

MATERNAL KNOWLEDGE ABOUT VITAMIN D SUPPLEMENT AMONG BREASTFED INFANTS UNDER SIX MONTHS OF AGE

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ABSTRACT

Introduction: Vitamin D is essential for calcium absorption and skeletal growth, and deficiency of vitamin D can cause nutritional rickets. Although considered a historical disease after the advent of vitamin D fortification of foods, rickets persists worldwide, typically in un-supplemented exclusively breastfed infants. The aim of study to assess maternal knowledge about vitamin D supplementation to their infants and the relation of maternal knowledge about vitamin D to sociodemographic factors for both mother and infant. **Method:** A descriptive analytic cross sectional study, conducted at five primary health care centers in Babylon city from first of February 2020 until first of February 2021. 383 mothers of infants under six months attending primary health care centers for routine vaccination and follow up of their infants were included in the study. Questionnaire-based study was used. A scoring system was designed for knowledge. Statistical analyses were done using SPSS version 26. Chi square test and multinomial logistic regression test were used to show the association between knowledge, mother and infant variables. **Results:** The results showed that (43.3%) and (31.9%) of participants had fair and good knowledge about vitamin D respectively. Only (42.8%) of infants received vitamin D supplements. The good knowledge was significantly associated with younger age mothers and mixed infant feeding (P value ≤ 0.05). While there was no association with occupation, residence, socioeconomic states, educational level of mothers. The main source of information about vitamin D was the health staff (44.13%). **Conclusion:** The study revealed that the overall knowledge about vitamin D is good.

KEYWORDS: Knowledge, vitamin D supplementation, preference.

INTRODUCTION

During the previous years, there has been major concern about vitamin D in the health and biomedical fields, and many studies had been conducted examining its importance, uses, and its deficiency.^[1] Vitamin D produced by the body during exposure to sunlight, and also found in eggs, oily fish, and fortified food.^[2] Vitamin D has two biologically inert precursors: vitamin D3 and vitamin D2, both precursors that come from sunlight exposure and diet are converted by two hydroxylation: one in the liver and the other in the kidney to form active 1, 25-dihydroxyvitamin D (calcitriol).^[3] Worldwide, deficiency of vitamin D is a global health problem in both children and adults and considered an epidemic. The Middle East and North African region, which includes Saudi Arabia, has a very high rate of vitamin D deficiency, which reaches 81% among various age groups.^[4] Vitamin D deficiency will occur, when there is no proper dietary intake of vitamin D or proper exposure to sunlight.^[5] The World Health

Organization (WHO) recommends exclusive breastfeeding for the first six months of birth, followed by continued breastfeeding with complementary food until two years of age and beyond.^[6] Exclusive breastfeeding means there is no other fluid or food that given to the infant. It was recommended that for the duration of exclusive breastfeeding a mother's breast milk alone is sufficient to meet the energy and nutrition requirements of her infant.^[7] Symptomatic vitamin D deficiency present as craniotabes, frontal bossing of the skull, rickety rosary, swelling of the ends of long bones, hypocalcaemia seizures or tetany and slow motor development and the bony condition resulting from vitamin D deficiency in children is nutritional rickets.^[8] Vitamin D deficiency in exclusively breast-fed infants up to 6 months of age can be prevented by the following: Vitamin D supplementing to pregnant women at risk of vitamin D deficiency and lactating mothers. Vitamin D supplementing to all exclusively breast-fed infants. Exposing all pregnant and lactating women and their infants to sunlight.^[9] High-dose maternal vitamin D

supplementation (4000-6400 IU/d or a single monthly dose of 150,000 IU) can sufficiently enrich breast milk in nursing mothers, preventing vitamin D deficiency in their infants without evident toxicity.^[10] Through a study on awareness of vitamin D supplementation among healthcare professionals of different groups like health visitors, general practitioners and midwives have declared that less than half of the health visitors and fewer midwives routinely advised vitamin D supplementation to their patient groups. Of more interest was the finding that a majority of GPs were unaware of different aspects of supplementation.^[11] Lack of adequate updating about vitamin D role for physicians are associated with the lack of adequate recommendations about vitamin D supplementation by professional organizations may also contribute to the development of rickets in exclusively breast-fed infants.^[12] The aim of study to assess maternal knowledge about vitamin D supplementation to their infants and the relation of maternal knowledge about vitamin D to sociodemographic factors for both mother and infant.

METHOD

This was a cross-sectional study that was conducted during a period of 12 months' duration (1st of February /2020 – 1st of February /2021). Primary health care centers in Babylon city (Halif Al-Quran, Shaheed Al-Eslam, Al-Khalesa, Babil, Al-Qadia). There are 18 primary health care centers in Babylon city including sector one that contain eight primary health care centers and sector two that contain 10 primary health care centers. The sample proportion was 30% of the total number of primary health care center in Babylon city, which yield five PHCCs, two centers from sector one and three centers from sector two. The five PHCCs then

selected using simple random sample by a list of all PHCCs from Babylon health directorate then lottery method to select PHCCs from list. A questionnaire form which is constructed for the study through a literature review of studies^[13,14] and assessed by a panel of experts in family, community and pediatric medicine. Questions 4-10 were used to calculate the knowledge score. As each question, investigate different aspects about vitamin D. The answer options provided were yes and no for knowledge related questions except question 4, which include the sources of vitamin D that include (sun exposure, food, and supplement). Each correct answer was given score one (whatever yes or no), while the wrong answer was given zero (whatever yes or no) and each participant was scored out of a total 7. For a maximum score of 7 points (100%) and the total knowledge score was calculated as: Level of knowledge was classified into three groups: poor knowledge 1-3, fair knowledge 4-5 and good knowledge 6-7. The collected quantitative data will be summarized and analyzed statistically by using statistical package for the social sciences (SPSS) program version 26. Descriptive statistics were expressed as frequencies and percentages. Chi square test and multinomial logistic regression test were used to show the association between knowledge and variables. P value of ≤ 0.05 was considered as statistically significant.

RESULTS

The total study sample included 383 mothers of infants under 6 months. About half of participants (195) (50.9%) aged between 14-25 years with a mean of 25.75 ± 5.6612 , about two third of them (286) (74.7%) were urban, (253) (66.1%) were housewives and (83) (21.7%) had a higher education. (Table 1).

Table 1: Distribution of mother variables.

variables		frequency	percentage
Age group (years)	14-25	195	50.9
	26-35	174	45.4
	36-45	14	3.7
Residence	Urban	286	74.7
	Rural	97	25.3
Occupation	Housewife	253	66.1
	Employed	130	33.9
Education	Illiterate	54	14.1
	Primary	120	31.3
	Secondary	126	32.9
Socioeconomic status	High education	83	21.7
	Monthly income (1million) Good	87	22.7
	Monthly income (500000-1million) Fair	254	66.3
	Monthly income (≤ 500000) Poor	42	11.0

More than half (204) (53.3%) of infants aged between 4-6 months, (278) (72.6%) visit PHCC for vaccination, (266)

(59.0%) were on exclusive breastfeed feeding and only (164) (42.8%) were given vitamin D supplement. (Table 2).

Table 2: Distribution of infant variables.

variables		frequency	percentage
Age of infant (months)	1-3	179	46.7
	4-6	204	53.3
Reason of visit to PHCC	Vaccine	278	72.6
	Seeking care	105	27.4
Type of infant feeding	Mixed	157	41.0
	Exclusive breastfeed	226	59.0
Infant order in family	3 rd and less	321	83.8
	More than 3	62	16.2
Giving vitamin D to infants	No	219	57.2
	Yes	164	42.8

When calculating the knowledge score (166) (43.3%) had fair knowledge score while (122) (31.9%) and (95) (24.8%) had good and poor score respectively. As in fig 1.

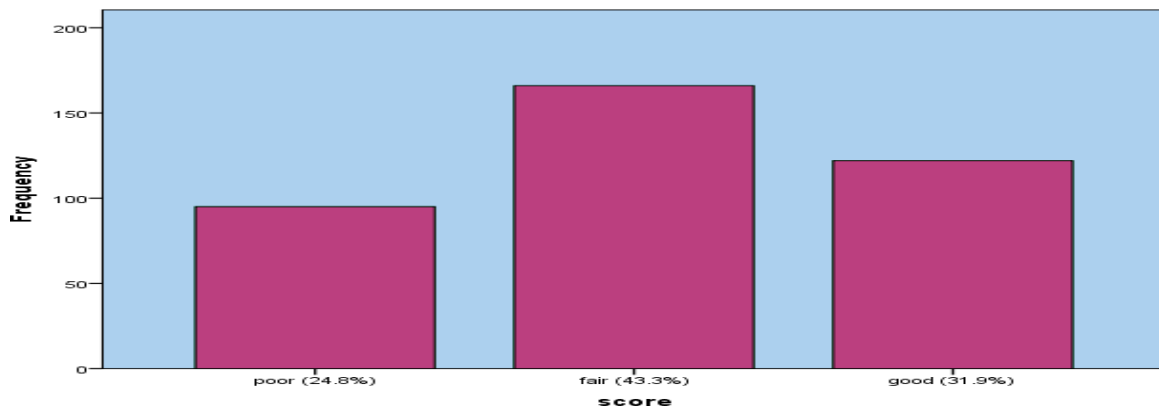


Fig 1: Distribution of knowledge about vitamin D.

Fig 2 shows that among of 383 mothers only (164) (42.82%) were given their infants vitamin D.

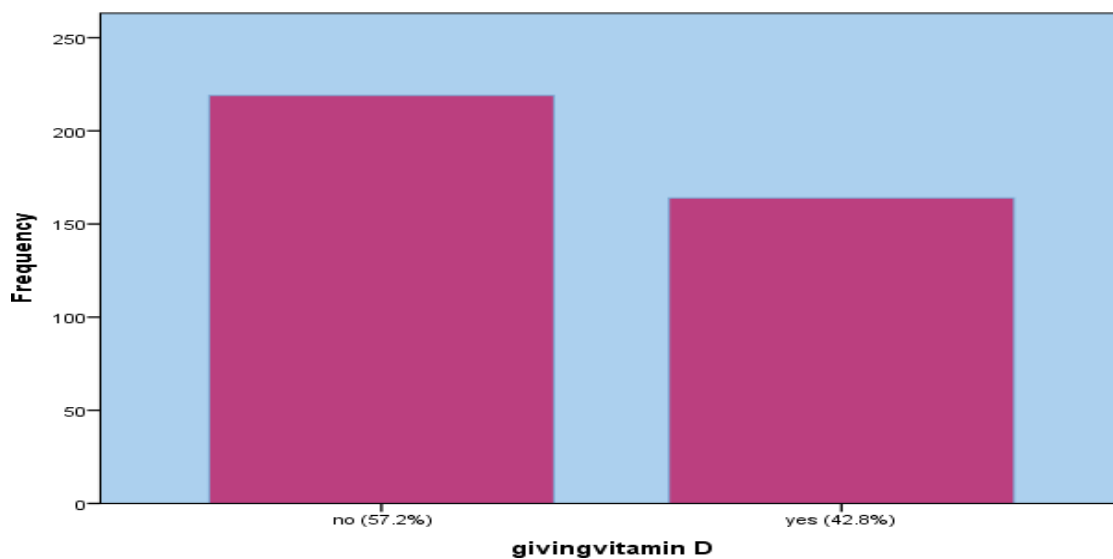
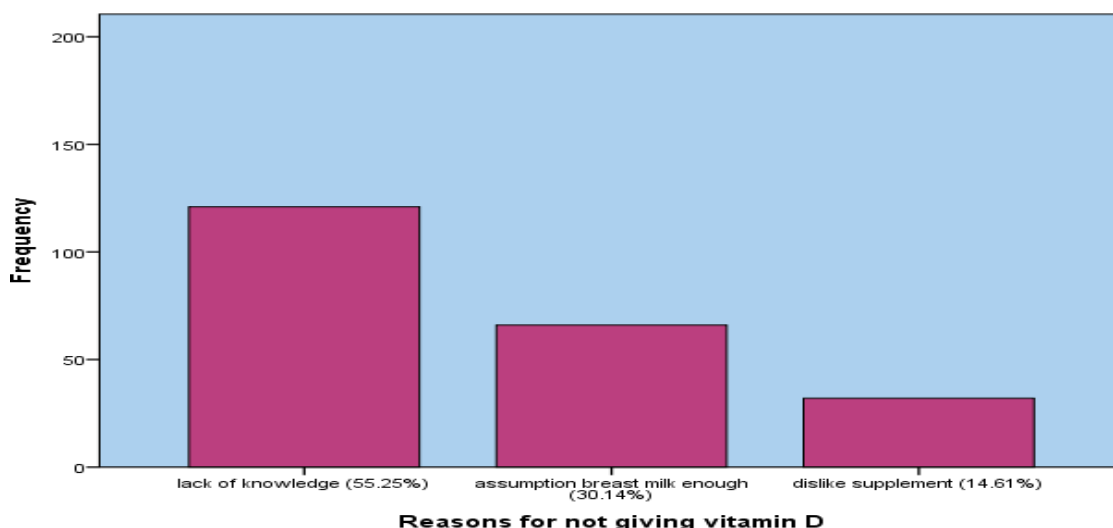


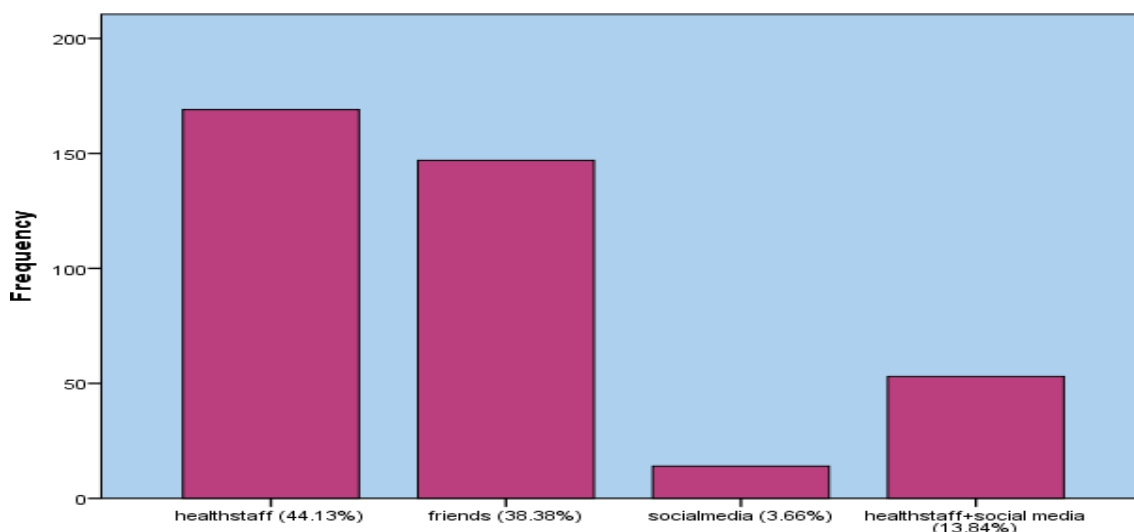
Fig 2: Distribution of Giving Vitamin D.

Figure (3): Shows the mothers reason for not given vitamin D to their infants. More than half because lack of knowledge about proper use of vitamin D.



Reasons for not giving vitamin D
Fig 3: Reasons for not giving Vitamin D.

When questioning about the source of information about vitamin D, (169) (44.13%) of them the source was health staff, (147) (38.38%) was friends, while only (14) (3.66%) was the social media. Fig.4.



Source of information
Fig 4: Distribution of source of information.

There was a significant relationship between knowledge about vitamin D supplement and young aged mothers, as (84) (43.0%) of mothers aged 14-25 years had fair knowledge. In addition, there was a significant relationship between mothers' source of information

about vitamin D and knowledge as (78) (46.1%) those source of information from health staff had fair knowledge compared to (66) (44.8%), (6) (42.8%) and (15) (28.3%) from friends, social media and from both social media and health staff. (Table 3).

Table 3: Association between variables of mother and knowledge.

variables		knowledge			Total	P-value
		Poor	Fair	Good		
Age group(years)	14-25	37 (18.9%)	84(43.0%)	74(37.9%)	195(100%)	0.026
	26-35	54 (31.0%)	75(43.10%)	45(25.8%)	174(100%)	
	36-45	4 (28.5%)	7(50%)	3 (21.4%)	14(100%)	
Residence	Urban	85(29.7%)	116(40.5%)	85 (29.7%)	286(100%)	0.0001
	Rural	10(10.3%)	50(51.5%)	37 (38.1%)	97(100%)	
Occupation	Housewife	47 (18.5%)	117(46.2%)	89 (35.1%)	253(100%)	0.0001
	Employed	48 (36.9%)	49(37.6%)	33 (25.3%)	130(100%)	
	Illiterate	4 (7.4%)	31(57.4%)	19 (35.1%)	54(100%)	
Education	Primary	19 (15.8%)	53(44.1%)	48 (40.0%)	120(100%)	0.0001

	Secondary	41 (32.5%)	45(35.7%)	40 (31.7%)	126(100%)	
	High education	31 (37.3%)	37(44.5%)	15 (18.0%)	83(100%)	
	Good	32 (36.7%)	37(42.5%)	18 (20.6%)	87(100%)	0.0001
Socioeconomic	Fair	61 (24.0%)	99(38.9%)	94 (37.0%)	254(100%)	
	Poor	2 (4.7%)	30(71.4%)	10 (23.8%)	42(100%)	
Source of knowledge about vitamin D	Health staff	53 (31.3%)	78(46.1%)	38 (22.4%)	169(100%)	0.0001
	Friend	3 (2.0%)	66(44.8%)	78 (53.0%)	147(100%)	
	Social media	2 (14.2%)	6(42.8%)	6 (42.8%)	14(100%)	
	Health staff+ social media	37 (69.8%)	15(28.3%)	1 (1.88%)	53(100%)	

P-value ≤ 0.05 (significant).

There was a significant relationship between knowledge about vitamin D supplement and type of infants feeding, as (79) (50.3%) on mixed feeding their mothers had fair knowledge compared to (87) (38.4%) of infants on exclusive breast feeding. In addition, there was a significant relationship between mothers who given their infants vitamin D and knowledge as (93) (56.7%) of

mothers who given their infants vitamin D had fair knowledge compare to (85) (38.8%) of mothers who did not given their infants vitamin D. Whereas there was no significant relationship between infants age, reason of visit to PHCC and infants order in family with knowledge about vitamin D. (Table 4).

Table 4: Association between variables of infant and knowledge of mothers.

Variables	knowledge				P-value	
	Poor	Fair	Good	Total		
Age of infant (mo.)	1-3	45 (25.1%)	71(39.6%)	63 (35.1%)	179(100%)	0.49
	4-6	50(24.5%)	95(46.5%)	59 (28.9%)	204(100%)	
Reason of visit	Vaccine	66 (23.7%)	123(4.2%)	89(32.0%)	278 (100%)	0.26
	Seeking care	29 (27.6%)	43(40.9%)	33(31.4%)	105 (100%)	
Type of infant feeding	Mixed	20(12.7%)	79(50.3%)	58 (36.9%)	157(100%)	0.0001
	Exclusive breast feeding	75 (33.1%)	87(38.4%)	64(28.3%)	226 (100%)	
Infant order in family	3rd and less	79 (24.6%)	137(42.6%)	105(32.7%)	321(100%)	0.48
	More than 3	16 (25.8%)	29(46.7%)	17(27.4%)	62 (100%)	
Infants were given vitamin D	Yes	2 (1.21%)	93(56.7%)	69(42.0%)	164 (100%)	0.0001
	No	132 (60.2%)	85(38.8%)	2(0.91%)	219(100%)	

P-value ≤ 0.05 (significant).

DISCUSSION

Adequate level of vitamin D is important for proper bone growth and prevention of skeletal abnormalities. Neonatal vitamin D deficiency is associated with rickets, altered calcium metabolism, poor growth, early childhood tooth decay and asthma. Lower vitamin D levels have also recently been linked to an increased risk of acute lower respiratory tract infections including respiratory syncytial virus.^[15] The results of our study showed that (43.3%) of the participants had an adequate level of knowledge about vitamin D. which is compatible with a study about knowledge, attitude and practice of Iraqi mothers towards Vitamin D supplementation to their infants in Baghdad Al -Rusafa 2016 revealed that (41.5%) of the mothers attending primary health centers had fair knowledge.^[14] While in Saudi Arabia (60%) of mothers had a low level of knowledge about vitamin D supplementation to their infants.^[16] The difference in our

study from others study about the knowledge may be due to difference in knowledge questions about vitamin D and increase advertisements and education about the benefits, importance and symptoms of vitamin D deficiency, possible role of vitamin D in the treatment of COVID-19 patients may increase the knowledge and by increasing the access to the internet and social media in recent years. Regarding vitamin D supplementation practice in this study only (164) (42.82%) of the total participants (383) were giving their infants vitamin D drops, which is compatible to study done in Baghdad Al -Rusafa 2016 showed only (45%) of the total participants (400) were giving vitamin D drops to their infants.^[14] Similar poor vitamin D supplementation practices were reported among Muslim mothers and infants both in Ireland and Saudi Arabia, in 2015, where only (49.4%) of Ireland Muslim, mothers were given vitamin D to their infants, while it is much higher than in Saudi in which (13.2%) of Saudi Muslim, mothers were giving

their infants vitamin D drops.^[17] This difference from Saudi mothers related to increase knowledge raises concern among mothers regarding their infants need for vitamin D supplementations and improves their practice.

Regarding mothers who did not give vitamin D to their infants, this study showed that inadequate knowledge about proper supplement of vitamin D constitute more than half (55.25%), believed that breast milk is sufficient with vitamin D (30.14%) and dislike the supplementation (14.61%) lead to poor practice toward vitamin D. Worldwide mothers who did not give their infants vitamin D because not all health care practitioners recommend vitamin D supplementation after considering exclusive breast feeding and furthermore the parents noncompliance to supplementation is a widespread concern. In some cases, due to parental perception that their infant does not like the supplement.^[18] On the other hand, in this study (57.7%) were aware of the insufficiency of breast milk in vitamin D. In contrast to a study done in Baghdad Al -Rusafa 2016 showed that only 14.25% were aware of the insufficiency of breast milk in vitamin D.^[14] While in a Turkish study where 40% of Turkish mothers considered breastmilk to be a sufficient source of vitamin D.^[19] This difference in results might be due to improvement of knowledge that breast milk is the best food for the infant but it does not contain adequate amounts of vitamin D and hence adequate intake of vitamin D cannot be met with breast milk as the only source of vitamin D in exclusive breast feeding infants. Regarding Sun exposure, in this study (40.5%) of mothers believed that sun exposure can substitute vitamin D supplement which is compatible to study done in Baghdad Al -Rusafa 2016 showed that (39%) of mothers believed that sun exposure can substitute vitamin D supplement.^[14] Sun exposure is considered adequate for more than twice per week with the exposure of arms and legs, which is equivalent to 20-25% body surface area. Most of people had poor knowledge about the duration and surface area for sun exposure, also many did not have time due to their working. Regarding health benefits of vitamin D, the current study revealed that participants had a good level of knowledge regarding the benefits of vitamin D as (97.9%) were knowledgeable that vitamin D helps with bone growth and (55.4%) were knowledgeable that vitamin D helps with immunity, decrease rickets and asthma, which is compatible to Cairo study showed that (90.6%) were aware of the role of vitamin D in bone growth while a few percentage of mothers identified specific vitamin D non-bone related functions.^[20] It is not surprising that mothers were less knowledgeable on the relation between vitamin D and immunity, because these relations have been more recently identified within the last several years. These results were higher than what was found in a French study (78.1%).^[21] About sources of vitamin D in our study, (50.7%) of participants reported that sun exposure as the main source of vitamin D, (13.3%) of participants reported that food as the main source of vitamin D, (10.7%) of participants reported

supplement as the main source of vitamin D and only (3.4%) were aware about all sources of vitamin D (sun exposure, food and supplement). This is lower than the Cairo study in which the majority of mothers (84.1%) were aware of the sunrays as a source of vitamin D, (61.1%) of them reported food sources, and (17.1%) reported supplementation.^[20] These findings are similar to a study in Saudi Arabia, which found that most of the participants identified correctly the sun as a source of vitamin D (85%) while a minor percentage of participants identified specific correct food sources of vitamin D.^[22] In comparison to Baghdad where more than 60% are not aware of the nutritional sources of vitamin D.^[14] On the other hand, more than 40% of Turkish mothers were not aware of the nutritional sources of vitamin D.^[19] While in a French study, 72% of participants reported sun exposure as the main source of vitamin D and 50–60% of participants reported the right food sources like fatty fish.^[21]

CONCLUSION

Less than half of mothers had fair knowledge about vitamin D and the majority of the mothers who given vitamin D to their infants get advice from health staff followed by friends and then by social media. There was a significant relationship between mother's age, source of information about vitamin D, type of infants feeding and knowledge about vitamin D. There was no significant association between knowledge and residency, occupation, educational level, socioeconomic state of mothers, age of infant, infants order in family and reason for visiting PHCC.

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