

ASSESSMENT THE KNOWLEDGE REGARDING VITAMIN D DEFICIENCY AMONG FEMALE ADULT ATTENDING THE PRIMARY HEALTH CLINIC AT MAKKAH , SAUDI ARABIA SAUDI ARABIAN IN 2019: A CROSS-SECTIONAL STUDY

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Abstract:

Background

Vitamin D is one of the major vitamin and very essential for maintenance of normal growth and development of strong bones. It is often referred to as the "sunshine vitamin" because it can be synthesized in the body from the ultraviolet rays provided by the sun. Vitamin D is known to have essential roles in the human body. However, the case of vitamin deficiency is reported to increase in many adult worldwide, especially in Saudi Arabia. Vitamin D deficiency is associated with numerous chronic diseases including cancer, heart disease and diabetes type 1 and 2. It is currently estimated that one billion people suffer from vitamin D deficiency worldwide. Sunlight is the main and natural source of vitamin D and most foods contain very little amount of it. The main action of vitamin D is to help calcium and phosphorus in our diet to be absorbed from the gut.

Aim of the study: The study's aim was to assess the knowledge regarding vitamin D deficiency among female adult attending the primary health clinic at Makkah at Saudi Arabia

Methodology: Across sectional descriptive study was conducted among female adult attending to clinic in PHC at Makkah, Saudi Arabia city, during the October to December, 2019. Our total participants were (150).

Results: Major findings of the study were (38%) adult women were in the group of age between 25 to 35 years. The majority of the women (84.67%) "married" status. The majority of the women were (49.33) secondary level of education, regarding chronic disease, most of the mothers in the study were found to have no chronic disease were (62.00%). The income level of (56.0%) of the respondents ranged average, the majority of the women were (42.0%) Sources of knowledge doctor.

Conclusion: Vitamin D deficiency is prevalent among the various age groups in our country due to various factors. So, Awareness programmes have to be conducted to make the general public including the females aware of the vitamin D, its deficiency, causative factors and the preventive measures. So this study was done this study was conducted assessment the knowledge towards vitamin D deficiency, sun exposure, supplementation in a sample of adult female attending the primary health clinic at Makkah, Saudi Arabia Saudi Arabian.

Key words: Knowledge, Vitamin D, Supplementation, deficiency, adult, female.

1. INTRODUCTION

1.1Background

The topic of Vitamin D has become a highly significant subject in the medical world as Vitamin D deficiency is largely an unrecognized worldwide epidemic. [1,2] Vitamin D deficiency has been recognized as a worldwide epidemic, affecting even healthy population. [3]. Historically vitamin D deficiency was associated with poor musculoskeletal health namely rickets and osteomalacia . However, in recent years' research has indicated that vitamin D is vital to the development, growth and protection of a healthy body throughout the entire life span. [4]

Vitamin D deficiency is a globally occurring problem nowadays. Most of the Saudi female adult are suffering from this deficiency which may be due to the inadequate exposure to the sunlight, inappropriate infrastructure, cultural or religious practices, inadequate of the dairy products with Vitamin D. [5] The topic of Vitamin D has become a highly significant subject in the medical world as Vitamin D deficiency is largely an unrecognized worldwide epidemic. [2,6]

Vitamin D is vital for the bone health as it helps in proper utilization of calcium in our diet. It is produced due to the exposure of skin to the sun. It also occurs naturally in few of the food products like fortified dairy and

grains, fish and fish liver oils. If the body is not getting the sufficient vitamin D, it may lead to the vitamin D deficiency. This vitamin D deficiency is responsible for causing Rickets in children and Osteomalacia in adults. It plays an important role in the development of the cardiovascular disorders, osteoporosis, cancer, diabetes and infections [7]

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Historically vitamin D deficiency was associated with poor musculoskeletal health namely rickets and osteomalacia . However, in recent years' research has indicated that vitamin D is vital to the development, growth and protection of a healthy body throughout the entire life span. [1] Other diseases that have been linked to vitamin D deficiency are: multiple sclerosis, [8] rheumatoid arthritis hypertension, and Alzheimer's. [9,10] Mental health has also been shown to be affected by vitamin D deficiency. [11]

Despite the sunny desert climate of Saudi Arabia; vitamin D deficiency has been reported in different studies in Riyadh, Jeddah and the Eastern region of the kingdom [12-13]. There is evidence that the prevalence of rickets and vitamin D deficiency is greater across the Middle East than in Western populations,[14] with a large meta analysis concluding that 20–80% of apparently healthy individuals suffer from vitamin D deficiency.

Vitamin D is essential for absorption of dietary calcium and phosphorus from the intestine, thereby adequate levels of vitamin D is essential for promoting healthy bone growth and has protective effect against several bone manifestations [15]. Thus, vitamin D deficiency can lead to hypocalcaemia, hypophosphatemia and increased parathyroid hormone which in turn will increase calcium resorption from bone, to compensate for the low level of calcium, leading to a variety of bone problems [16, 17].

1.2 Literature Review

A study conducted in Riyadh among King Abdul-Aziz medical city's out patients in 2010 showed that the prevalence of vitamin D deficiency was 78.1% in females and 72.4% in males. [18] Another recent study in Oman reported a high prevalence of vitamin D deficiency as well (87.5%) [19]

A study conducted in Riyadh showed that the optimal time for sun exposure for vitamin D production was between 10 AM and 2 PM during winter season, while during summer season it's from 9 AM to 10:30 AM and from 2 PM to 3 PM [20]. It is well-known that melanin decreases the absorption of UV light and hence decreasing the production of vitamin D in dark-skinned people [21], also, countrywide studies in India had found that the prevalence was as high as 70% to 100% in the general population [22].

Another study report more sun exposure time is required for people with dark skin compared to those with fair skin [23]. Though, a very small percentage of participants recognized that more time is required for people with dark skin. Confusion in sun exposure time among the survey participants was similar to the Australian findings [24].

Two other studies conducted simultaneously in Jeddah reported a prevalence of 87.8% in males [25] and 86.3% in children [26]. The US National Health and Nutrition Examination Survey 2005 to 2006 data showed that the overall prevalence rate of vitamin D deficiency in adults was 41.6% [27].

Riaz Uddin et al (2013) did a study on awareness regarding the importance of calcium and vitamin D among the undergraduate pharmacy students in Bangladesh and concluded that the pharmacy students have lack of knowledge about calcium and vitamin D and thus it can be clearly predicted that the condition of general people may be worse [28].

The Sources of Vitamin D are Sun exposure, Fortified sources (Cereal, Milk, Orange juice), Non-fortified food sources (Breast milk, Cod liver oil, Egg yolk, Mackerel, Salmon, Sardines, Tuna), Vitamin D Supplement [29].

Dr. Mona alfadeel et al (2013-2014) conducted a study about Awareness of Vitamin D Deficiency among Female in ALMAAREFA College in 2013-2014 and found that the most of the women were aware of the vitamin D deficiency and its functions but many of them are not aware of the pregnancy related complications. This study also revealed that although the women are aware of vitamin D deficiency but they didn't get enough vitamin D due to bad food habits and majority of them didn't perform the test to know their vitamin D levels due to the carelessness [18]

Al-Daghri et al (2012) report that exposure to outdoor sunlight is the main source of vitamin D in both summer and winter time. However, due to restricted outdoor activities during summer season -very high temperature-, reliant was on the intake of vitamin D fortified food and supplements [20].

2.1 Rationale

Vitamin D deficiency is associated with numerous chronic diseases including cancer, heart disease and diabetes type 1 and 2. It is currently estimated that one billion people suffer from vitamin D deficiency worldwide. A major cause is lack of sun exposure, and this is evident even in countries at mid and low latitudes. Although a high prevalence has been found in Saudi Arabia, little is known to date about the reasons for this and, consequently about, reduction methodologies. Finally, the researcher is interested in this topic because one of his family member suffered from Vitamin D deficiency also majority of the females are suffering from the back pain/leg pain or bone pain which can be due to the deficient vitamin D levels.

3. METHODOLOGY

3.1 Study Design

This is a cross sectional study.

3.2 Study Area

The study was carried out in the city of Makkah Al-Mokarramah Makkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. contains a population around 1.578 million .The city has seven sectors of PHC divided into three inners and four outer. Each sector consists of a group of Primary Health Care Centers. The researcher is concerned with one of the inner PHC .

3.3 Study Population

The study was conducted among adult woman's attending Primary Health Care Centers. during the period of study in 2019

Selection criteria:**3.4 Inclusion criteria:**

Adult women are attending to the clinic.

The approval of the participant's woman's in the study to participate

Female only.

Age above <25 year to>45year

All nationalities

3.5 Exclusion criteria:

Non-Arabic or English speaker

The Women who refuse to take part in the study

Chronic liver disease

Renal disease

3.6 Sample size

The total number of adult woman attending in PHC is 250 during the last 3 weeks. From the literature review of the same subject the prevalence of adherence to the Vitamin D supplement recommendation as average as 20% .

The sample size was calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is (150) of woman attending and adding 10 more to decrease margin of error.

3.7 Sampling technique:

The researcher used random sampling technique, also convenience sampling technique was utilized to select the participants in the study. By using systematic sampling random as dividing the total population by the required sample size; $(250 / 125 = 2)$.

3.8 Data collection tool

A questionnaire has been carefully designed by the researcher to serve the purpose of this study. A questionnaire of similar studies has been reviewed before finalizing the study Questionnaire. An interview Questionnaire has been used for data collection.

The Questionnaire has been designed in the Arabic language with a cover letter to clarify the objectives of the study and the assurance of confidentiality.

First section: demographic data.

Second section: questions to assess the Knowledge regarding vitamin D deficiency.

The validity of questionnaire has been ascertained by three consultants in the fields of family medicine and community medicine. The researcher has been examining the reliability of the questionnaire by testing and retesting.

3.9 Data collection technique:

Researcher has been visits the selected PHC after getting the approval from the ministry of health. The researcher has obtained permission from primary health care director and participants woman's .

After the arrival of the woman to the PHC, they should go to the reception first to register and ensure the presence of the center's card. Then, the receptionist gives to the woman number. During that period of waiting the researcher has been select participants conveniently until the target number achieves and gives the questionnaire for answering. She has been explained the purpose of the study to all woman's attending the clinic. The data has been collected through the 2019.

3.10 Study Variables**Dependent variable :**

Adherence to the vitamin D recommendation among women Knowledge regarding vitamin D deficiency

Independent variables:

Age, gender, marital status, educational level, occupation, home/living the reason for taking a vitamin D , or reasons for refusing .

Woman's with chronic disease .The number of children.

Breastfeeding infant .

3.11 Data entry and analysis:

The Statistical Package for Social Sciences (SPSS) software version 24.0 was used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using Chi-Square tests (χ^2) to test for the association and the difference between two categorical variables were applied. A p-value ≤ 0.05 was considered statistically significant.

3.12 Pilot study:

A pilot study was conducted in one PHC in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire was clear and no defect was detected in the methodology.

3.13 Ethical considerations: Permission from the Makkah joint program of family medicine was obtained. Permission from the Directorate of Health Affairs of the Holy Capital Primary Health Care was obtained.

Verbal consents from all participants in the questionnaire were obtained.

All information was kept confidential, and results will be submitted to the department as feedback.

3.14 Relevance & Expectations:

This study was carried out to assess the knowledge towards vitamin D deficiency PHC.

At the end of this study we are able to identify some factors towards vitamin D deficiency in the adult female in PHC. The researcher expects from the study, low level of knowledge about the vitamin D deficiency

The researcher expects from the study increase the awareness level of knowledge about the vitamin D deficiency

3.15 Budget:Self-funded

4. Result Table (1) the distribution of Socio-demographic data in study group

	N	%
Age		
<25	43	28.67
25-35	57	38.00
35-45	30	20.00
>45	20	13.33
Level of education		
Primary	22	14.67
Intermediate	39	26.00
Secondary	74	49.33
High education	15	10.00
Marital status		
Married	127	84.67
Divorce	23	15.33
Economic level		
Low	45	30.00
Average	84	56.00
High	21	14.00
Chronic disease		
Yes	57	38.00
No	93	62.00
Sources of knowledge		
Doctor	63	42.00
Family members	16	10.67
Internet	14	9.33
Book/magazine	46	30.67
TV /Radio	11	7.33

Regarding age Table 1 describes the demographic characteristic of the samples. Major findings of the study were (38%) adult women were in the group of age between 25 to 35 years, minor portion of the subjects <25 years (25%) while above <45 years were 20% of them. The majority of the women (84.67%) “married” status. The majority of the women were (49.33) secondary level of education, regarding chronic disease, most of the mothers in the study were found to have no chronic disease were (62.00%). The income level of (56.0%) of the respondents ranged average, the majority of the women were (42.0%) Sources of knowledge doctor

Table(2): distribution of the knowledge on sources of vitamin D, daily recommended dosage to the adult women and time needed in sun to get adequate vitamin D

	N	%
Knowledge on sources of vitamin D		
Fruits & vegetables	67	44.67
Water	18	12.00
Mushroom	29	19.33
Fatty fish	33	22.00
Vitamin D supplements	15	10.00
Sun	52	34.67
Air	7.5	5.00
Selected cereals	17	11.33
Milk/Diary	31	20.67
Nuts	50	33.33
Cod-liver oil	27	18.00
Chicken	3	2.00
Egg	36	24.00
Beef	3	2.00
Don't know	51	34.00
Daily recommended dosage of vitamin D		
200 IU	17	11.33
400 IU	15	10.00
600 IU	7	4.67
1000 IU	111	74.00
Time needed in sun to get adequate vitamin D		
<30 min	34	22.67
30-60min	90	60.00
>60min	26	17.33

Table 2 denotes the knowledge on source of vitamin D among mothers as follows. The less number of the subjects were able to mark the correct responses from the source of the vitamin D. The correct sources were picked by subjects as follows mushroom(19.33%),fatty fish(22%),vitamin D supplements(10%) milk and dairy products(20.67%),cod liver oil (18%),egg (24%) and sunshine(34%) is the main source of vitamin D. Majority of the subjects were not aware on the source of vitamin D, regarding the knowledge on daily recommended dosage of vitamin D among adult woman as follows. Majority of the subjects were unaware of the daily recommended dosage of vitamin D during pregnancy and (4.67%) and1000 IU were 74.0% had knowledge on daily recommended dose. regarding illustrates the knowledge on time needed in sun to get adequate vitamin D. Majority of the subjects were didn't have knowledge on time to spend to get adequate vitamin D. Very few subjects were had knowledge on time needed in sun to get adequate vitamin D in that 22.67% of the subjects were said less than 30 minutes, 60.0% of them said more than 30-60 minutes and 17.33% expressed more than >60 min are needed in sun to get adequate vitamin D.

Table (3): distribution of the Knowledge of the adult women about the benefits of vitamin D and factors affecting vitamin D level among adult women .

	N	%
Benefits of vitamin D		
Bone health	66	44.00
Immune health	35	23.33
Prevents Rickets	51	34.00
Vision	27	18.00
Pregnancy & breast feeding	51	34.00
Hair growth	78	52.00
Diabetes mellitus	17	11.33
Cardiovascular health	14	9.33
Cognitive health	15	10.00
Cancer prevention	32	21.33
Cancer prevention	44	29.33
Calcium absorption	17	11.33
Prevent osteoporosis	29	19.33
Knowledge on factors affecting vitamin D		
Skin pigment	35	23.33
Cloud & shade	15	10.00
Time of the day	36	24.00
Latitude	14	9.33
Season	9	6.00
Age	36	24.00
Pregnancy/ lactation	35	23.33
Fatty diet	62	41.33
Sunscreen use	17	11.33
Vegetarian diet	18	12.00
Diary allergy	12	8.00
Pollution	24	16.00
Wind	20	13.33
Smoking	27	18.00
BMI	15	10.00

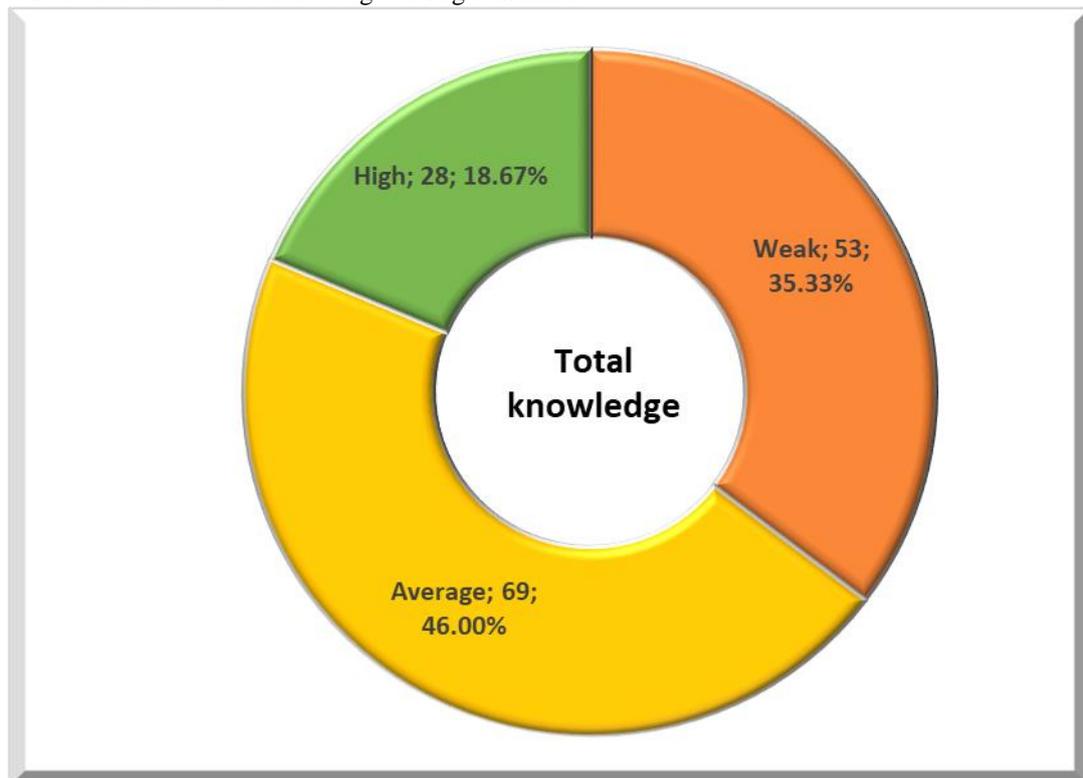
Table 3 enumerates the knowledge on benefits of vitamin D among adult women as follows. In that very few subjects were able to give correct response on knowledge on benefits on vitamin D, bone health(44.0%), immune health (23.0%), prevents rickets(34.0%), pregnancy and breast feeding(34%), cardiovascular (9.33%), cognitive (10%), calcium absorption (11.33%), prevents osteoporosis(19.33%) .the participants identified correct response that is skin pigment 23.22%, cloud and time of the day 24%, latitude 9.33%, season 6%, Age24%, pregnancy and lactation 23.33%, sunscreen use 11.33%, vegetarian diet 12%, pollution 16% .All the factors that can influence the amount of vitamin D that people get through.

Table(4) and figure(1) Distribution of the total Knowledge among vitamin D

		Total Knowledge		Score (%)	
		N	%	Range	Mean+SD
Weak		53	35.00	10-78%	57.54+12.55
Average		69	46.00		
High		28	19.00		
Total		150	100.00		
Chi-square	X²	17.08			
	P-value	<0.001*			

Table 4 and figure (1) show the total Knowledge of the participants about vitamin D results show the majority of participant had average information were(46.00%) while high of the total Knowledge about vitamin D were(19.0%) the data ranged from(10-78) by mean \pm SD(57.54+12.55) and a statistical significant relation While Chi-square X^2 17.08 and P=value 0.001

Figure (1) Distribution of the total Knowledge among **vitamin D**

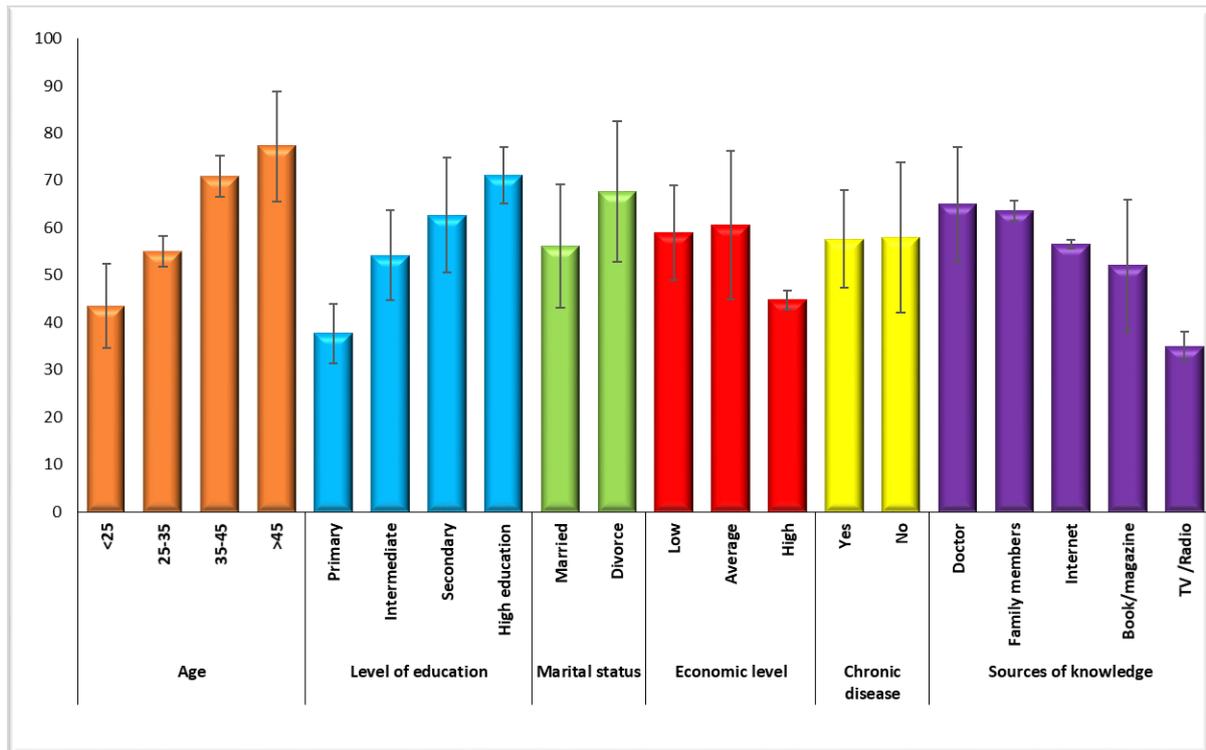


Table(5) and figure(2) Distribution of the total knowledge and the demographic data(age, marital status, level of education, income level, sources of knowledge)

		N	Total knowledge			F or T	ANOVA or T-test	
			Mean	±	SD		Test value	P-value
Age	<25	43	43.451	±	8.936	f	151.165	<0.001*
	25-35	57	55.094	±	3.254			
	35-45	30	70.888	±	4.427			
	>45	20	77.179	±	11.567			
Level of education	Primary	21	37.721	±	6.277	f	42.893	<0.001*
	Intermediate	39	54.142	±	9.480			
	Secondary	74	62.671	±	12.094			
	High education	16	71.103	±	5.898			
Marital status	Married	127	56.083	±	13.073	t	-3.832	<0.001*
	Divorce	23	67.673	±	14.810			
Economic level	Low	45	58.958	±	9.955	f	12.688	<0.001*
	Average	84	60.547	±	15.626			
	High	21	44.758	±	2.065			
Chronic disease	Yes	57	57.623	±	10.302	t	-0.179	0.858
	No	93	58.005	±	15.821			
Sources of knowledge	Doctor	63	64.968	±	12.091	f	22.442	<0.001*
	Family members	16	63.601	±	2.140			
	Internet	14	56.534	±	0.850			
	Book/magazine	46	52.008	±	13.875			
	TV /Radio	11	34.957	±	3.018			

Table (5) and figure (2) show that is a significant relation between total knowledge and demographic data regarding age (increase in >45 years follow by age 35-45) where $F=151.165$ and $P\text{-value}=<0.001$ by mean+ SD (77.179 ± 11.567 , 70.888 ± 4.427). Regarding marital status show that a significant relation between total knowledge and marital status (increase in Divorce) were $T=-3.832$ and $P\text{-value}=0.001$ by mean+ SD (67.673 ± 14.810). Regarding Level of education show that a significant relation between total knowledge and Level of education (increase in high education) were $F=42.893$ and $P\text{-value}=0.001$ by mean+ SD (71.103 ± 5.898). Also regarding the income level show that a significant relation between total knowledge and income level (increase in the average income participants) were $F=12.688$ and $P\text{-value}=0.001$ by mean+ SD (60.547 ± 15.626). Regarding Sources of knowledge show that a significant relation between total knowledge and sources of knowledge (increase in doctor) were $F=22.442$ and $P\text{-value}=0.001$ by mean+ SD (64.968 ± 12.091).

Figure (2) Distribution of the total knowledge and the demographic data(age, marital status, level of education, income level, sources of knowledge)



DISCUSSION

Our study reveals that the Average level of Vitamin D knowledge has been found among adult women . Toher et al reported that (71%) of pregnant women had insufficient knowledge about vitamin D and its sources[24]

Study similar reveals that 59% of the subjects were heard of vitamin D, in that half of the subjects have enriched knowledge of vitamin D through books and magazines and majority of patients (85.5%) agreed about the importance of sunshine as a source of vitamin D and 60.0% thought that they can get vitamin D from the nutrients [30]

Regarding the main sources of knowledge about vitamin D, 42.0 % of patients got knowledge from doctors, 12.5% from the Book/magazine, 30.67%. Awareness of vitamin D dietary sources is poor among adult women, because of lack of awareness of Vitamin D and failure to identify themselves as being at risk of vitamin D deficiency , supplementation might be important for this population to prevent vitamin D deficiency[31]

With this, knowledge of vitamin D supplementation should also be increased. Very few researches have been undertaken regarding individual's knowledge of supplementation. The National Institute of Nutrition recommends daily dietary intake of 1000 IU for healthy individuals adult women. In our study it has been found that adult women are not practicing the intake of adequate amount of vitamin D through diet so adult women might be vitamin D deficient .

Our study reveals that most of the subjects 60.0%were exposed 30-60min minutes in sun light but not covering their arms and face.

In this study it was found that majority of the participants did not have positive attitude towards benefits of vitamin D supplementation. But other studies reveal that negative attitude toward sunlight and inadequate knowledge on vitamin D could adversely affect the bone health among health care providers and general public. These data provides a basis for developing public health strategies for the prevention of vitamin D deficiency in the adult women[32]

The extreme discomfort of the scorching heat associated with most sunny days of KSA summer and the undying desire of most KSA to attain a fairer skin complexion instantly extinguish any desire for sun exposure, and a person's primary focus is on finding ways to avoid the sun, at all costs. In the blazing heat of KSA score very high and the quest for vitamin D sufficiency takes a backseat, always. Therefore, in the KSA scenario, vitamin D sufficiency cannot be attained by depending on adequate sun exposure.[33]

Conclusion

Vitamin D containing supplements may be the best strategy at present for improving vitamin D status with a need for increased vitamin D education. Requirement for Vitamin D is high at particular stages of the lifecycle

especially during pregnancy and infancy. Severe vitamin D deficiency during pregnancy may increase the risk of rickets and deafness in childhood. Supplementation might be an important enabler and therefore more research into the optimal levels of vitamin D is urgently needed. Governmental actions such as creating more areas for women to uncover freely and fortifying more foods may be needed in the battle to prevent the epidemic of vitamin D deficiency as a threat to public health, due to a severe scarcity of research into the field of qualitative and socio-cultural studies on KAP regarding vitamin D deficiency, a qualitative KAP study was carried out. The majority of participants study had limited knowledge, poor practices, and did not have attitude towards benefits of vitamin D supplements may be a barrier to the prevention of vitamin D deficiency..

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