

# Vitamin D Deficiency has a Strong Negative Affect on Sleep

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## ABSTRACT

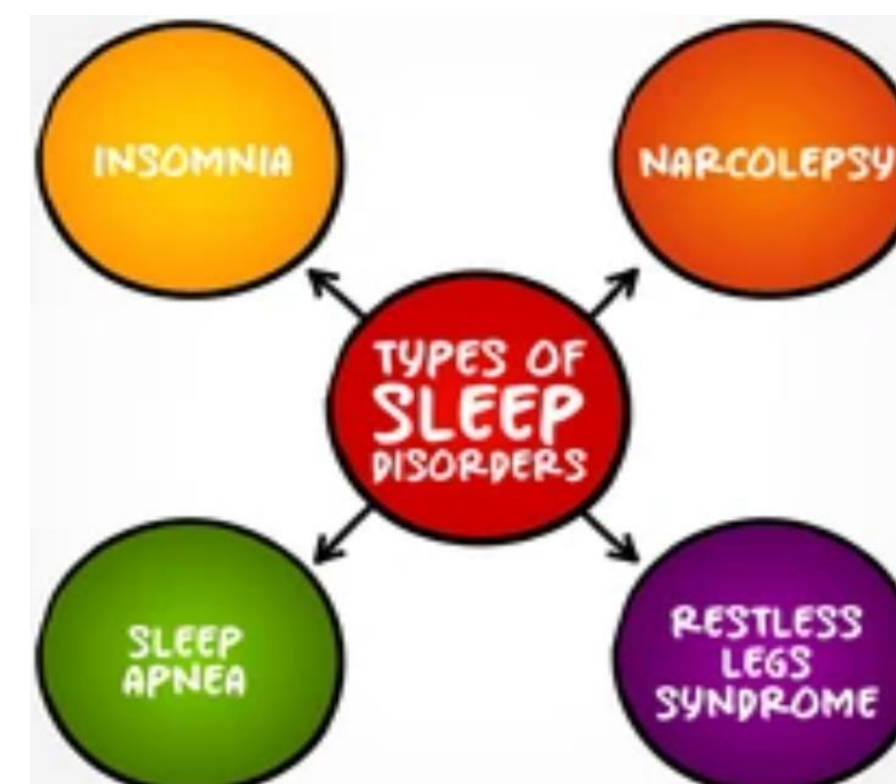
Having sufficient sleep is crucial for maintaining good health, as it enhances our ability to perform skills like problem-solving and decision-making. As individuals age, various biological and physical factors can reduce sleep duration, leading to an increased risk of developing sleep disorders. A factor that contributes to the proper functioning of the body is maintaining optimal vitamin D levels. Vitamin D is essential for growth, bone health, and other processes in the body. However, it is unclear whether vitamin D deficiency can increase the risk of developing sleep disorders in adults. In this literature review, we aimed to determine whether increasing vitamin D levels in the body could decrease the risk of sleep disorders. We examined many primary and secondary sources to understand the relationship between sleep and vitamin D functioning in the body. Our analysis found that decreased levels of vitamin D in the body are associated with lower sleep duration during the night. In addition, adequate vitamin D levels in the body are necessary for essential processes like growth and bone health. Furthermore, vitamin D deficiency can lead to dysfunction of the circadian cycle and melatonin hormone, eventually resulting in increased sleep disorders. In summary, we discovered that having adequate vitamin D is necessary for normal bone health and body growth and that lack of vitamin D can lead to weaker bones and associated body pain during the night, leading to disturbed sleep and reduced sleep duration. Therefore, our research suggests that individuals should strive to get 600 IU of vitamin D per day to help ensure that they have a longer duration of sleep as they age and reduce their risk of sleep disorders.

## METHODS

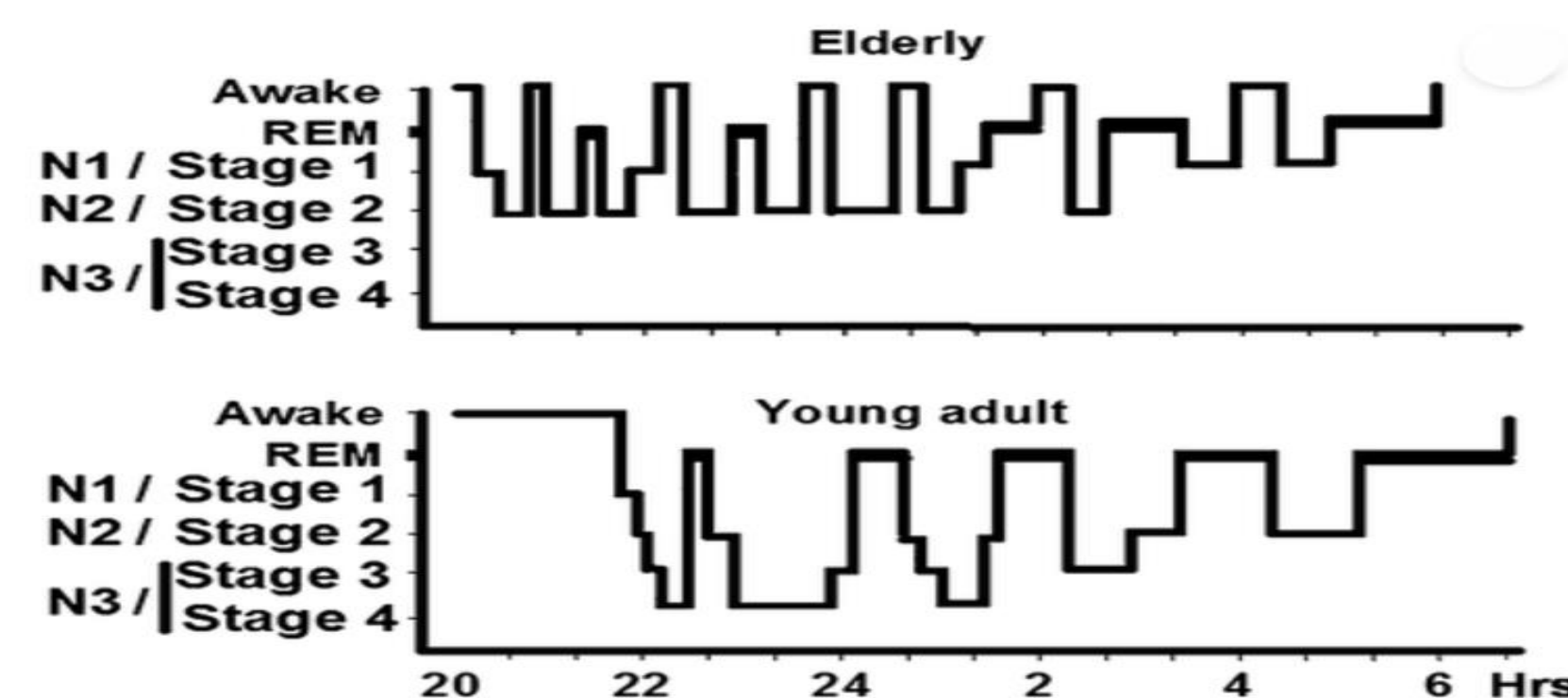
Extensive research of 30 primary and secondary peer reviewed articles regarding sleep disorders and its connection to vitamin D.

## BIOLOGICAL PROCESS OF SLEEP AND VITAMIN D

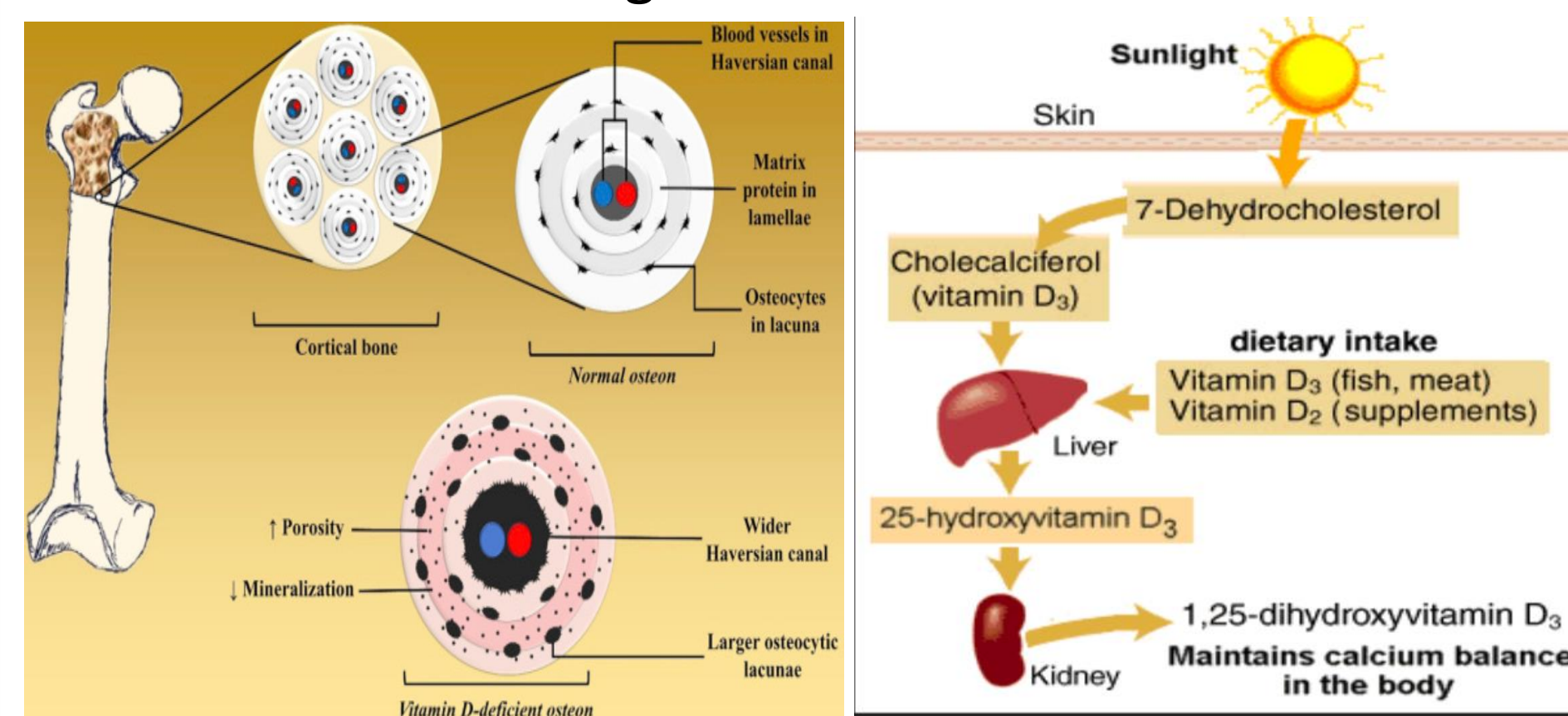
- Sleep occurs through the process of circadian rhythm that helps the body maintain the physiological process



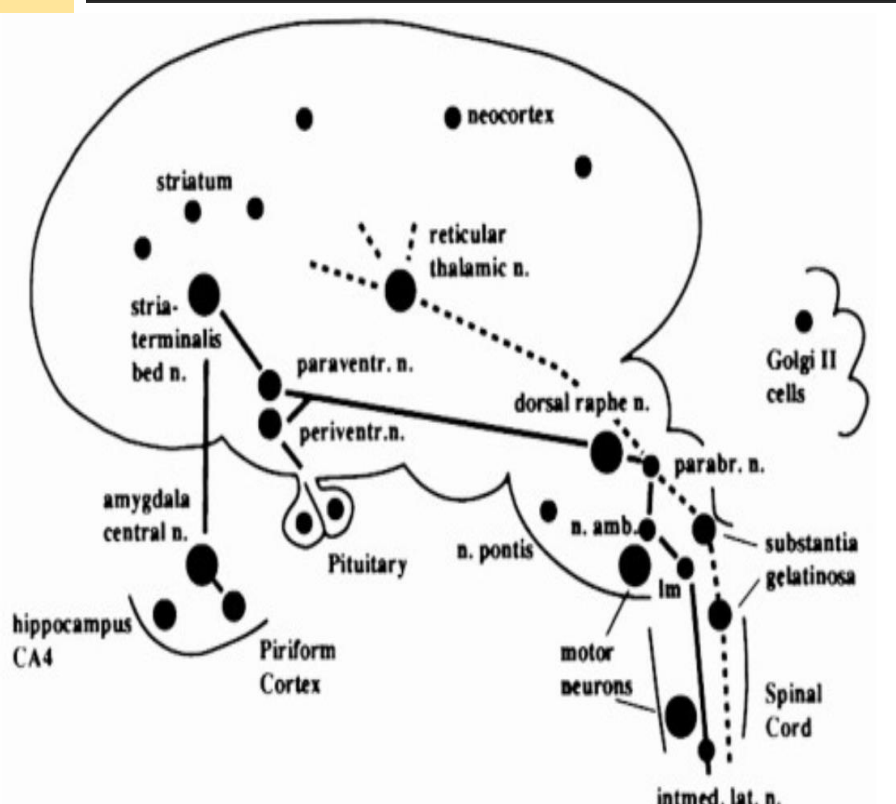
- 50-70% of American face sleep disorders as they age.



- Consequences of decreased sleep:
  - Negative affect on synaptic functions and neuronal function
  - post traumatic stress, depression, eating disorders
- Benefits of sleep:
  - Improves learning and problem-solving skills
  - Less stress and improves decision making skills



Common purpose of vitamin D: brain function, circadian rhythms, melatonin production, endocrine system, maintain calcium level, skeleton and intestine



## RESULTS OF VITAMIN D DEFICIENCY ON SLEEP FUNCTION

2015 Study : 2966 participants given vitamin D supplement to test its effect on their neurological patterns and it affect on sleeping patterns

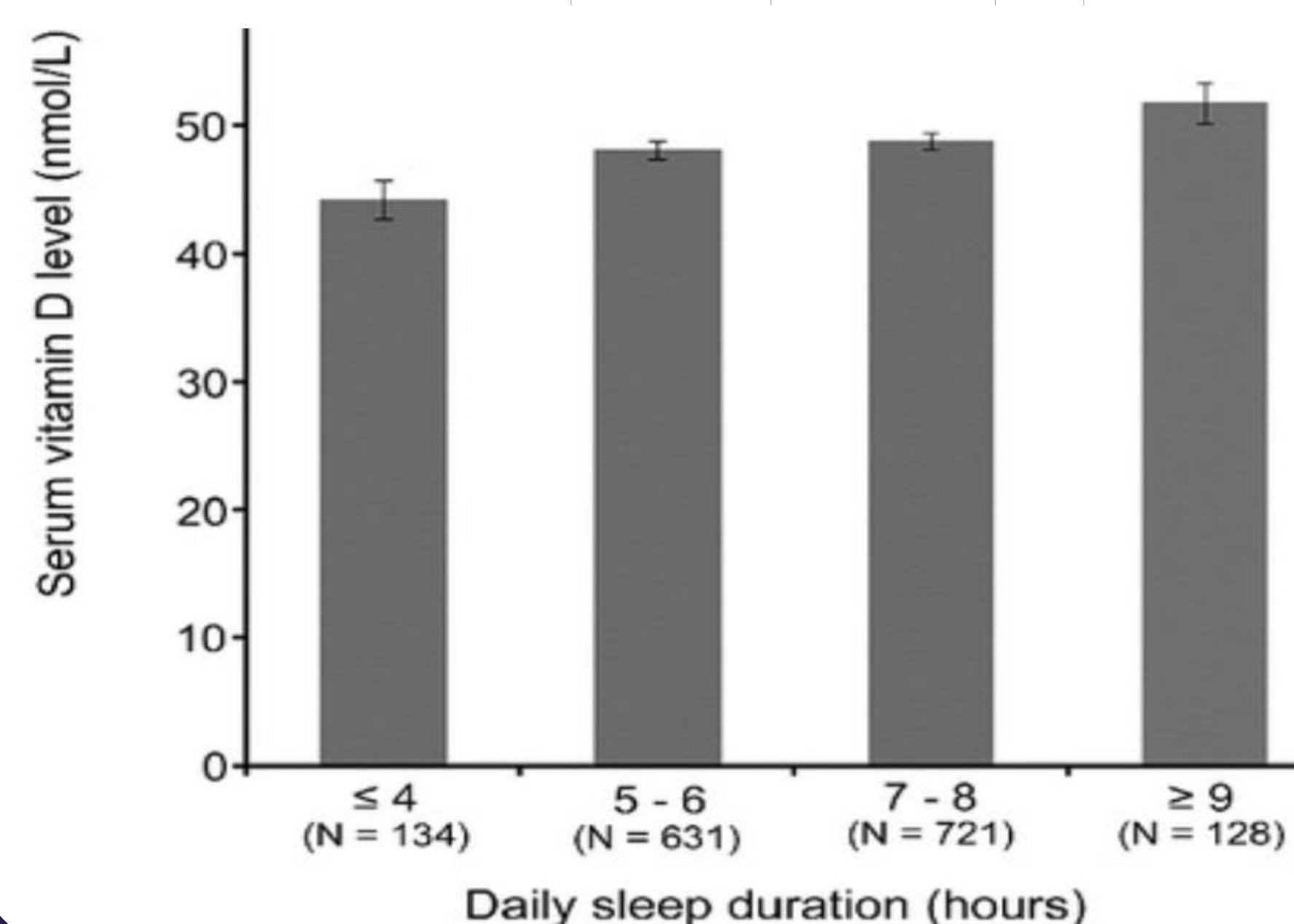
	Total serum 25(OH)D categories (ng/mL)			
	< 20.3 (n = 485)	20.3–30.04 (n = 1,311)	30.05–40.05 (n = 885)	≥ 40.06 (n = 285)
Total sleep time, n (%)				
< 5 h	86 (17.7)	173 (13.2)	86 (9.7)	19 (6.7)
5–8 h	359 (74.0)	1061 (80.9)	727 (82.2)	242 (84.9)
> 8 h	40 (8.3)	77 (5.9)	72 (8.1)	24 (8.4)
Sleep efficiency, mean (SD)	76.1 (12.7)	77.6 (12.5)	79.4 (10.8)	80.1 (10.7)

Various vitamin D levels given to test odds of short sleep duration

	Total serum 25(OH)D categories (ng/mL)			
	< 20.3 (n = 485)	20.3–30.04 (n = 1,311)	30.05–40.05 (n = 885)	≥ 40.06 (n = 285)
3.02 (1.80–5.09)	2.13 (1.30–3.48)	1.51(0.90–2.52)	1.00 (ref)	
2.97 (1.72–5.10)	2.02 (1.22–3.35)	1.43 (0.85–2.42)	1.00 (ref)	

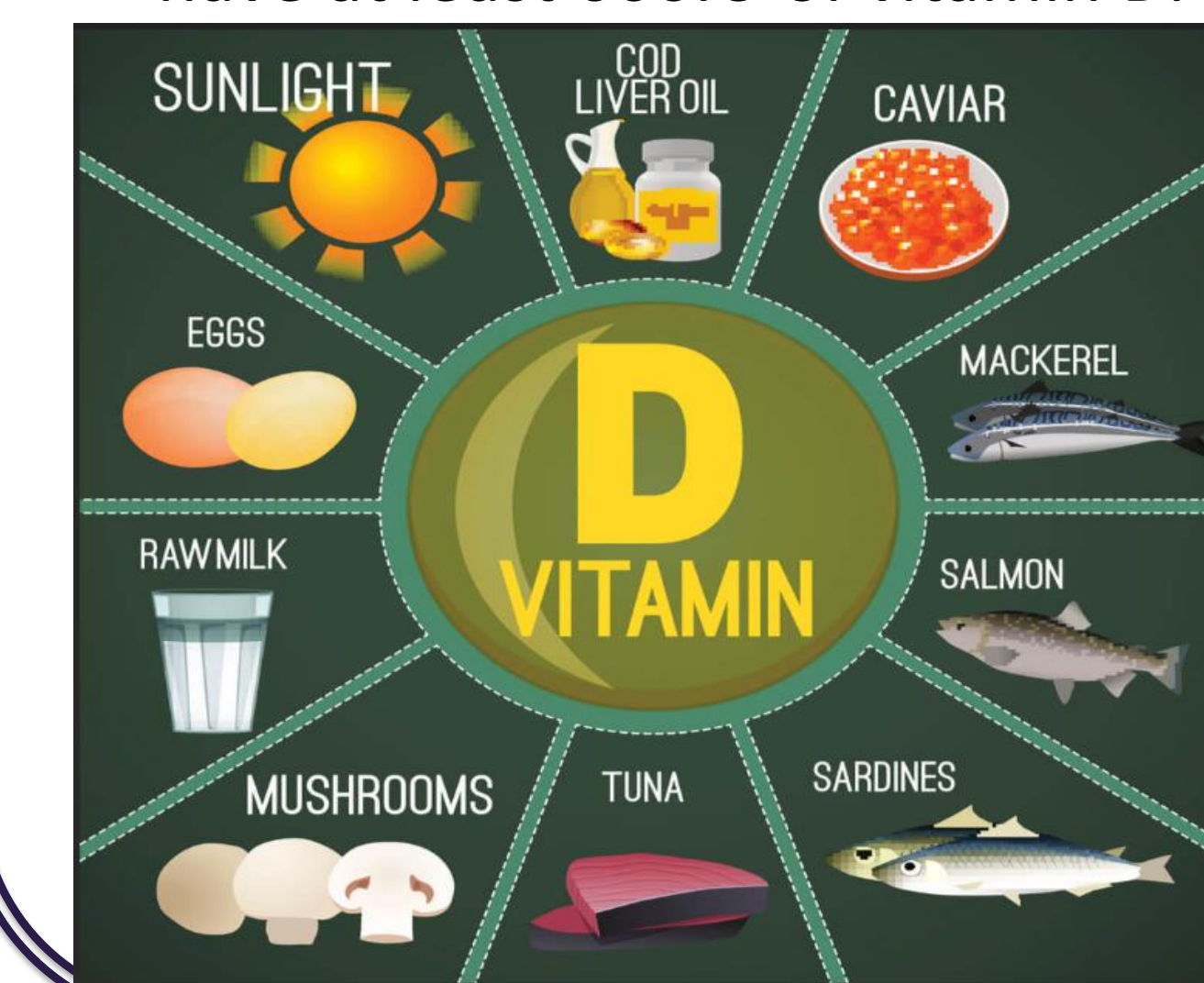
Study done on 39 COPD patients and divided into two groups: Insufficient vitamin D (InsVD) and Normal vitamin D (NorVD)

Duration of sleep (hours)	>7	12	50%	1	6%
	6-7	6	25%	6	35%
	5-6	4	17%	6	35%
	<5	2	8%	4	24%
	Sleep efficiency (%)	> 85	11	46%	5
	75-84	8	33%	6	35%
	65-74	2	8%	3	18%
	<65	3	13%	3	18%



## CONCLUSION

- Our analysis suggests that amount of vitamin D in the body is associated with sleep and can increase the risk of developing sleep disorders.
- Reduced levels of vitamin D showed negative effect on sleep patterns and duration.
- Adequate vitamin D leads to increasing bone health and growth which further improves sleep duration and sleep quality. Resulting in reducing the prevalence of sleep disorders.
- Vitamin D levels increased through diet and UV absorption. It is essential for the body to have at least 600IU of vitamin D.



## ACKNOWLEDGMENTS

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## REFERENCES

