

## A Survey to Assess Knowledge Attitude Practice of People towards Vitamin D

Essra Ali Safdar, Nida Ali Safdar, Syeda Afifa Fathima, Pathan Amanullah Khan\*

Department of Pharmacy Practice, Anwar Uloom College of Pharmacy, New Mallepally, Hyderabad, Telangana 500001, India

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Corresponding Author: **Pathan Amanullah Khan** | E-Mail: [aman.pathan811@gmail.com](mailto:aman.pathan811@gmail.com)

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### ABSTRACT

Vitamin D deficiency is a global epidemic a survey was carried out to assess knowledge attitude practice of people towards vitamin D for a period of five month (January -May 2023) among 300 participants which were asked to fill the google docs created online questionnaire relating to KAP. It was found that participants had good knowledge about normal range and important sources of vitamin D, exposure period required to be in sun, daily requirements, causes, and symptoms of vitamin D deficiency. Positive Attitude towards sun exposure and Practices among participants include sun exposure, taking vitamin D supplements, drinking 2 cups of milk, including seafood in diet, avoiding sunscreen. Awareness should be brought among people wherein pharmacists plays a major role as in this study only 4.6% of primary health care providers we're responsible for educating the public towards vitamin D.

**Keywords:** Vitamin D, KAP, Sunlight, Vitamin D, Diet

### Introduction

Vitamin D (also known as cholecalciferol) is a fat-soluble vitamin that is largely produced in the skin by activating 7-dehydrocholesterol in the presence of ultraviolet (UVB type) radiation. In the liver, it is quickly converted into 25-hydroxy vitamin D 25(OH) D. One more hydroxylation of 25(OH) D by 1-alpha hydroxylase takes place in the kidney, producing 1,25-dihydroxy vitamin D (1,25 D(OH)D), which is thought to be the most active metabolite of vitamin D [1]. Less than 50 nmol/L indicates insufficiency, and less than 25 nmol/L is considered vitamin D deficiency [2]. The blood's ability to maintain calcium and phosphorus balance is significantly influenced by vitamin D. Thus, it is essential for bone health, as a lack of vitamin D contributes to metabolic bone diseases that cause osteomalacia in adults and rickets in youngsters. Inadequate intake of vitamin D is linked to an increased risk of infection. Vitamin D is also crucial for the prevention of many chronic diseases, such as cancer, cardiovascular disease, diabetes, metabolic syndrome, autoimmune diseases, and depression [3]. Additionally, it has been hypothesized that vitamin D has a beneficial immune-modulating effect that causes an anti-inflammatory and anti-fibrogenic pattern in the liver. It is also crucial in preventing non-alcoholic fatty liver disease (NAFLD) and colon cancer from developing and progressing [4]. Numerous causes, such as insufficient vitamin D in the diet, malabsorption, and poor utilization, as well as increased needs, increased excretion, and catabolism, are all associated with vitamin D insufficiency. In addition, there are various diseases that affect the bioavailability of vitamin D, including

gastrointestinal issues that limit absorption; and issues with the kidneys and liver that can prevent the activation of parenteral vitamin D or affect its conversion to active metabolites.

Multiple sclerosis and other autoimmune illnesses like rheumatoid arthritis are linked to vitamin D deficiency. Vitamin D insufficiency and the likelihood of developing chronic diseases are strongly correlated. According to another study, people with vitamin D levels below 20 ng/mL have a 30%–50% higher chance of developing colon, prostate, and breast cancers as well as a higher mortality rate from these diseases. The intensity of COVID-19-related symptoms has recently been linked to vitamin D insufficiency [5]. South Asians are one of the population groups most afflicted by vitamin D deficiency, according to mounting research that suggests it is becoming a global epidemic. The main source of vitamin D is sunshine exposure. Oily fish, egg yolks, and dietary supplements for vitamin D are some of the finest sources of vitamin D in the diet. South Asians continue to be one of the demographics most susceptible to low vitamin D levels despite receiving enough of sunlight throughout the year in their nations [6]. In light of this, educating the public on the necessity of vitamin D can help to significantly reduce the health problems brought on by its insufficiency. The current study's objective was to evaluate public knowledge about vitamin D as well as attitudes and practices related to vitamin D deficiency.

## Material and Methods

A survey study was carried out January 2023 to May 2023, both males and females were included in study with age greater than 18 years. The online version of the questionnaire was used to reach a larger number of people to assess their fundamental knowledge, attitudes, and actions toward vitamin D. The necessary information was gathered over the course of five months, utilizing a Google Docs-created online survey that was digitally disseminated over Twitter, Telegram, and WhatsApp. There were close-ended multiple-choice questions in each of the three sections of the questionnaires. The participants' age, gender, educational attainment were all discussed in Section A. Questions in Section B evaluated sources of primary information about vitamin D, knowledge about significant sources of vitamin D, the purpose and advantages of vitamin D, the daily recommended dosage of vitamin D, and the typical amount of sun exposure needed to obtain adequate levels of vitamin D. Part C was created to assess how people behave and think about sunlight, including how much time is spent outside in the sun, how often it is exposed to them, whether they prefer to be outside during a particular season, how they protect themselves by using sunscreen, whether they smoke, and how they can raise their vitamin D levels.

## Results

Study was conducted among 300 people, 55% of people were in the age group 18-39 years, 40.7% were in the age group 40-59 years, and 4.3% were in the age group > 60 years. 59% of participants were female and 41% were male. 69.7% of participants were postgraduate, 14.3%, 10%, 3.3% 2.67% were graduate intermediate and illiterate respectively.

### Knowledge and Awareness about vitamin D

The majority of the participants (92.7%) heard about vitamin D and 7.3% did not hear. 81.66% of people heard about vitamin D from educational institutions, 8% from media, 4.66% from primary health care center, and 5.66% from relatives and friends.

77.7% of people knows the normal range of vitamin D as 20-50 ng/ml and 9.64% do not know the normal range. 6.33% participants answered as <12ng/ml and <20ng/ml 6.33% of participants.

72.7% people answered sun, milk and milk products, fatty fish, egg yolk, cod liver oil, mushroom as essential sources of vitamin D and 16.7% reported sun as an important source, 4.33% milk and milk products, 1% fatty fish, 0.66% egg yolk, 1% cod liver oil, 0.33% mushroom, 3.33% as I don't know.

79.3% people know that 10-20 minutes are required to be in sun to get enough vitamin D and 7% answered as 30-60 minutes, 6.66% as < 10 minutes, 1.66% as >1 hour, 5% as I don't know.

only 38% of participants know the daily requirement of vitamin D 600IU, 13.3% do not know the daily requirement of vitamin D, 8.7%, 40%, answered daily requirement for vitamin D as 200IU, 800 IU respectively.

83% of people think taking calcium supplement helps in maintaining vitamin D levels in body, 10% did not know 7% people do not believe.

75.7% of the participants reported all the causes of vitamin D (genetics, less exposure to sunlight, lack of food rich in vitamin D, kidney disease, respiratory infection.) 7.3% do not know the cause of vitamin D deficiency, 5% as genetics, 7.67% as less

exposure to sunlight, 4% as lack of food rich in vitamin D, 0.33% as kidney disease.

77% of people know the functions and effects of vitamin D (prevents osteoporosis, prevents general weakness, prevents chronic disease, prevents cancer, aids in calcium absorption, good for vision), 9% of people do not know function and effect of vitamin D and 6% reported as prevention of osteoporosis as only function and effect of vitamin D.

78% of people knows the symptoms of vitamin D deficiency (joint and bone pain, delayed tooth growth, walking delay in children, muscle pain, deformity of knee joint in children, depression, alopecia) 12% answered as joint and bone pain as only symptoms of vitamin D deficiency, 2% reported as delayed tooth growth, 0.33% as muscle pain, 0.67% as deformity of knee joint in children, 0.33% as depression, 1% as alopecia, 5.67% do not know the symptoms.

81% people believe that vitamin D deficiency is associated with other disease such as CVD, cancer, depression, celiac disease, multiple sclerosis. 12.7% do not know and 6.3% do not believe.

89% people do not have any disease causing vitamin D deficiency and 11% people have.

### Attitude and practice towards vitamin D

53.3% people have checked their vitamin D levels and 46.7% did not.

53.3% people always like to be in sun, 30% avoid sun exposure, 9% rarely get the sun, 7.7% do not know.

62% people like to spend time in sun in early morning, 28.3% avoid sunlight, 1.33% in noon, 2.33% in afternoon, 6% do not know.

74.3% people are exposed to sun >3 times / week, 12% people 2-3 times / week, 6.4% people 0-1 times, 7.3% do not know.

38.3% of people exposure period in sun is 30-60 min, 36.3% >1 hour, 10.3% within 15 minute, 7.3% do not know, 7.8% is 15-29 minute.

51% of people do not use protection, 36.3% use sunscreen, 8.3% use scarf 4.4% use an umbrella most often as a sunscreen.

41.3% of people use sunscreen with SPF >15, 49.7% do not use, 9% do not know.

51% people never used sunscreen, 40% uses sunscreen every time, 3.6% use sunscreen rarely, 5.66% uses sunscreen sometimes.

88.7% of people were non-smokers, 6.3% were current smoker, 4.97 were former smoker.

41.7% of people expose their body to the sun to prevent vitamin D deficiency, 34.3% take vitamin D supplements and 12.3% people do take vitamin D supplement, Drink 2 cups of milk, not using sunscreen, including seafood in diet and do sun exposure as a measure to prevent vitamin D deficiency, 34.33% take vitamin D supplements, 5% participants drink 2 cups of milk, 0.33% don't use sunscreen, 1.33% include seafood in diet, 5% participants don't take measures to improve vitamin D.

## Discussion

### Knowledge and Awareness of vitamin D

The result indicates that participants heard about vitamin D (92.7%) and had good knowledge about normal range of vitamin D (77.7%) which is in line with study [7] conducted in Jordan. Educational institution was the main source of information for 81.6% of the participants in our study contrary to the study conducted by [8], which was conducted where

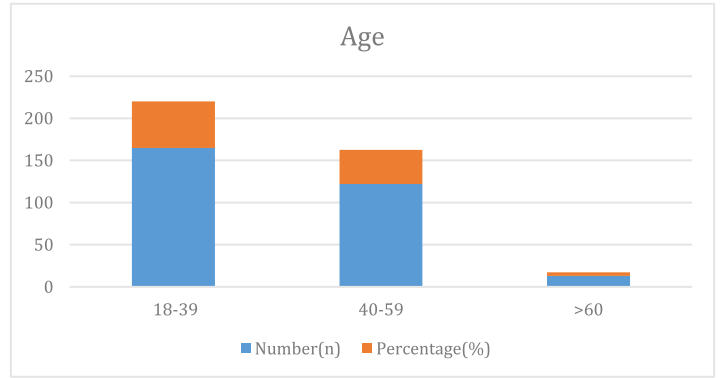
educational institutions contributed only 2.3% in cases group and 11.3% in control group(8).Participants had good knowledge about all the important sources of vitamin D(72.7%) which includes sun, milk and milk products, fatty fish, egg yolk, cod liver oil, mushroom contrary to the study conducted by [9] where only 9% male and 13% female students identified the correct sources of vitamin D(9) . 79.3% people were aware of the time needed to spend in sun to get enough vitamin D (10-20 minutes) similar to the study conducted by [10] where 77% of participants know the time required to be in sun to get enough vitamin D(10).Despite good knowledge about vitamin D only 38% of participants know the daily requirement of vitamin D(600IU) Which is higher than the study conducted by [11] where only 13.9% were aware of daily requirement of vitamin D(11).83% of people were aware about role of calcium supplement in maintaining vitamin D levels in body. Participants had good knowledge about all the causes of vitamin D deficiency (75.7%) in line with study conducted by [12]. Majority of the participants 77% had good knowledge about the function of vitamin D(prevents osteoporosis, prevents general weakness, prevents chronic disease, prevents cancer, aids in calcium absorption, good for vision),which is contrary to the study conducted by [13] in India where only 34 participants knows the benefits of vitamin D [14]. participants had good knowledge (78%) about all the effects of vitamin D deficiency (joint and bone pain, delayed tooth growth, walking delay in children, muscle pain, deformity of knee joint in children, depression, alopecia). Majority of the participants (81%) had good knowledge about vitamin D and its association with other disease (such as CVD, cancer, depression, celiac disease, multiple sclerosis) which is higher to the study conducted in Kuwait by [15] where 70.5% of participants were not aware of association of vitamin D with other diseases [16].

**Attitude and Practice of vitamin D**

More than half of the surveyed participants (53.3%) had checked their vitamin D levels. Majority of the participants had positive attitude towards spending time in sun particularly in early morning around 30-60 minute > 3times/ week and more than half of participants avoids the usage of sunscreen and their ingredients. Majority of participants were non-smoker (88.7%) as majority of the participants were female. Almost all the participants include certain practices to improve vitamin D levels of which exposing to sun was the most common practice which is in line with study conducted in Jordan [17].

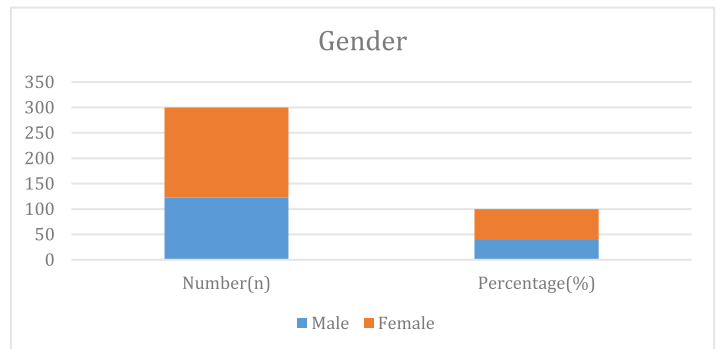
**Table 1.1 Displays Age of the participants**

S. No.	Age	Number (n)	Percentage (%)
1	18-39	165	55
2	40-59	122	40.67
3	>60	13	4.33



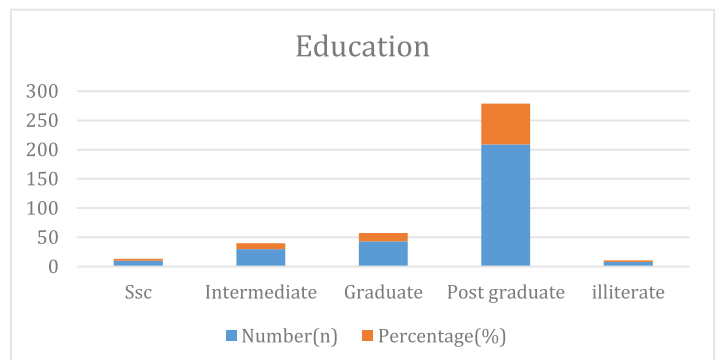
**Table 1.2 Displays Gender of the participants**

S.No	Gender	Number(n)	Percentage (%)
1	Male	123	41
2	Female	177	59



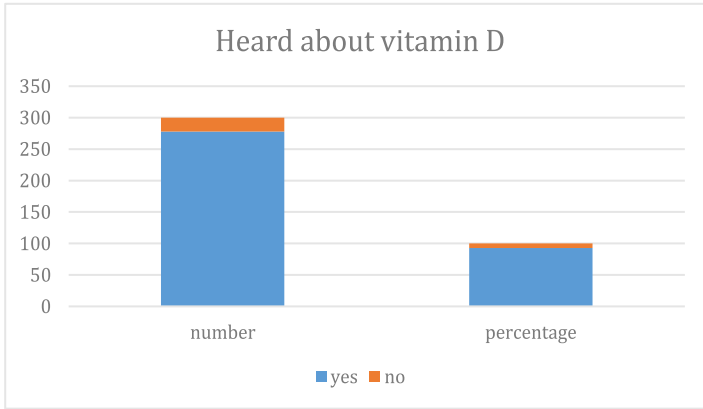
**Table 1.3 Displays Education of the participants**

S. No	Education	Number (n)	Percentage (%)
1	SSC	10	3.33
2	Intermediate	30	10
3	Graduate	43	14.33
4	Post graduate	209	69.67
5	illiterate	8	2.67



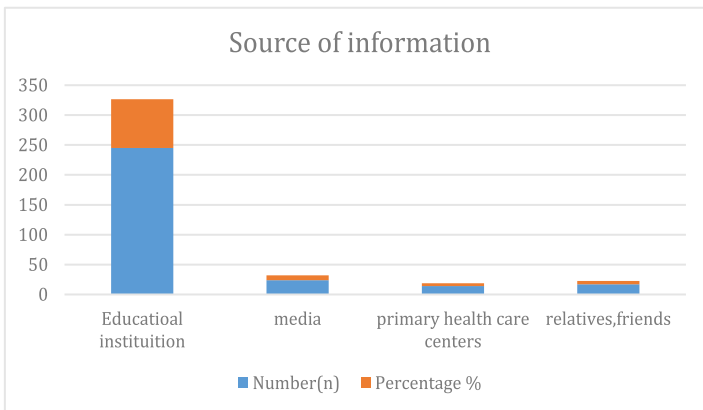
**Table 1.4 Displays whether they heard about vitamin D**

S. No	Heard	Number	Percentage
1	yes	278	92.7
2	no	22	7.3



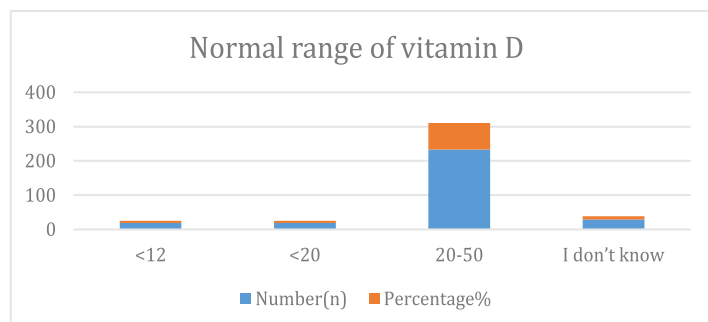
**Table 1.5 Displays source of information about vitamin D**

S.no	source of information	Number(n)	Percentage %
1	Educational Institution	245	81.66
2	media	24	8
3	primary health care centers	14	4.66
4	relatives, friends	17	5.66



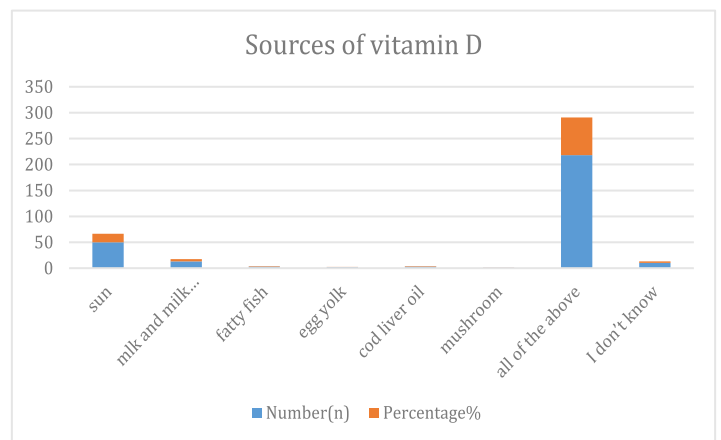
**Table 1.6 Displays knowledge about normal range of vitamin D among participants**

S.no	Normal range	Number(n)	Percentage%
1	<12	19	6.33
2	<20	19	6.33
3	20-50	233	77.7
4	I don't know	29	9.64



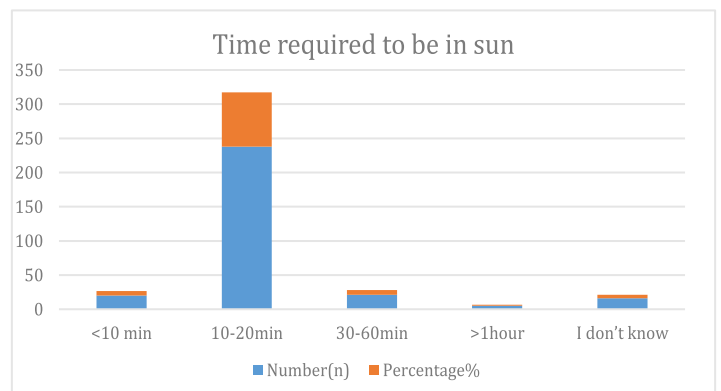
**Table 1.7 Displays important sources of vitamin D of about vitamin D in of the participants**

S.No	sources	Number(n)	Percentage%
1	sun	50	16.66
2	Milk and milk products	13	4.33
3	fatty fish	3	1
4	egg yolk	2	0.66
5	cod liver oil	3	1
6	mushroom	1	0.33
7	all of the above	218	72.6
8	I don't know	10	3.33



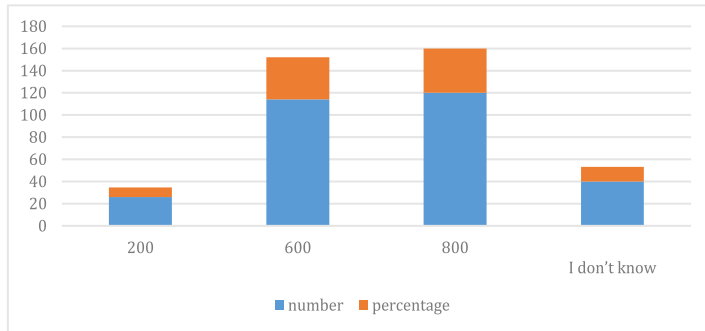
**Table 1.8 Displays knowledge about time required to be in sun to get enough vitamin D among participants**

S.no	Time required	Number(n)	Percentage%
1	<10 min	20	6.66
2	10-20min	238	79.3
3	30-60min	21	7
4	>1hour	5	1.66
5	I don't know	16	5



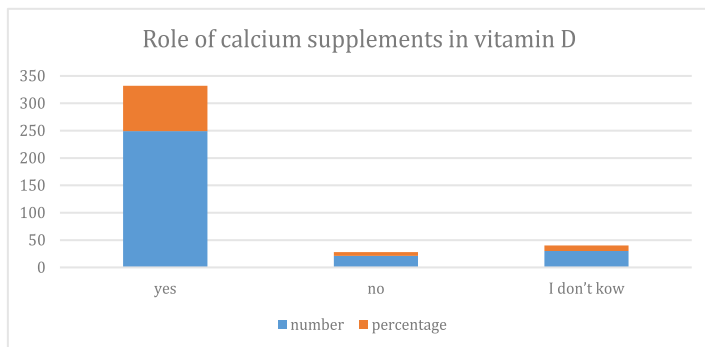
**Table 1.9 Displays knowledge about daily requirement of vitamin D among participants**

S.no	Daily requirement	Number(n)	Percentage%
1	200	26	8.7
2	600	114	38
3	800	120	40
4	I don't know	40	13.3



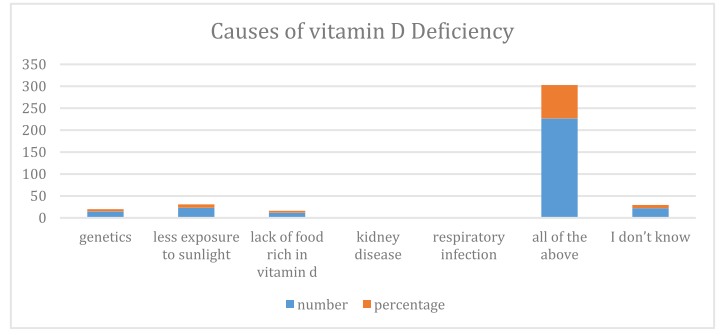
**Table 1.10 Displays knowledge whether taking calcium supplements maintains vitamin D among participants**

S.no	Believe	Number(n)	Percentage%
1	yes	249	83
2	no	21	7
3	I don't know	30	10



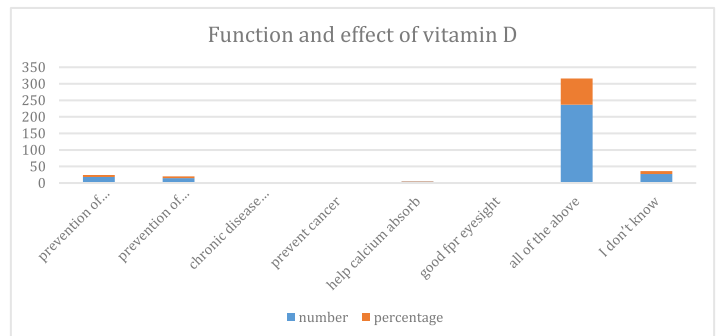
**Table 1.11 Displays knowledge about causes of vitamin D among participants**

s.no	causes	number(n)	percentage
1	genetics	15	5
2	less exposure to sunlight	23	7.67
3	lack of food rich in vitamin d	12	4
4	kidney disease	1	0.33
5	respiratory infection	0	0
6	all of the above	227	75.67
7	I don't know	22	7.33



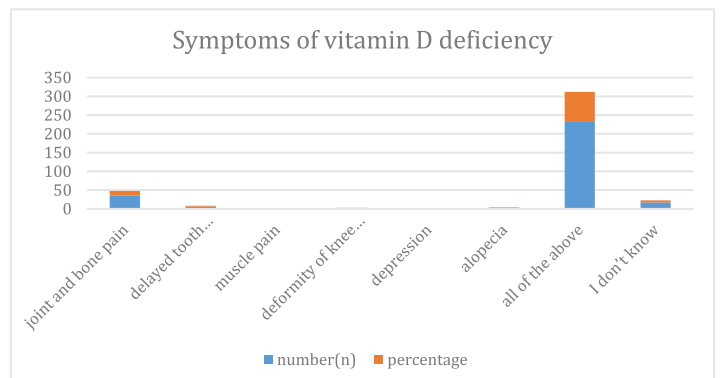
**Table 1.12 Displays knowledge about function and effect of vitamin D among participants**

S.no	Function and effect of vitamin d	Number(n)	Percentage%
1	prevention of osteoporosis	18	6
2	prevention of general weakness	15	5
3	chronic disease prevention	2	0.67
4	prevent cancer	1	0.33
5	help calcium absorb	4	1.33
6	good for eyesight	2	0.67
7	all of the above	237	79
8	I don't know	27	9



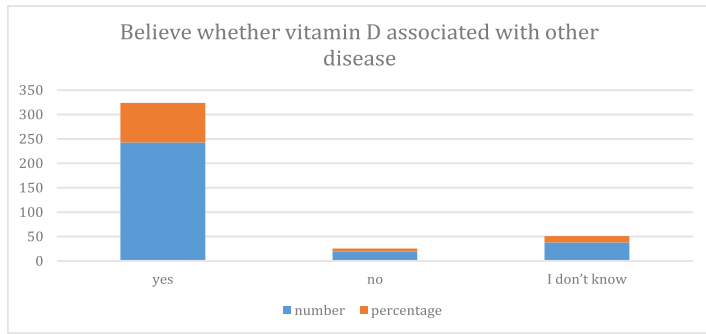
**Table 1.13 Displays knowledge about symptoms of vitamin D among participants**

S. Nos	Symptoms	Number(n)	Percentage
1	joint and bone pain	36	12
2	delayed tooth growth	6	2
3	muscle pain	1	0.33
4	deformity of knee joint in children	2	0.67
5	depression	1	0.33
6	alopecia	3	1
7	all of the above	234	78
8	I don't know	17	5.67



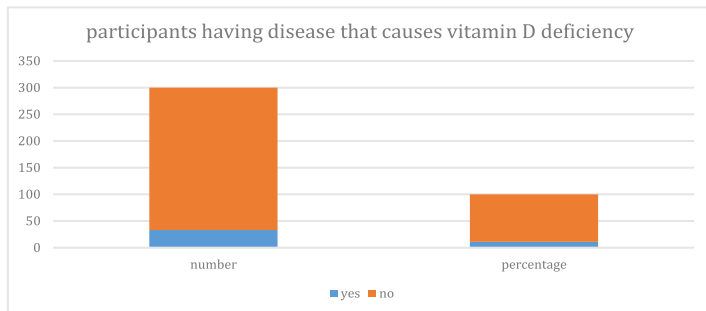
**Table 1.14 Displays knowledge whether vitamin D deficiency is associated with other disease among participants**

S.no	Disease	Number(n)	Percentage%
1	yes	243	81
2	no	19	6.3
3	I don't know	38	12.7



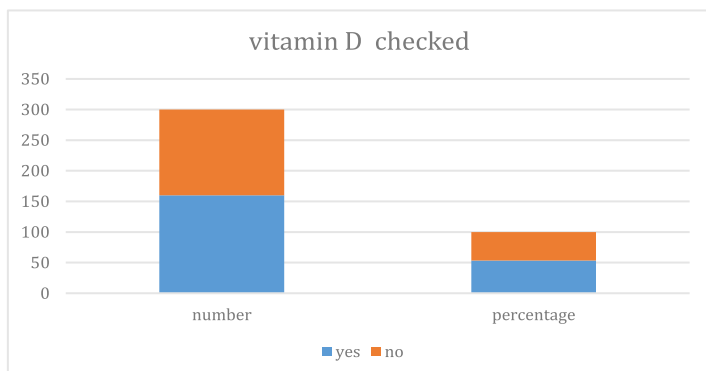
**Table 1.15 Displays knowledge whether participants have disease that causes vitamin D deficiency**

S.no	Disease	Number(n)	Percentage%
1	yes	33	11
2	no	267	89



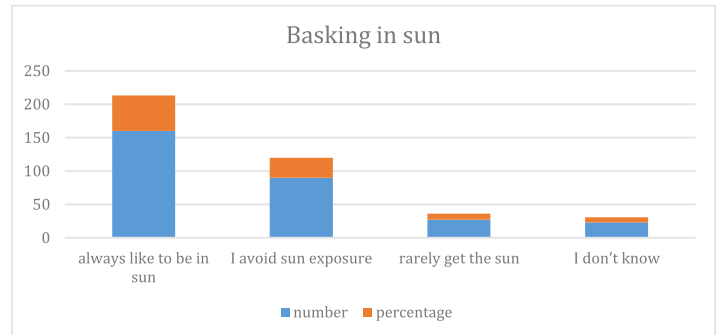
**Table 1.16 Displays attitude whether participants have checked their vitamin D levels**

S.no	Checked	Number(n)	Percentage
1	yes	160	53.3
2	No	140	46.7



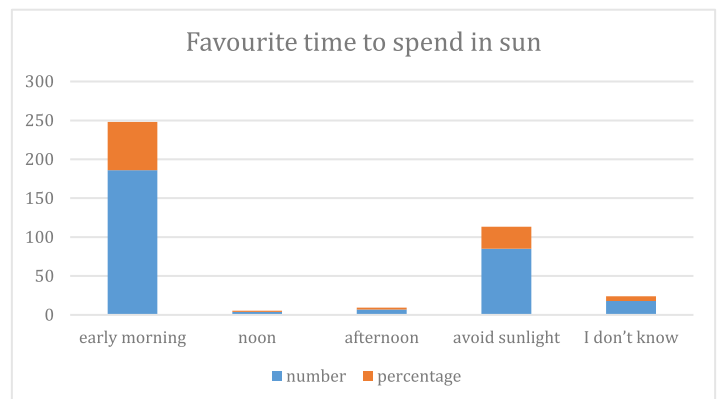
**Table 1.17 Displays how participants feel about basking in sun**

S.no	Basking in sun	Number(n)	Percentage%
1	always like to be in sun	160	53.3
2	I avoid sun exposure	90	30
3	rarely get the sun	27	9
4	I don't know	23	7.7



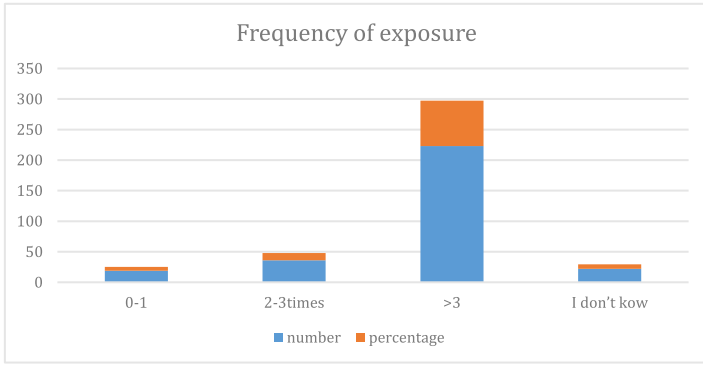
**Table 1.18 Displays when the favorite time of participants to spend in sun among participants**

S.no	Time	Number(n)	Percentage%
1	early morning	186	62
2	noon	4	1.33
3	afternoon	7	2.33
4	avoid sunlight	85	28.33
5	I don't know	18	6



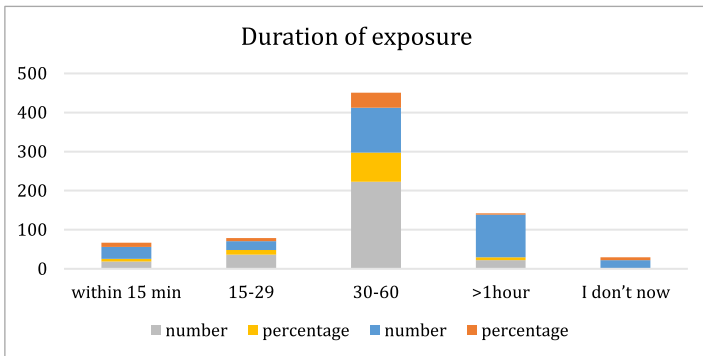
**Table 1.19 Displays how often participants are exposed to sun**

S.no	Frequency of exposure	Number(n)	Percentage%
1	0-1	19	6.33
2	2-3times	36	12
3	>3	223	74.33
4	I don't kow	22	7.33



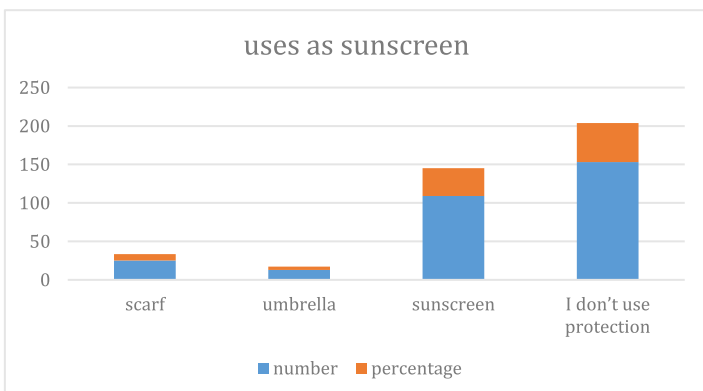
**Table 1.20 Displays duration of exposure among participants**

S.no	Duration of exposure	Number(n)	Percentage%
1	within 15 min	31	10.33
2	15-29	23	7.67
3	30-60	115	38.33
4	>1hour	109	36.33
5	I don't now	22	7.33



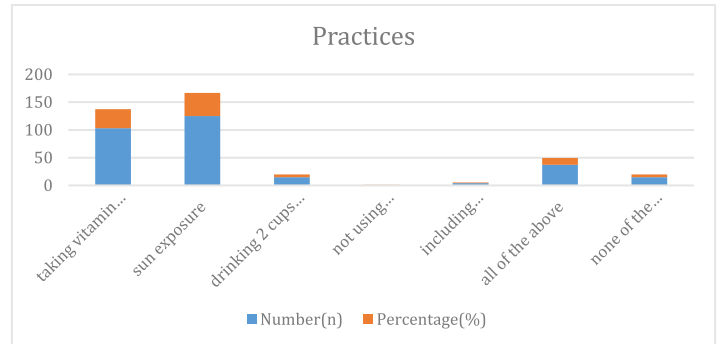
**Table 1.21 Displays what participants use often as a sunscreen among participants**

S.no	What participants uses as sunscreen	Number(n)	Percentage%
1	scarf	25	8.33
2	umbrella	13	4.33
3	sunscreen	109	36.33
4	I don't use protection	153	51



**Table 1.22 Displays practice towards vitamin D among participants**

S.no	Practices	Number(n)	Percentage(%)
1	taking vitamin d supplements	103	34.33
2	sun exposure	125	41.67
3	drinking 2 cups of milk	15	5
4	not using sunscreen	1	0.33
5	including seafood in diet	4	1.33
6	all of the above	37	12.33
7	none of the above	15	5



**Conclusion**

The current study Conducted among 300 participants indicate that participants had Good knowledge about the normal range and important sources of vitamin D, the Exposure period required to be in the sun, daily requirement, causes, symptoms of vitamin D deficiency, and Positive Attitude towards sun exposure and Practices among participants include sun exposure, taking vitamin D supplements, drinking 2 cups of milk, including seafood in diet, avoiding sunscreen. As Vitamin D deficiency is a global epidemic awareness should be brought among people wherein pharmacists plays a major role in educating the public as in this study only 4.6% of primary health care providers we're responsible for educating the public regarding vitamin D.

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