milk allergy or lactose intolerance and those who consume a vegan diet.(12)

When the level of Vitamin D is below **20 ng/ml** this will lead to deficiency. Vitamin D is an extremely important vitamin that has powerful effects on several systems Vitamin D deficiency is very common. It's estimated that about 1 billion people worldwide have low levels of the vitamin in their blood.

The recommended daily intake (**RDI**) is usually around 400–800 IU. (16)

**: Symptoms of vitamin D deficiency may include**

- Getting sick or infected more often.
- Fatigue.
- Painful bones and back.
- Depressed mood.
- Impaired wound healing.
- Hair loss.
- Muscle pain.

**: If Vitamin D deficiency continues for long periods of time it can result in**

- obesity
- diabetes
- hypertension
- depression
- fibromyalgia
- chronic fatigue syndrome
- osteoporosis
- neurodegenerative diseases, such as Alzheimer's disease

Vitamin D deficiency may also contribute to the development of certain cancers, especially **breast, prostate, and colon cancers**. [1,2,3].

**Patients and method**

**Methodology:**

**Study design:** Case control study.

**Setting and duration:** The study was conducted in Al-Muthanna College of Medicine, from 3rd of November 2022 to 1st of March 2023.

**Population and Sampling:** Study sample include students attending medical,. Out of total number of students, the convenient sample of 95 students were selected and agreed to participate in the study.

**Data collecting:**

A prospective study was conducted in Al – Hussain Teaching lab A total number of 95 patients already diagnosis as vitamin D deficiency (by clinical manifestation and laboratory test ) were selected from medical outpatient and from al-Murtadha lab .

A history was taken from these patients including (name, age , job, associated illnesses , level of vitamin D deficiency and treatment )

In the lab , the method done by take blood sample from the patients then the next step was centrifugation of blood and after centrifuge , take plasma for detect of (25-hydroxyvitamin D ) in VIDAS device .

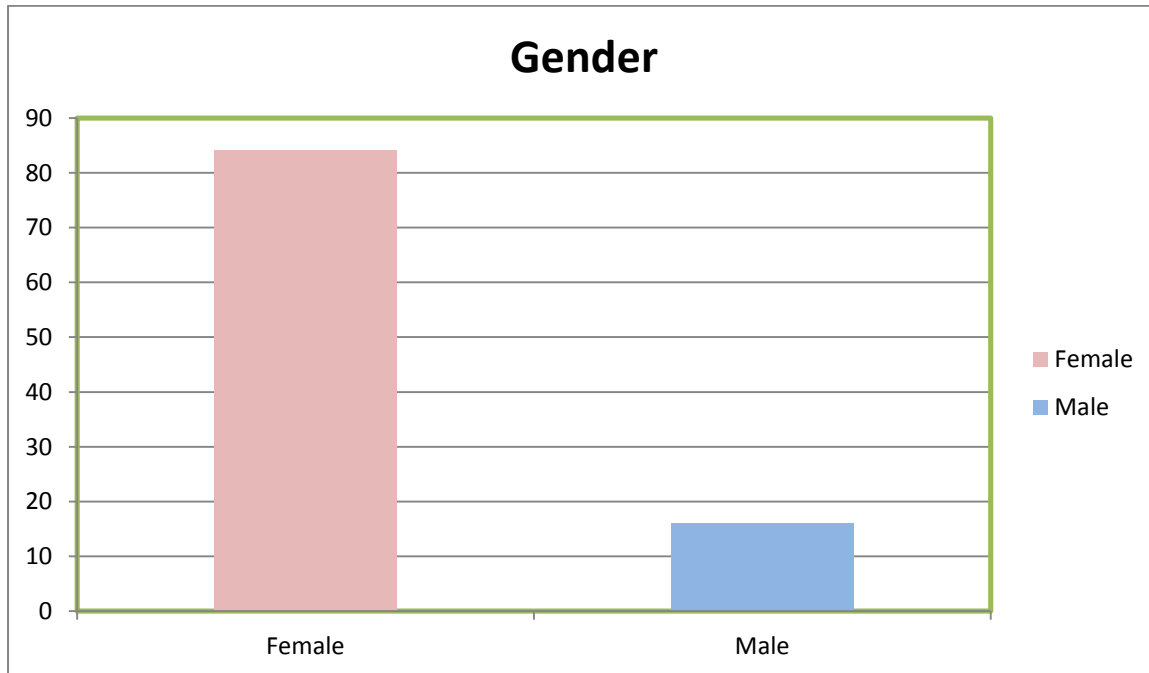
**The Result**

In our study a total number of patients is 95 , incidence of vitamin D deficiency in women more common than men :(66 abnormal , 29 normal)

Table 1 : Disturbance of sample according to stages characterized			
Variables		No.	%
Gender	Female	55	84
	Male	11	16
Age	(17-20)	18	18.9

	(21-24)	48	81.1
Stages	Second	12	19
	Third	14	21
	Fourth	18	24.2
	Fifth	11	17.9
	Sixth	11	17.9

The data obtained in this study shows that females 84% participate more than males 16%. Figure (1)



The data shows the stages in which the research was conducted

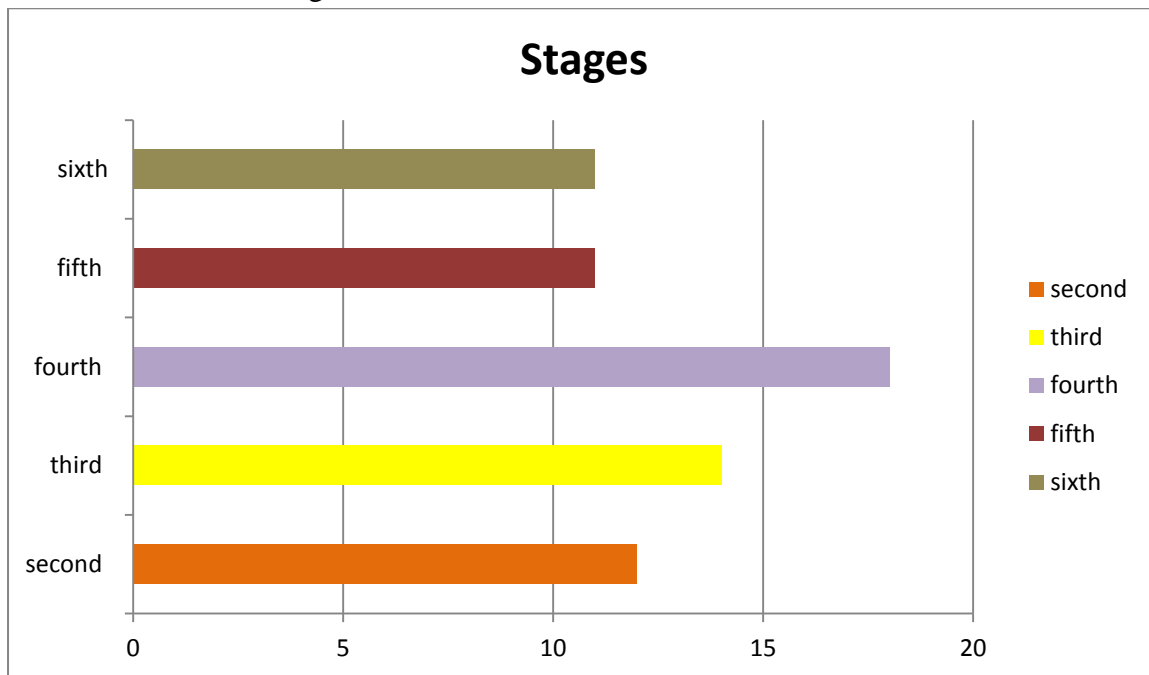
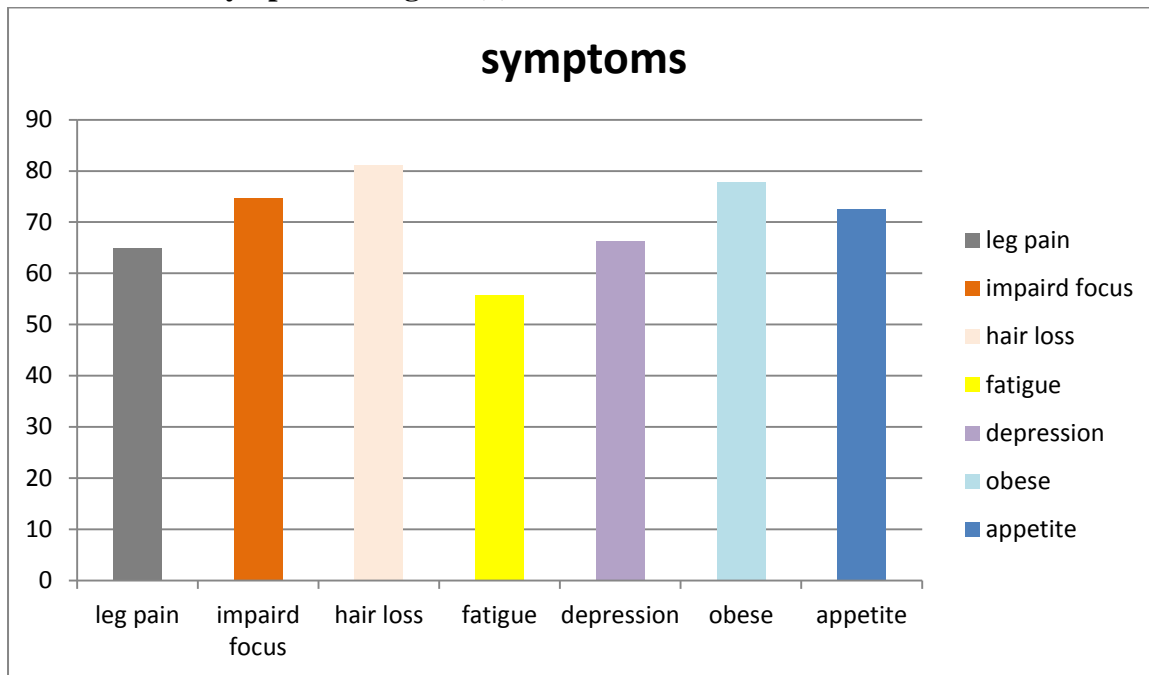


Figure 2 : Distribution of sample according to Stage in the college.

Most of the symptoms that promoted the participants to undergo vit D3 analysis are fatigue and hair loss And other symptoms . Figure (3)



**Figure 3 : Symptoms promote students to analysis**

The data shows that 69.5% of participants did routine checkup, which promoted them to undergo vit D3 analysis. Figure (4)

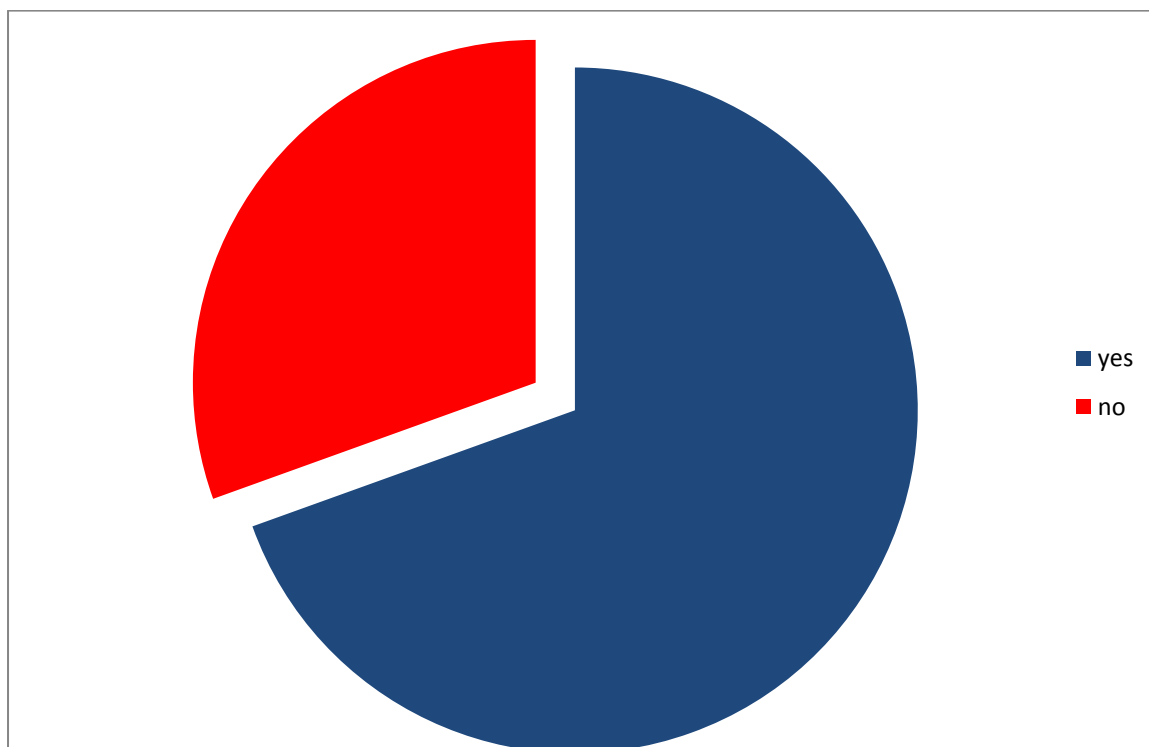
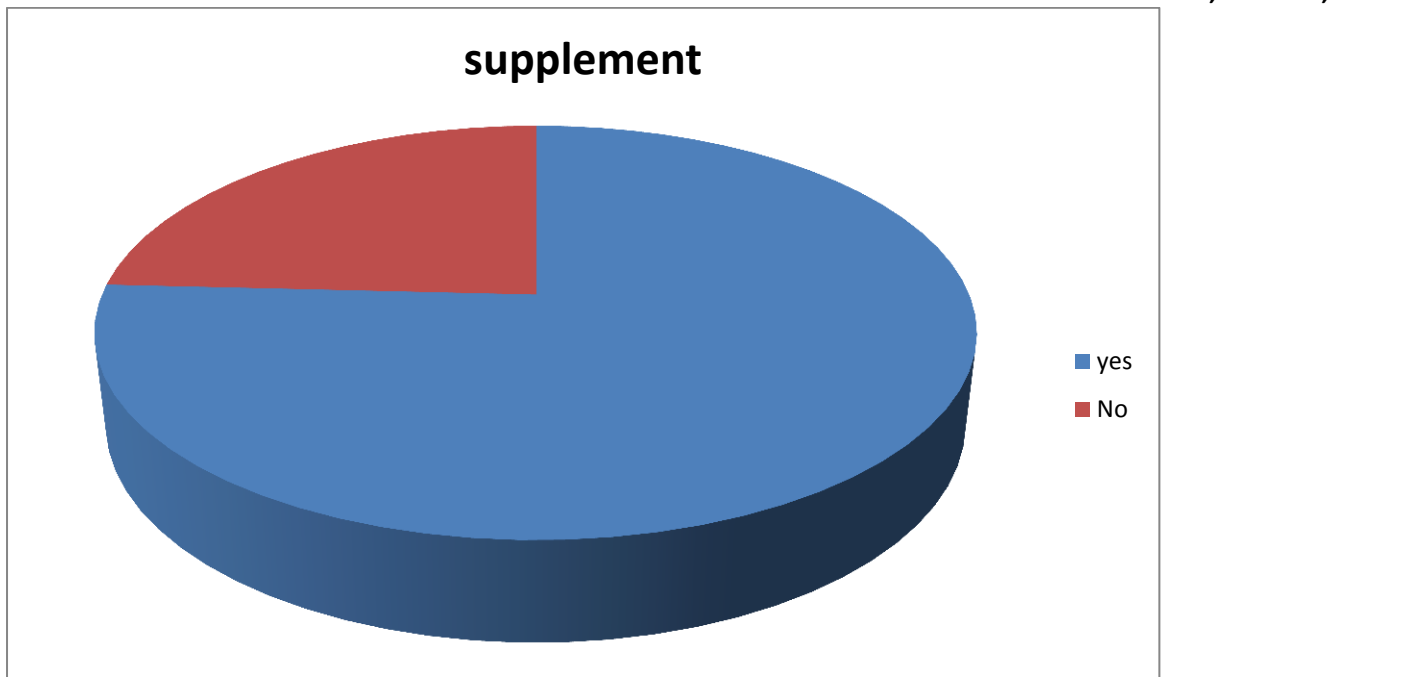


Figure (5) shows that 75.8 % of participants are taking vit D3 supplement



### Discussion:

Medical students are at a higher risk of developing physical health problems such as infection , depression , hair loss , obese ,fatigue as compared to a non-medical student due to the academic study in hospitals . Due to Iraqi's geographic location, the sun's rays are available for 10 months of the year or even more, but because the sunlight is very strong in Iraq, Iraqis are not exposed to it directly, especially in the afternoon during the summer.

According to figure (3) the symptoms of participants who suffer from vitamin D deficiency, 55.8% of the participants had fatigue as a complication of vitamin D deficiency. Case studies have shown that very low blood levels of vitamin D can cause fatigue that can have a severe negative effect on quality of life. (23-24) In figure (3), **66.4%** of the participants had bone and leg pain as a complication of vitamin D deficiency. Vitamin D improves the body's absorption of calcium.

In figure (3), **81.1%** of the participants (mostly females) had hair loss with vitamin D deficiency. Vitamin D is metabolized in the skin by keratinocytes. These are skin cells that process keratin, a protein in hair, nails, and skin. When the body doesn't have enough vitamin D, keratinocytes in hair follicles have trouble regulating hair growth and shedding. A 2017 review in the International Journal of Molecular Sciences found that low vitamin D levels have been linked to: Telogen effluvium, or excess hair shedding (26). And a 2016 study from the International Journal of Trichology found that among younger people with hair loss, women showed greater vitamin D deficiency.

According to figure (3), 64.5% of the participants had depression as a complication of vitamin D deficiency. Some studies have shown that giving vitamin D to people who are deficient helps improve depression, including seasonal depression (28-29) .

(31) It's also been suggested that vitamin D's role in controlling inflammation and fighting infection is important for proper healing. One analysis looked at patients with diabetic foot infections. It found that those with severe vitamin D deficiency were more likely to have higher levels of inflammatory markers that can jeopardize healing.

However, one study involving 60 people with diabetic foot ulcers found that taking a vitamin D supplement for 12 weeks significantly improved wound healing compared with a control group.

Generally, The number of Iraqi people who have deficiency of vitamin D is large and according to the research that was conducted here, figure (1) shows the total percentage of people who have a deficiency are 69.5% and according to statistics, females have deficiency more than males, as females are 84% of total 65 and males are 16% of total 30.

Also, due to study “Prevalence of vitamin D level in the serum of patients living in Erbil city, Iraq, 2018”, referred to **private clinical laboratory and effect** of age and sex on it, the participants in this study have been categorized considering gender and age. Females found to be most of the participant that have been referred for vit level detection, this is due to the fact that females in this area are more likely to stay at home and exposing less to the sunlight, which in return leads to deficiency.

### Conclusion:

- 1- Vit D Deficiency was high among medical students, in spite of the sunlight is very strong in Iraq but Iraqis are not exposed to it directly.
- 2- Vit D Deficiency symptoms were higher among female medical students than males, because of our middle east society most females wear scarf and cover most of their body, so limited exposure to sunlight will lead to reduction in the activation of vitamin D

### Recommendation:

- 1- Students are of greater need of support with Supplements as they less likely to seek and receive help. Ideally, we should have to checkup Vit D and other values routinely.
- 2- Encourage student to daily exposure to sunlight during middle of the day especially wavelength (270-300nm) the best rays for Vit D activation .
- 3- Students should eat dietary food rich with benefits substance such as Vit D, that are important for healthy body.
- 4- Students should know the importance Vitamin D, and its ability to reduce symptoms of infections.

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