LEVEL OF KNOWLEDGE AND ADHERENCE TO VITAMIN D SUPPLEMENTATION AMONG INFANTS ATTENDING WELL-BABY CLINIC IN PRIMARY HEALTH CARE CENTER IN MAKKAH, SAUDI ARABIA 2021

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Abstract

Background:

With the report of high prevalence rate of Vitamin D deficiency in the literature since the 1980s, the condition can be considered an epidemic in Saudi Arabia. However, some specific steps have been taken by the Ministry of Health to tackle the problem. Moreover, little is known about Knowledge and Adherence of Vitamin D supplementation for infants. Women's health is of particular concern due to reproduction which affects their health. The Saudi community has changed recently in regard to women's rights and education. Those changes are expected to have a great impact on breastfeeding practice and contraception use, Knowledge and Adherence of Vitamin D supplementation for infants. Vitamin D is known to have essential roles in the human body. However, the case of vitamin deficiency is reported to increase in many infants worldwide, especially in Saudi Arabia. Mothers, having adequate knowledge about vitamin D and its supplementation, may lead to possible lowering of the cases of vitamin D deficiency and its complications. Many international medical organizations recommend vitamin D supplementation for infants, especially exclusively breastfed infants, however, data regarding the vitamin D status in infants are lacking. Such data would help to support physician decisions and guide medical practice

Ami of the study: To Level of knowledge and adherence to Vitamin D Supplementation among Infants attending Well-Baby Clinic in Primary Health Care Center in Makkah, Saudi Arabia 2021.

Methods: A cross-sectional study was conducted among (200) mothers of infants attending the well-baby clinic in the Primary Health clinic in 2021at Makkah AL-Mokarramah random sampling technique was applied and an Arabic self-administered questionnaire used for data collection.

Result: Regarding the Adherence to Vitamin D Supplement the majority of participant answer No were(66.0%) While a significant relation while p=0.001 and X^2 19.845.regarding the Level of Vitamin D knowledge the most of participant weak were (65.0%) while p=0.001 and X^2 92.68.

Conclusion: Most full-term, exclusively breastfed infants have serum vitamin D concentration below sufficiency level at 6 months of age. However, vitamin D supplementation (400 IU/day) improves their vitamin D status and prevents vitamin D deficiency.

Keywords: Knowledge, Vitamin D, deficiency, infants, attending, well-baby clinic, Makkah

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1.Introduction:

Related literature since 1983 indicates that the problem of Vitamin D deficiency in Saudi Arabia is not recent.[1] In articles published in the last few years to highlight the size of the problem,[1,2] several factors have been identified as contributors to the low level of Vitamin D in the Saudi population. These include the religious practice whereby women wear Hijab, limited exposure to the sun in spite of abundant sunlight all year round, and poor dietary intake.[3,4]. World Health Organization (WHO) define infant, a child from the first month after birth to 12 months of age, more specific the period from 28 days to 12 months old. [5] The infant period is one of the most critical stages of a personal life which is represent the most rapid growth and physical development experience to achieve optimal growth and healthy development we need sufficient nutrition [6].

Vitamin D deficiency has emerged as a major health problem in Saudi Arabia in both genders[1,7] and all age groups.[8,9] The reported prevalence in patients visiting primary health care centers (PHCs) is between 28% in healthy adult males, 80% in healthy school children, and 100% in young adult females.[10,11] This reported wide variability in the prevalence could be related to the use of different cut-off points for the definition of Vitamin D deficiency, or the differences in the methods used in analyzing the blood samples for Vitamin D levels.[12]

Over the last decade, interest in vitamin D deficiency has grown, as it exerts effects not only on bone mineralization but also on diabetes, cancers, autoimmune diseases, infectious diseases, and others [13]. Nutritional vitamin D deficiency is the most common cause of rickets, a condition that affects infants and young children, which causes symptoms including delayed closing of fontanels, morphological anomalies of the lower limbs, short stature, and retardation of growth and development[14] . Vitamin D insufficiency or deficiency may also be detected in children who do not show clinical manifestations of rickets. Vitamin D deficiency is more prevalent than rickets and it is a serious health problem both in developing and developed countries [15]

During the first year of life, breastfeeding is one of the most critical factors to child survival, nutrition, development, and maternal health. The World Health Organization and the United Nations Children's Fund recommend that infants should be exclusively breastfed for the first 6 months of life [16]. However, breastfed infants are known to be at risk of vitamin D deficiency, especially in areas of high latitude, because the vitamin D content in breast milk can vary depending on the maternal vitamin D status and is often low [17]. Moreover, infants' exposure to sunlight may be limited because of their geographical location; their parents' culture, beliefs, or practices; or other reasons. As a result, many international medical organizations recommend vitamin D supplementation for infants, especially those who are exclusively breastfed [18]. For example, AAP guideline in 2008 suggested that vitamin D supplementation should begin in the first few days of life for breastfed and partially breastfed new-borns at 400 IU/day and continue until the infant is weaned to at least 1 L or 1 qt of vitamin D–fortified formula or whole milk per day [19]. The relationship between Vitamin D, rickets, osteomalacia and osteoporosis is well established, but Vitamin D has recently been identified as an immunomodulation that could be linked to such conditions as bronchial asthma, atopic dermatitis and food allergy,[20] type 1 diabetes mellitus and an increased susceptibility to infections.[21]

Literature Review

Studies from Saudi Arabia, Switzerland, and the USA reported that vitamin D supplementation rates were 38,3%, 64%, and 58% up to the first year of life, respectively [22].

A study was carried out 2011, showed Neonates born with 25-OHD concentrations <50 nmol/L had a six fold (95% confidence interval: 1.6-24.9; P = .01) increased the risk of RSV LRTI in the first year of living compared with those with 25-OHD concentrations ≥75 nmol/L [23]

Study in Thailand, we found that approximately 30% of lactating women had serum vitamin D concentration below sufficiency level. Limited data are available on the vitamin D status in breastfed infants, the mean 25OHD concentration in supplemented breastfed infants in another study was comparable with that in breastfed infants born in summer in Greece (19.4 ± 2.8 ng/ml) [12]

A study from Turkey reported that among mothers of infants aged 1-24 months,75% administered vitamin D [25] , while in another study 82.7 % of infants received vitamin D in the first year of life [26] . Similarly, 62.6% of the infants were administered vitamin D during the first 2 years of life in the present study. This figure reflects the success of the project in some parts of Turkey. To find out the impact of national recommendations regarding vitamin D supplementation, the European Society for Pediatric Endocrinology (ESPE) conducted a study with member countries and reported 79% of them recommended vitamin D for all infants in the first year of life whether they

are breastfed or not. Good adherence to vitamin D supplementation was reported by 59% of the countries including Turkey and report demonstrate that the prevalence of supplementation is 80% in Turkey [27]

Study in Hong Kong reported that unless they were receiving vitamin D supplementation, 56.8% of breastfed infants at 6 months of age had serum vitamin D concentration below sufficiency level. The prevalence of vitamin D insufficiency or deficiency among infants in tropical countries was previously expected to be low because of the large amount of sunlight in these areas. The prevalence of vitamin D insufficiency and deficiency (≤20 ng/ mL) among supplemented breastfed infants in the present study are comparable (60%) [28], but lower than those reported in India (90%) [14] also Taiwan (86.1%),Qatar (83%) , and Japan (76.9%) [29] but higher than those in Boston, MA, USA (40%) , Kenya (23.4%) , and Indonesia (16.7%) [30]

Prospective Cohort Study was done in USA 2016, and the sample was taken from 265 umbilical cord, showed Vitamin D deficiency in 38.9 % and insufficiency in 29.8% among infant. There was an association between deficient vitamin D level and maternity factors as (=race, younger age, multiple pregnancies) [31]

The Greece study also showed a significantly higher 25OHD concentration in infants born in summer than in winter. In contrast to countries located in the northern and southern hemispheres with marked seasonal variations in weather, especially in summer and winter, Thailand has only three seasons with relatively abundant sunlight all year round. This may explain the lack of a significant association of infants' birth season with the serum vitamin V Concentrations .[32]

Rational:

The majority of general practitioners had a positive attitude toward Vitamin D supplementation for infants. However, their knowledge and practice need improvement. The vitamin D deficiency and iron deficiency anemia are common preventable diseases. 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 .Furthermore, the prevalence of 0-4 years old in Saudi Arabia is 10.6 % among the Saudis with an estimated 2.20 million people in 1437.Moreover, up to the researcher knowledge, there are no a previous studies according to the adherence to Vitamin D supplements recommendations among Saudi infants. Studies from Saudi Arabia, reported that vitamin D supplementation rates were 38,3%, noticed that a lot of mothers who came for vaccinating their children have no idea or proper information about the vitamin D and a lot of mother's consultations about vitamin D.

Ami of the study:

To Level of knowledge and adherence to Vitamin D Supplementation among Infants attending Well-Baby Clinic in Primary Health Care Center in Makkah, Saudi Arabia 2021

Objectives:

- To identify the level of adherence to Vitamin D supplements recommendations among Infants attending the well-baby clinic in PHC in Makkah al Mukarramah January 2021.
- To assess the knowledge of mothers about Vitamin D supplements recommendations in Infants attending the well-baby clinic in PHC in Makkah al Mukarramah January 2021.

Methodology

Study Design

This is a cross sectional study.

Study Area

Makkah Al-Mukarramah is located in western region in Saudi Arabia. It is the holy city for all Muslims, which contain the masjid al haram and al ka'abah. It is one of the most important and populated city. In addition it have multiple nationalities and different socioeconomic status. The city is divided into four inner and three outer sections of primary health care, which contains 85 PHC centers. PHC it is belongs to Al Zaher sector which serves six regions. It is includes several clinics such as chronic disease, general, well-baby and antenatal. The study will be conducted in the well-baby clinic

Study Population

Infants are attending the well-baby clinic at primary health care in Makkah al-Mukarramah

Eligibility Criteria

Inclusion criteria:

- Infants are attending the well-baby clinic.
- Male and female infants.
- All nationalities.

Exclusion criteria:

- Non-Arabic or English speaker.
- Infant has a medical disease.
- Infant come without his mother.

Sample size

The total number of mother attending with their infants the well-baby clinic in PHC for three weeks is expected to be **200.**

From the literature review of the same subject the prevalence of adherence to the vitamin D supplement recommendation among infant 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 125 of mother attending with their infants.

Sampling technique

By personal contact the researcher found that the most visiting PHC centers for well-baby clinic the PHC, Al- Eskan, Al-Azeziah and Al-kaakih.

Then the researcher selected PHC randomly by using a numbered list of PHC through online random number generator. By using systematic sampling random as dividing the total population by the required sample siz e. The researcher will take every second mother. The first mother will be as index case.

Data collection tool

A questionnaire will be carefully designed by the researcher to serve the purpose of this study. Questionnaires of similar studies will be review before finalizing the study Questionnaire.

An interview Questionnaire will uses for data collection.

The Questionnaire has be 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: question to assess the Adherence to the vitamin D recommendation among infant and the knowledge of the recommendation.

The validity of questionnaire will ascertained by three consultants in the fields of family medicine and community medicine .

The researcher will examine the reliability of the questionnaire by testing and retesting.

Data Collection technique

The researcher has be visits the selected PHC after getting the approval from the ministry of health. The researcher has be obtained permission from primary health care director and mother. She has be explained the purpose of the study to all mother attending the well-baby clinic. The mother has be interview by the researcher herself inside the well-baby clinic.

Before giving vaccine to the infant to prevent disturbance to mother . The data will collect through 3 weeks in January 2021

Data Entry and Analysis

Data has be collected and verified by hand then coded before entry to personal computer. Data entry and analysis has carried out using the statistical program for social sciences (SPSS) version 24 . P-value has be considered statistically significance if it is < 0.05.

Pilot Study

A pilot study has be conducted in Al Zaher PHC center on 10% of the sample size before the actual research, and these subjects will not include within the real study. Therefore, questionnaire applicability and understanding has be tested. Data from pilot study will analyzed but will not include in the main study.

Ethical Considerations

• Written permission from higher authorities in ministry of health (public health) will obtained.

• Written permission from the joint program of family medicine will be obtained before conducting the study.

• Permission of PCH center director has be obtained.

• Verbal consent has be obtained from each participant.

• All information has be keep confidential and will not disclose except for the study purpose.

Budget

This study is self-funded

Result

Table 1 Distribution of demographic data(age, gender, social, Smoking, duration ,Occupation) in our study(n=200)

	N	%
Mother's Age		
<25	54	27
25-35	66	33
>35	80	40
Baby's Age		
<1	38	19

1-5.	98	49
>5	64	32
Sex of the baby		
Male	134	67
Female	66	33
Mother Educational qualification		
Illiterate	32	16
Primary	10	5
Intermediate	24	12
Secondary	44	22
University	74	37
Postgraduate studies	16	8
Mother job		
Government job	32	16
Private job	46	23
Housewife	68	34
Looking for job	24	12
Student	30	15
Chronic disease		
Yes	38	19
No	162	81
Father Educational qualification		
Illiterate	16	8
Primary	30	15
Intermediate	22	11
Secondary	68	34
University	40	20
Postgraduate studies	24	12
Family income		
Less than 5000	48	24
5000-10000	130	65
more than 10000	22	11

Table 1 regarding the Mother's Age shows that most of the participants >35 were(40.0%) followed by age 25-35 years were (33.0%) also regarding the Baby's Age shows that most of the participants 1-5 were(49.0%) followed by age >5 years were (32.0%), regarding Sex of the baby the majority of participant are male were(67.0%), regarding Mother Educational qualification the majority of participant are University were(37.0%). Regarding the Chronic disease the majority of participant No. were(81.0%), regarding Mother job the majority of participant are Housewife were(34.0%). Regarding the Father Educational qualification the majority of participant Secondary were(34.0%). Regarding the Economic level the majority of participant from 5000-10000 were(65.0%).

Table 2. Nutritional characteristics of infants under breastfeeding or mix type of feeding (N=200).

	N	%
Do you use for your child supplement vitamin D?		
Yes	**68**	**34**
Sometimes	**22**	**11**
Do not use	**110**	**55**
How much dose is used of Vitamin D supplement for your child? N=34		
200 IU (two drops)	**38**	**19**
400 IU (four drops)	**130**	**65**
Otherwise	**32**	**16**
From where you get your supplement?		

The primary health care center	**140**	**70**
External	**42**	**21**
Missing	**18**	**9**
Do you use for your child any supplement or other medicine?		
Yes	**24**	**12**
No	**176**	**88**
Nutritional characteristics of babies under artificial type of feeding		
Is the milk used in is fortified with vitamin D?		
Yes	**70**	**35**
I do not know	**130**	**65**
Does your child drink 1 liter of milk daily? (About 8 small Bottles 120 ml)		
Yes	**24**	**12**
Sometimes	**36**	**18**
No	**108**	**54**
Not Sure	**32**	**16**
Do you use for your child supplement vitamin D?		
Yes	**48**	**24**
Sometimes	**34**	**17**
Do not use	**118**	**59**
How much dose is used of Vitamin D supplement for your child?		
200 IU (two drops)	**38**	**19**
400 IU (four drops)	**108**	**54**
Otherwise	**54**	**27**
What are the reasons for not use vitamin D supplements?		
There is not enough information	**130**	**65**
Do not see the importance of vitamin D	**30**	**15**
Busy about other children	**20**	**10**
Harmful	**16**	**8**
Vitamin D were not prescribed	**4**	**2**

Table 2 shows the nutritional characteristics of infants under breastfeeding or mix type of feeding (N=78). Majority (55.0%) of them were not using Vitamin D supplement, while Yes used were (34.0%) regarding How much dose is used of Vitamin D supplement for your child almost 400 IU (four drops) were(65.0%) but From where you get your supplement the most of participant from The primary health care center were(70.5%). Regarding Do you use for your child any supplement or other medicine most of participant answer I do No were(88.0%)

Nutritional characteristics of babies under artificial type of feeding .

Regarding Is the milk used in is fortified with vitamin D the most of participant answer I do not know were(65.0%). While your child drink 1 liter of milk daily (About 8 small Bottles 120 ml most of participant answer No were(54.0%), regarding Do you use for your child supplement vitamin D the most of participant answer not use were(59.0%), regarding the How much dose is used of Vitamin D supplement for your child the most of participant 400 IU (four drops) were(54.0%), while regarding the reasons for not use vitamin D supplements the most of participant There is not enough information were(65.0%)

Knowledge of Mothers towards Vitamin D

Table 3. Knowledge towards Vitamin D of the studied population

	N	%
Have you ever read or heard about vitamin deficiency in children?		
Yes	**150**	**75**
No	**50**	**25**
Do you have enough information about vitamin deficiency in children?		
Yes	**36**	**18**

No	**164**	**82**
Do you think that vitamin D is important for child health?		
Yes	**132**	**66**
No	**24**	**12**
I don't know	**44**	**22**
Do you know there are recommendations on how to use vitamin D supplements for children?		
Yes	**16**	**8**
No	**184**	**92**
What is the suitable age to give vitamin D?		
After birth	**56**	**28**
3 months	**24**	**12**
6 months	**88**	**44**
1 year and above	**16**	**8**
I do not know	**4**	**2**
Otherwise	**12**	**6**
Is there a relationship between the type of feeding and the required dose of vitamin D?		
Yes	**84**	**42**
No	**22**	**11**
I don't know	**94**	**47**
What is the recommended dose of Vitamin D supplement to give in infant?		
400 IU	**68**	**34**
I do not know	**132**	**66**

The knowledge of mothers towards Vitamin D was also assessed in this study. Nearly two-third (75.0%) of mothers have ever read or heard about Vitamin deficiency in children, whereas only around one-third (25.0%) have not as shown in Table 3. Regarding you have enough information about vitamin deficiency in children the Majority of participant answer No were (82.0%), regarding the Majority (66.0%) thought that vitamin D is important for the health of their children, With regard to supplementation, most (92.0%) were not informed that there are recommendations on how to use vitamin D supplements for children. Regarding What is the suitable age to give vitamin D major reported 6 months (44.0%) followed after birth were(28.0%), regarding Is there a relationship between the type of feeding and the required dose of vitamin D the most of participant I don't know were (47.0), but regarding What is the recommended dose of Vitamin D supplement to give in infant the most of participant I do not know were(66.0%)

Table 4. Adherence to Vitamin D of the studied population

	N	**%**	**Chi-square**	
Adherence to Vitamin D Supplement			X 2	P-value
Yes	68	34	19.845	<0.001*
No	132	66		
Level of Vitamin D knowledge				
Weak	**130**	**65**	92.68	<0.001*
Average	**44**	**22**		
High	**26**	**13**		

Table 4 shown, Regarding the Adherence to Vitamin D Supplement the majority of participant answer No were(66.0%) While a significant relation while p=0.001 and X^2 19.845.regarding the Level of Vitamin D knowledge the most of participant weak were (65.0%) while p=0.001 and X^2 92.68.

Figure 1 Adherence to Vitamin D of the studied population among Infants in Makkah Al-Mokarramah, 2021

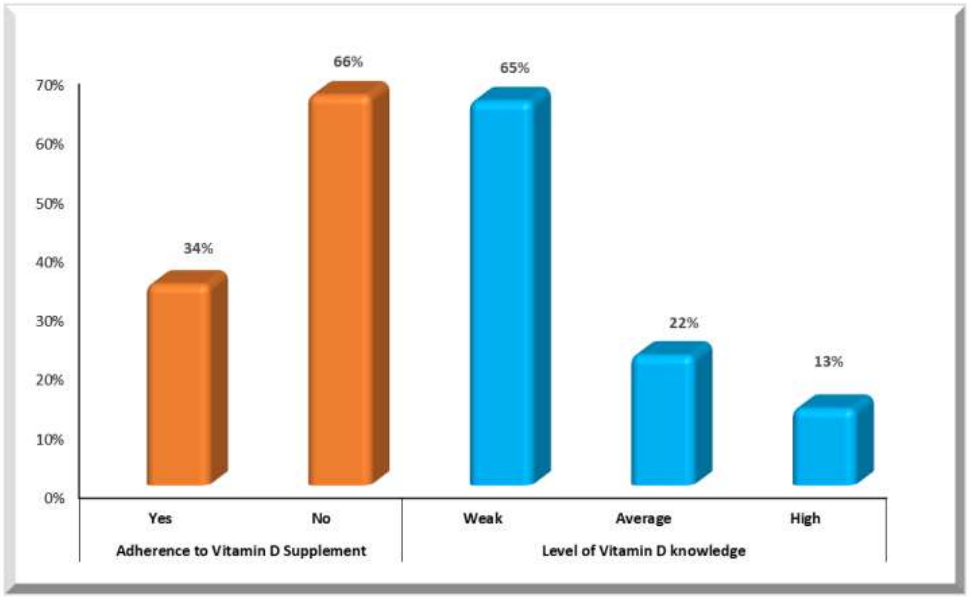
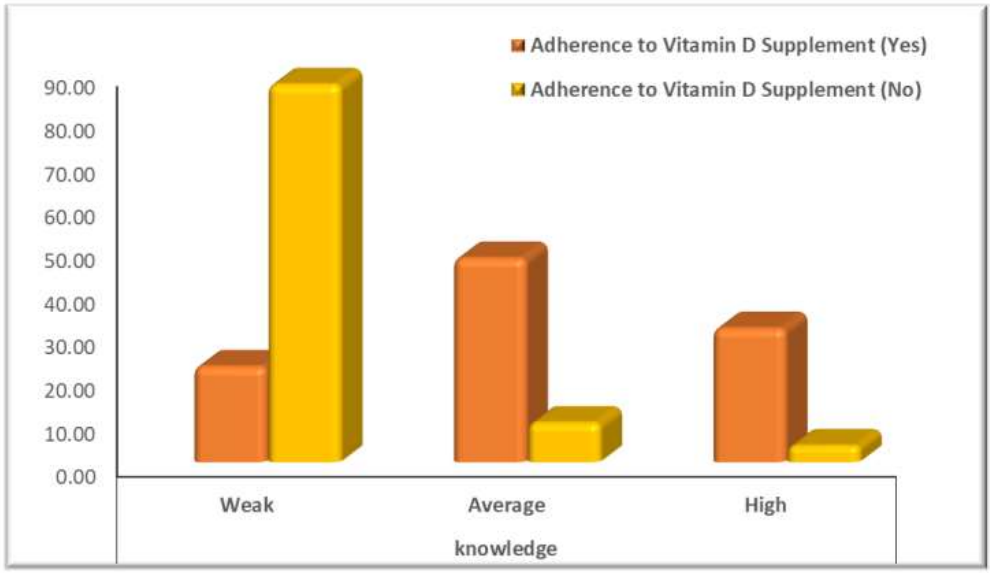


Table 5: Distribution of the Knowledge regarding Adherence to Vitamin D Supplement among Infants

		Adherence to Vitamin D Supplement				Total	
		Yes		No			
		N	%	N	%	N	%
knowledge	Weak	**15**	**22.06**	**115**	**87.12**	**130**	**65**
	Average	**32**	**47.06**	**12**	**9.09**	**44**	**22**
	High	**21**	**30.88**	**5**	**3.79**	**26**	**13**
	Total	**68**	**100.00**	**132**	**100.00**	**200**	**100**
CHi-square	X^2	83.98					
	P-value	<0.001					

Table 5 shown, the results of the Adherence to Vitamin D Supplement Knowledge a significant Average relation were (47.06%) in Yes while No most of participant were(87.12%) in weak while p=0.001 and X 2 83.98.

Figure 2 Distribution of the Knowledge regarding Adherence to Vitamin D Supplement among Infants



4. Discussion

In this study, the level and knowledge on vitamin D and adherence to supplementation of the mothers of infants attending the well-baby clinic PHCC, Makkah Al-Mukarrama, Saudi Arabia 2021, was evaluated. Results revealed that majority of the mothers under study thought that vitamin D is important for the health of their children; however large percentage of them had limited information about vitamin deficiency. Similarly, the work of Hoel and colleagues [33], Babelghaith and co-workers [34], Alamoudi and others in Saudi Arabia showed that the participants under their studies exhibited limited knowledge when it comes to Vitamin D and its deficiency[23]. Al-Saleh and others [36] mentioned that possible reasons for the said deficiency can be the insufficient knowledge about vitamin D, suggesting an increase in public awareness, especially to mothers, to be promoted to manage the increasing prevalence of Vitamin D deficiency and avoid its further complications. Contrary to the result of current study, a similar cross-sectional study in Majmaah City, Saudi Arabia reported that majority (80.5%) of the participants were aware about vitamin D [23]. Other studies in Saudi Arabia indicated the primary source of the Vitamin D knowledge of respondents as media [19], Doctor and health care professionals [21]

Knowledge of mothers towards Vitamin D was also assessed in this study. Nearly twothird (75.0%) of mothers have ever read or heard about Vitamin deficiency in children, whereas only around one-third (25.0%) have not as shown in (Table 3). Regarding you have enough information about vitamin deficiency in children the Majority of participant answer No were (82.0%), regarding the Majority (66.0%) thought that vitamin D is important for the health of their children, With regard to supplementation, most (92.0%) were not informed that there are recommendations on how to use vitamin D supplements for children. Regarding What is the suitable age to give vitamin D major reported 6 months (44.0%) followed after birth were(28.0%), regarding Is there a relationship between the type of feeding and the required dose of vitamin D the most of participant I don't know were (47.0), but regarding What is the recommended dose of Vitamin D supplement to give in infant the most of participant I do not know were(66.0%)(see table 3) in the study of Alamoudi and colleagues [35] in Jeddah, Saudi Arabia.

Regarding adherence to vitamin D supplementation, majority (76.0%) of the respondents was found to not adhere to vitamin D supplementation. In other Arab country, Alotaibi and co-workers [23] also reported that majority (74.8%) of the participants in their study did not take vitamin D supplements. Comparable results were also seen to other published non-Arab works wherein a percentage ranging from 2 to 19% of breastfeeding infants were reported to be under vitamin D supplementation [22]. Contrary to the result of current study have received vitamin D supplementation in the prospective cohort study of pregnant women and their children [24] . The low percentage of adherence to Vitamin D of the mothers under study can possibly be due to their poor knowledge on vitamin D and its deficiency. Paediatricians and allied health care providers have significant roles in advising or educating parents to practice supplementation for their infants.

Conclusion

Since vitamin D supplementation rates were higher in families who visited their WellBaby Clinic in Primary Health Care regularly, they must be encouraged to visit their wellbaby visits at every opportunity. The new-born unit can be an ideal place to start a program that educates breastfeeding families about the need for supplements, as only breastfeeding infants receive less vitamin D. Healthcare providers has the most important role in supplementation practices, so they must participate in education programs on initiation and continuation of vitamin D supplements within the strategy of preventing vitamin D deficiency.

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