

Knowledge, Attitude and Practice Regarding Vitamin D Deficiency among Female Adult Attending the Primary Health Clinic at Makkah, Saudi Arabia in 2018

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Abstract Background 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. 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. **Aim of the study:** The study's aim was to assessment the knowledge, attitude and practice (KAP) towards vitamin D deficiency, sun exposure, supplementation in a sample of adult female attending the primary health clinic at Makkah, Saudi Arabia Saudi Arabian. **Methodology:** A cross-sectional study was conducted among 86 female adult attending to clinic in PHC at Makkah, Saudi Arabia. Validated questionnaires concerning demographic data and knowledge scores on Vitamin D and its supplementation were given. **Results:** All subjects (100%) were not taking vitamin D supplements, most of the subjects were not taking adequate amount of sea foods (96%), (90%) not consuming 1 litter of milk and inadequate intake mushroom in the diet(84%) during maturity period 58% **Conclusion:** This study was conducted assessment the knowledge, attitude and practice (KAP) towards vitamin D deficiency, sun exposure, supplementation in a sample of adult female attending the primary health clinic at Makkah, Saudi Arabia Saudi Arabian. Most of the respondents were found to have limited information about vitamin D deficiency, and the high prevalence of low level of adherence to vitamin D supplementation of the participants. Overall, must be exposed to health care and educational program in order for them to increase their knowledge about the importance of micronutrients – its function and supplementation - towards adult female, especially the vitamin D.

Keywords: knowledge, attitude, practice, Vitamin D, supplementation, adult female

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1. Introduction

1.1. Background

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. [1]

Research linking Vitamin D deficiency to other major diseases such as numerous types of cancer [4,5,6] coronary heart disease, [7] and type 1 and 2 diabetes [8,9]

has been extensive. [10,11] Other diseases that have been linked to vitamin D deficiency are: multiple sclerosis, [12] rheumatoid arthritis hypertension, and Alzheimer's. [1,10] Mental health has also been shown to be affected by vitamin D deficiency.[10]

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 [13,14]. A recent 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 [15]. Two other studies conducted simultaneously in Jeddah reported a prevalence of 87.8% in males [16] and 86.3% in children [17]. 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% [18].

Furthermore, countrywide studies in India had found that the prevalence was as high as 70% to 100% in the general population [3]. Another recent study in Oman reported a high prevalence of vitamin D deficiency as well (87.5%) [19]

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. Thus, vitamin D deficiency can lead to hypocalcaemia [20] 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 [20,21].

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 [22].

1.2. Rationale

The vitamin D deficiency and iron deficiency anemia are common preventable diseases.

Recent 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.

Vitamin D has essential roles in the body; including bone growth, bone remodeling, modulation of cell growth, neuromuscular and immune function development, and a decrease of inflammation.

2. Methodology

2.1. Study Design

This is a cross sectional study.

2.2. 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 (Al-Zahir, Al-Adel, Al-Kakyeea, Al-Sharaee, Al-Jamom, Al-Kamel, and Kolese). Each sector consists of a group of Primary Health Care Centers. The researcher is concerned with one of the inner PHC of Al-kakyeea sector called "AL-Eskan PHCC."

2.3. Study Population

The study was conducted among adult woman's attending Al-Eskan PHCC in Makkah Al-Mokarramah, during the period of study in 2018

2.4. Selection Criteria

2.4.1. 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 20 year

All nationalities.

2.4.2. Exclusion Criteria

Non-Arabic or English speaker the Women who refuse to take part in the study

Chronic liver disease

Renal disease

Treatment with anti-tubercular / anti-epileptic drugs.

2.4.3. Sample Size

The total number of adult woman attending in AL-Eskan 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 86 of woman attending and adding 10 more to decrease margin of error.

2.5. Sampling Technique

The researcher used Multi-stage random sampling technique, giving each sector code number from one to seven (1- Al-zahir, 2- Al-adel, 3- Al-kakyeea, 4- Al-sharaee, 5- Al-jamom, 6- Al-kamel, 7- Al- Kolese). After that, by using random number generator, the minimum number was one, and the maximum was seven, the generation number was three which is Al-kakyeea sector. Then simple random sampling technique was applied to select the PHC from Al-Kakyeea sector (1- Al-Kakyeea, 2- Al-Khaldya, 3- Al-Hejra, 4- Al-Eskan, 5- Al-Masflah, 6- Al-Nakash, 7- Al-hilal Alahmer, 8- Al-Heglah, 9- Al-Hndaweeah, 10- Um-Alrakah, 11- Al-Khadhra) the given number was 4" Al-Eskan PHCC".

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; $(250 / 125 = 2)$.

2.6. 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, attitude and practice 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 examined the reliability of the questionnaire by testing and retesting.

2.7. Data Collection Technique

Researcher has visited the selected PHC after getting the approval from the ministry of health. The researcher has obtained permission from primary health care director and participants' women.

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 selected participants conveniently until the target number is achieved and gives the questionnaire for answering. She has explained the purpose of the study to all women attending the clinic. The data has been collected through the 2018.

2.8. Study Variables

Dependent variable:

Adherence to the vitamin D recommendation among women's Knowledge, attitude and practice 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.

2.9. Data Entry and Analysis

The Statistical Package for Social Sciences (SPSS) software version 22.0 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.

2.10. 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.

2.11. 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.

2.12. Relevance & Expectations

This study was carried out to assess the knowledge, attitude and practice (KAP) towards vitamin D deficiency in Al-Eskan PHC.

At the end of this study we are able to identify some factors towards vitamin D deficiency in the adult female in Al-Eskan PHC.

The researcher expects from the study, low level of knowledge, attitude and practice (KAP) about the vitamin D deficiency.

The researcher expects from the study increase the awareness level of knowledge, attitude and practice (KAP) about the vitamin D deficiency.

2.13. Budget

Self-funded.

3. Result

Table 1. The distribution of Socio-demographic data in study group

	N	%
Age		
21-25	32	38
26-30	41	48
31-35	7	8
35 above	6	7
Nationality		
Saudi	74	86
Non-Saudi	12	14
Level of education		
Primary	3	3
Intermediate	26	30
Secondary	49	57
High education	8	9
Marital status		
Married	80	93
Divorce	6	7
Economic level		
Low	20	23
Average	50	58
High	16	18
Chronic disease		
Yes	7	8
No	79	92

Regarding age Table 1 describes the demographic characteristic of the samples. Major findings of the study are half of the (48%) adult women were in the group of age between 26 to 30 years, minor portion of the subjects 21-25 years (38 %) while above 35 years were 2% of them. The majority of the women (86%) of the studied were of Saudi nationality, having most (93.2%) of the women to be in “married” status. More than one-third of the mothers have attained a high education were (9%) and Secondary (57%) levels of education, while only (3%), primary (30%), intermediate. regarding chronic disease, most of the mothers in the study were found to have no chronic disease. The income level of more than half (58.0%) of the respondents ranged Average, followed by about (18%) of family having high income with low income (23%).

Table 2. Knowledge of the adult women about vitamin D

	Knowledge of vitamin D	Frequency (N= 86)	Percentage (%)
1	Heard of vitamin D		
	Yes	51	59
	No	35	41
2	Sources of knowledge		
	Family members	1	1
	doctor	1	1
	Nurse	5	6
	Internet	5	6
	Book/magazine	46	53
	Tv /Radio	2	2
	Relatives	2	2
	Others	-	-
	NO	31	36
	Total	86	100

Table 2 summaries the knowledge of the vitamin D on the samples as follows. Subjects were heard of vitamin D is 59 % in that half of the subjects (53%) were enriched knowledge of vitamin D through book and magazine, of them were gained knowledge through health care professionals and 2% of them from the mass media.

Table 3. Knowledge on sources of vitamin D

	Response	Frequency (N =86)	Percentage %
1	Fruits & vegetables	29	34
	Water	4	5
	Mushroom	8	9
	Fatty fish	10	12
	Vitamin D supplements	10	12
	Sun	38	44
	Air	1	1
	Selected cereals	6	7
	Milk/Diary	16	19
	Nuts	20	23
	Cod-liver oil	7	8
	Chicken	1	1
	Egg	15	17
	Beef	1	1
	Don't know	41	48

Table 3 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 (9%), fatty fish (12%), vitamin D supplements (16%) milk and dairy products (19%), cod liver oil (8%), egg (17%) and sunshine (44%) is the main source of vitamin D. Majority of the subjects were not aware on the source of vitamin D

Table 4. Sun exposure behavior of the adult women

	Response	Frequency (N =86)	Percentage %
1	Exposed to sun		
	Yes	83	97
	No	3	3
2	Sun exposure time		
	Below 30 min	36	42
	30 min above	20	24
	More than 1 hours	27	31
	Not exposed	3	3
3	Wearing full sleeved shirt /pant		
	Yes	8	9
	No	78	91
4	Covering of arms while working		
	Yes	6	7
	No	80	93
5	Wearing cap/umbrella		
	Yes	14	16
	No	72	84
6	Use of cosmetic cream contain SPF more than 8		
	Yes	37	43
	No	49	57
7	Use of sunscreen lotion		
	Yes	4	5
	No	82	95
8	Frequency of use cosmetic cream		
	Once a day	22	26
	Twice a day	15	18
	More than 2	Nil	
	Not using	49	56
	Duration of use		
	1-5 years	22	26
	6-10 years	10	12
	Above 10 years	5	6
	No	49	56

Table 4 express the sun exposure behavior of the samples as follows, In that Utmost of them (97%) were exposed to the sun. Half of the subjects (42%)of them are exposed below 30 mints, 24% of them exposed above 30 minutes and 31% of them exposed more than one hr. while working under the sun 9 % of them were wearing full sleeved pant and shirt and others(93%) not covering their arm. Only 5% were only using sunscreen lotion but 43% of them were using cosmetic cream containing SPF >8 without their knowledge in that 26 % of them using once a day and 18% of them using twice a day. Very few subjects (6%) were using cosmetic cream contain SPF more than 10 years, 12% of them using 6 to 10 years and 26% of them using 1 to 5 years.

Table 5 describes 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 2% of the health professionals (Doctor and Nurse) had knowledge on daily recommended dose.

Table 5. Knowledge on daily-recommended dosage of vitamin D to the adult women

	Response	Frequency (N =86)	Percentage %
1	Don't know	84	98
2	200 IU		
3	400 IU	2	2
4	600 IU		
5	1000 IU	86	100
	Total		

Table 6. Knowledge on time needed in sun to get adequate vitamin D

	Response	Frequency (N =86)	Percentage %
1	Don't know	60	70
2	Less than 30 min	10	12
3	More than 30 min	13	15
4	More than 1hr	3	3
	Total	86	100

Table 6 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 12% of the subjects were said less than 30 minutes, 15% of them said more than 30 minutes and 3% expressed more than 1 hours are needed in sun to get adequate vitamin D.

Table 7. Knowledge of the adult women about the Benefits of vitamin D

	Response	Frequency (N =86)	Percentage %
1	Bone health	25	29
2	Immune health	12	14
3	Prevents Rickets	14	16
4	Vision	12	14
5	Pregnancy & breast feeding	21	24
6	Hair growth	12	14
7	Diabetes mellitus	2	2
8	Cardiovascular health	4	5
9	Cognitive health	5	6
10	Cancer prevention	10	12
11	Cancer prevention	21	24
12	Calcium absorption	11	13
13	Prevent osteoporosis	5	6
14	Others		Nil
15	Don't know	45	52

Table 7 enumerates the knowledge on benefits of vitamin D among adult women as follows. Most of the subjects (52%) were don't know the benefits of the vitamin D. The remaining participants (48%) were able respond on the benefits of vitamin D. In that very few subjects were able to give correct response on knowledge on benefits on vitamin D, bone health(29%), immune health (14%), prevents rickets(16%), pregnancy and breast feeding (24%), cardiovascular (5%), cognitive (6%), calcium absorption (13%), prevents osteoporosis (6%).

Table 8. Knowledge on factors affecting vitamin D level among adult women

	Response	Frequency(N=86)	Percentage %
1	Skin pigment	19	22
2	Cloud & shade	6	7
3	Time of the day	10	12
4	Latitude	1	1
5	Season	8	9
6	Age	12	14
7	Pregnancy/ lactation	11	13
8	Fatty diet	4	5
9	Sunscreen use	9	10
10	Vegetarian diet	3	3
11	Diary allergy	4	5
12	Pollution	9	10
13	Wind	6	7
14	Smoking	7	8
15	BMI	5	6
16	Others		Nil
17	Don't know	56	65
	Total	86	100

Table 8 describes the knowledge on factors affecting vitamin D level among adult women as follows: 65% of the subjects were not aware on the factors affecting vitamin D level. About 19% identified an incorrect of vitamin D factors affecting vitamin D level .16% of the participants identified correct response that is skin pigment 22%, cloud and shade 7%, Time of the day 12%, latitude 1%, season 9%, Age 14%, pregnancy and lactation 13%, sunscreen use 10%, vegetarian diet 3%, pollution 9% .All the factors that can influence the amount of vitamin D that people get through the diet and sun light.

Table 9. Attitude of the adult women towards vitamin D supplementation

	Statements of Attitude	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
		No	%	No	%	No	%	No	%	No	%
1	Vitamin D supplements protects the children from softening of the bones (Rickets)	16	19	19	22	-	-	-	-	51	59
2	Vitamin D supplement reduce cancer risk	3	3	18	20			1	1	64	74
3	Vitamin D supplement helps to prevent heart disease	2	2	12	14			1	1	71	82
4	Vitamin D supplement increases the muscle strength	7	8	21	24	1	1	1	1	56	65
5	Vitamin D supplements make bones healthy and strong	15	17	16	19			1	1	54	63
6	Vitamin D reduces the risk of abnormal hardening of the tissue (Multiple Sclerosis)	5	6	8	9			2	2	71	83
7	Vitamin D decrease the risk of high blood pressure	2	2	7	8			2	2	75	87
8	Vitamin D reduces the infertility	2	2	7	8					77	90
9	Vitamin D reduces the allergic disorders	2	2	14	16			1	1	74	86
10	Vitamin D reduces the caesarian delivery	1	1	2	2			2	2	81	94
11	Vitamin D supplementation during pregnancy reduces language difficulty (Autism) in children	2	2	6	7			1	1	77	90

Table 10. Practice to prevent vitamin D deficiency in the adult women

	Practice	YES		NO	
		Frequency N=86	Percentage%	Frequency N=86	Percentage%
1	Exposure to sun light	50	58	36	42
2	Consuming 1liter of milk	9	10	77	90
3	Taking vitamin D supplement	-	-	86	100
4	Including more sea food in the diet	4	4	82	96
5	Not using SPF contain creams	45	52	41	48
6	Including mushroom in the diet	10	12	76	84

Table 9 predicts as follows. Most of the subjects did not have positive attitude towards benefits of vitamin D supplementation. Very few subjects were agreed (22%) and 19% strongly agree on the vitamin d supplementation protecting the children from rickets.

The Table 10 describes as follows. All subjects (100%) were not taking vitamin D supplements, most of the subjects were not taking adequate amount of sea foods (96%), (90%) not consuming 1 liter of milk and inadequate intake

4. Discussion

Our study reveals that the low 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 [23]

Our study 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 [24]

Regarding the main sources of knowledge about vitamin D, 40.5 % of patients got knowledge from doctors, 12.5% from the media, 29.0% from relatives and friends, 8.5% from background information and 9.5% from journals and magazines. 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 [25].

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 400IU 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 93% were exposed less than 30 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 [26].

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.[27]

5. Conclusion and Recommendations

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. It is recommended that this is addressed by health promotion campaigns with specific guidelines. Support from health-care professionals is needed to change health behavior. Furthermore, from their accounts we believe that participants were unlikely to experience sufficient sun exposure to prevent vitamin D deficiency. This could be explained by: cultural reasons for covering skin with clothing and the Saudi Arabian climate which is very hot and geared towards an indoors lifestyle. Play an important role in communicating health promoting behaviors to the adult woman. Planned health education interventions on vitamin D and its uses may prevent the vitamin D deficiency among woman's. This should be included in the routine nutritional counseling sections

Recommending 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.

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