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Annelerin Bebek Sağlığında D Vitamini Kullanımına İlişkin Bilgi ve Uygulamaları

Knowledge and Practices of Mothers Regarding Use of Vitamin D for Infant Health

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ÖZ

GİRİŞ: D vitamini yetersizliği dünya çapındaki nüfusun neredeyse % 50'sini etkilemektedir. Bebekler, hamileler ve yaşlılar bu durumdan en çok etkilenen gruplardır. Bu çalışmanın amacı, annelerin bebek sağlığı için D vitamini kullanımına ilişkin bilgi ve uygulamalarını incelemektir.

GEREÇ ve YÖNTEM: Bu tanımlayıcı çalışma, İzmir'de altı Aile Sağlığı Merkezi'nde gerçekleştirildi. Araştırma verileri araştırmacılar tarafından literatür doğrultusunda geliştirilen anket formu kullanılarak toplanmıştır. Anket formu aile sağlığı merkezlerine kayıtlı ve araştırmaya katılıma gönüllü olan 286 anneye uygulanmıştır.

BULGULAR: Annelerin %46,9'unun gebelikte D vitamini kullanımıyla ilgili eğitim aldığı ve bunlardan %30,1'inin eğitimlerini hemşire/ebeden aldığını belirlenmiştir. D vitamini kullanımı konusunda eğitim almış annelerin %88,1'inin gebelik süresince D vitamini desteği kullandığı, eğitim almayan annelerin ise %57,7'sinin gebelik süresince D vitamini desteği kullanmadığı tespit edildi (X^2=32,28, p<0,05). Ayrıca annelerin %87,8'sinin bebeklerine oral D vitamini desteği verdiği, %75,9'unun ise güneş ışınlarından yararlanmak için bebeklerini dışarı çıkardıkları bulundu.

SONUÇ: Annelerin bebek sağlığı ile D vitamini arasındaki ilişki üzerine bilgi düzeyi ve uygulamalarının yeterli olmadığı tespit edilmiştir. Sağlık profesyonelleri özellikle ebeler ve hemşireler, D vitamini kullanımına ilişkin annelerin ve bebeklerin sağlığını korumak ve iyileştirmek için anne ve bebek izlemlerini arttırmalı ve eğitim ve danışmanlık sağlamalıdır.

Anahtar kelimeler: D vitamini, D vitamini eksikliği, Bebek sağlığı, Annelerin bilgi ve uygulamaları

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SUMMARY

INTRODUCTION: Vitamin D insufficiency affects almost 50% of the population worldwide. The groups most affected by this situation are infants, pregnant women, and elderly people. This study examines the knowledge and practices of mothers regarding the use of vitamin D for infant health.

MATERİALS and METHODS: This descriptive study was conducted at six Family Health Centers in İzmir, Turkey. Data was collected using a questionnaire developed based on the literature by the researchers. The questionnaire was administered to 286 mothers who had registered to the centers and volunteered for participating in the study.

RESULTS: It was determined that 46.9% of the mothers received education on the use of vitamin D during pregnancy, with 30.1% of them stating that they received education from nurses or midwives. It was found that 88.1% of the mothers who had received education on the use of vitamin D used vitamin D supplements during their pregnancy, whereas 57.7% of the mothers who had not received any education did not use vitamin D supplements during their pregnancy ($X^2=32.28$, $p<0.05$). Furthermore, 87.8% of the mothers gave oral supplementations of vitamin D to their infants, whereas 75.9% of them put their babies outside to increase their exposure to sunlight.

CONCLUSIONS: The level of knowledge the mothers had on the relationship between infant health and vitamin D was not satisfactory. Health care professionals, especially midwives and nurses, should increase the monitoring of mothers and infants regarding use of vitamin D and provide education and counselling to protect and improve the health of mothers and infants.

Keywords: Vitamin D, Vitamin D deficiency, Infant health, Mothers' knowledge and practice

Introduction

Although it is known that vitamin D deficiency has negative impacts on musculoskeletal health, several research studies conducted in the last decade have shown that vitamin D can have significant ramifications for optimal growth, development, and health throughout the life cycle (1,2).

Vitamin D insufficiency affects almost 50% of the population worldwide (3). The high prevalence of vitamin D insufficiency is an important public health issue and an independent risk factor for total mortality in the general population (4,5). Due to its geographical location, there is sufficient sun exposure in Turkey, but among the Turkish population, the prevalence of vitamin D deficiency is higher in children and women (6). In a study conducted by Uçar et al. on this subject, a significantly high proportion of vitamin D deficiency (51.8%) and moderately high proportion of vitamin D insufficiency (20.7%) were reported (7). According to the results of the 'Program on Prevention of Vitamin D Deficiency and Improvement of Bone Health' launched by the Turkish Ministry of Health, it was found that in Turkey, 27.4% of infants and children and 82.1% of mothers had vitamin D deficiency, the findings of which indicate that Vitamin D deficiency is a significant health problem (8). Previous studies in different countries have shown that Vitamin D plays an essential role in calcium and phosphorus metabolism, the endocrine system; and in the prevention of many common, as well as serious diseases, including cancer, cardiovascular disease, inflammatory diseases, falls and fractures, autoimmune diseases, colds and flu, type 1 and type 2 diabetes, and depression (3,4,8,9).

The natural sources of vitamin D in breastfeeding infants are prenatal placental transfer, human milk, and sunlight exposure (10). Studies indicate that there is a close relationship between the vitamin D levels of the mothers and the concentration of vitamin D in breast milk (10–13). In view of this finding, maternal vitamin D insufficiency is the most critical risk factor for vitamin D deficiency in early infancy (10,14).

Vitamin D supplementation, particularly for infants, pregnant women, the elderly and nursing mothers, plays a significant role on a person's health. The World Health Organization (WHO) recommends a daily intake of 5 μg of Vitamin D for children and adults below the age of 50 (including pregnant and breastfeeding mothers), 10 μg for adults between the ages of 51 and 65, and 15 μg for individuals over 65 years of age (15). According to the Turkish Ministry of Health's Program on Prevention of Vitamin D Deficiency and Improvement of Bone Health, beginning from the first week, a daily dose of 400 IU (10 μg) of vitamin D is recommended for all infants (whether they are breastfeeding or formula feeding) for the entire first year of life, and preferably through three years. In addition, since 2011, the Turkish Ministry of Health has recommended vitamin D supplementation for all pregnant women at a dose of 1200 IU (30μg) /day starting from the 12th gestational week of pregnancy and up to the 6th month of the birth. Under the social security system in Turkey, vitamin D supplements are provided free of charge (16).

In studies, the analysis conducted on the knowledge and practices of mothers regarding vitamin D for infant health showed that their levels of knowledge and practices were not sufficient (1,17). Nurses, in their educative and consultative roles, should instruct mothers on the use of vitamin D to maintain and improve infant health. Nurses can be effective in ensuring the use of vitamin D in high-risk groups and thereby, increase the dissemination of its use throughout society.

Objective: The aim of the study was to determine the knowledge and practices of mothers regarding vitamin D supplementation and to identify the effective factors.

Materials and Methods

The research was conducted at six Family Health Centers in Bornova, Izmir between April 2015 and July 2015. The research population consisted of 1996 mothers, who were registered at a Family Health Center, with their babies aged 0-1. From this population, 286 mothers were randomly chosen by the stratified sampling method to form the research sample.

Data was collected through face-to-face communication with the women who visited the Family Health Center and agreed to participate in the research. During this communication, the mothers were asked to fill out a questionnaire form, which included questions on socio-demographic characteristics and the knowledge and practices regarding the use of Vitamin D, the latter part of which was prepared in accordance with the literature (10,18–21). Risks were calculated according to the potential risk factors of Vitamin D deficiency for infants, and infants whose risk factors were found to be higher than 50% were classified as the risky group. The level of knowledge the mothers had on Vitamin D supplementation was determined through their answers to the related questions. Data was analyzed using the SPSS software, with a significance level of α=0.05.

Ethical approval (EU-2015-48) to conduct the study was obtained by the Ege University School of Nursing Ethical Committee, and permission to collect data at the Family Health Centers was granted by the Public Health Directorate (604.02-725). The participants were informed about the study purpose and informed consent was obtained from all participants orally.

Results

Descriptive statistics and potential risk factors for vitamin D deficiency: The mean age of the 286 mothers was 29.10±5.26 (min.18-max.49). Analysis of the data collected showed that 60.9% of the mothers were at least high school graduates; 33.2% were employed; and 26.9% reported their income to be less than their expenses, while 65.7% reported their income as equal to their expenses. 54% of the infants were female and 46% were male; their mean age in months was 6.41±5.08; their mean weight was 7677±5600gr., and their mean height was 66.2±9.7 cm.; and 78.2% were born at term,

20.4% were preterm, and 1.4% post-term. Lastly, 14.7% of the mothers stated that their houses had no direct sunlight. The evaluation of the risks presented in Table 1 and Table 2 indicated that 26.9% of the infants were included in the risky group in terms of vitamin D deficiency.

Table 1. Risk factors for mothers which may cause vitamin D deficiency in infants (N: 286)

Variables		**N**	**%**
Personal and environmental risk factors	Dark skin tone	22	7.7
	Unplanned/unintended pregnancy	50	17.5
	Non-routine follow-up visits during pregnancy	7	2.4
	Lack of training on the importance of Vitamin D	152	53.1
	Low socio-economic status	77	26.9
	No sunlight in the house	42	14.7
Risk factors from practices	No vitamin D supplementation during pregnancy	79	27.6
	No routine outdoor exercising/walking during pregnancy	113	39.5
	No vitamin D supplementation during breastfeeding	186	65.0

Table 2. Risk factors for infants which may cause vitamin D deficiency (N: 286)

Variables		**N**	**%**
Personal risk Factors	Dark skin tone	7	2.4
	Delivery before 37 gestational week	58	20.3
Risk factors from practices	No vitamin D supplementation for infants	34	11.9
	No routine outdoor sun exposure for the baby	59	20.6

Findings on the level of mothers' knowledge

Analysis showed that 46.9% of the mothers received education on vitamin D supplementation during their pregnancy, with 30.1% having received the education from the nurse or midwife, and 49.7% of the mothers had learned they should give vitamin D supplements to their babies. Regarding the mothers' knowledge about vitamin D, 21.8% of the mothers (n: 72) knew all the sources of vitamin D, 78.3% knew sunlight to be a major source, 54.9% knew vitamins to be a major source, and 49.7% knew nutrients to be a major source. Only 1.8% of the mothers (n: 6) did not know anything about Vitamin D sources (Table 3), and 17.8% (n: 51) gave correct answers to the questions regarding all the health issues possibly caused by infants not getting enough vitamin D. The findings presented in Table 3 indicate that 70.6% of mothers had a lack of information on Vitamin D.

Table 3. Mothers' answers to the questions on vitamin D (N: 286)

Variables		N	%
What are the best sources of vitamin D? †	Nutrients	142	49.7
	Sunlight	224	78.3
	Vitamin D pills	157	54.9
	I don't know	6	1.8
Which foods contain the most vitamin D? †	Meat	95	33.2
	Milk	125	43.7
	Egg	96	33.6
	Fish	111	38.8
	Spinach	89	31.1
How long should you expose your child to the sun?	15 min.	98	34.3
	30 min.	111	38.8
	45 min.	27	9.4
	60 min.	41	14.3
Is there enough vitamin D in breast milk?	Yes	79	27.6
	No	199	69.6
	I don't know	8	2.8
How long should babies receive vitamin D drops?	1-6 months	47	16.4
	7-12 months	133	46.5
	13-18 months	3	1.0
	19-24 months	23	8.0
	I don't know	80	28.0
What happens when infants do not get enough vitamin D?	Delay in walking	132	46.2
	Delay in tooth eruption	120	42.0
	Delay in the closure of the fontanelle	155	54.2
	They frequently get sick	115	40.2
Is an overdose of vitamin D harmful for your infant?	Yes	189	66.1
	No	82	28.7
	I don't know	15	5.2
The risks of which potential diseases in the future decrease with the use of vitamin D supplementation for infants? †	Diabetes	60	21.0
	Hypertension	55	19.2
	Atherosclerosis	40	14.0
	Cancer	82	28.7
	Multiple sclerosis	56	19.6
	Bone fractures	217	75.9

† Multiple answers were given.

Findings on practices of mothers: It was found that 40.0% of the mothers used vitamin D drops, 21.3% used multivitamin tablets, so 71.3% used vitamin D in total during their pregnancy; 35.3% of the mothers regularly used vitamin D drops every day and 22% used 1200 IU/day of vitamin D drops; 22% of the mothers who preferred to use tablets used them regularly on a daily basis and of these, 18.5% of them took one tablet each day; 88.1% of the mothers who had received education on the use of vitamin D used vitamin D supplements during their pregnancy, whereas 57.7% of the mothers who had not received any education did not use vitamin D supplements during their pregnancy (X^2=32.28, $p<0.05$).

It was found that 87.8% of the mothers gave vitamin D supplementation to their babies, while 11.9% of them did not; 73.8% of the mothers who gave vitamin D preferred vitamin D drops and 15% preferred multivitamin syrups; 65.4% of the mothers regularly used vitamin drops each day and 52.4% used the drops in proper doses (400 IU); 14% of the mothers who used multivitamin syrups for their babies used them on a daily basis, with 56.1% giving their babies a dose of 5 ml/day (containing 400 IU vitamin D), and 43.9% giving them a dose of less than 5 ml; 42.8% of the mothers started to give vitamin D to their infants on the 15th day after birth.

Furthermore, 75.9% of the infants were exposed to the sun outdoors, with 16.1% of them being applied sunscreen, 60.8% wearing a hat and 23.4% wearing gloves before the sun exposure; and lastly, 53.8% of the infants were exposed to the sun outside between 10 a.m. and 4 p.m. The mean age up to which infants are exclusively breastfeed is 4.8 months, after which–i.e. the fifth month on average – the breast milk is complemented with foods.

Discussion

This study has aimed to determine the knowledge and practices of mothers regarding the use of vitamin D for infant health and to identify the factors that may be effective on Vitamin D supplementation. Recent studies have shown a high prevalence of vitamin D deficiency, even in sun-rich countries, like China, Turkey, India, Iran and Saudi Arabia (1,7,22–27).

People with naturally dark skin tones have natural sun protection and therefore require at least three to five times longer exposure to the sun to produce the same amount of vitamin D as people with white skin tones (28). Different studies in the literature have shown the relationship between dark skin tones and vitamin D deficiency/insufficiency (25,27,29). In this study, both the mothers and the infants had low levels of dark skin tones. A study titled, Anthropological Characteristics of Turkish People, revealed that more than half of the Turkish population had white-light skin (30) and therefore, given the relationship between skin color and vitamin D deficiency, they were in an advantageous situation. Some studies have indicated low socioeconomic status to be a risk factor for vitamin D deficiency

(22,24,25). In this study, almost one- third of the mothers had this risk, in terms of Vitamin D deficiency.

Kearney et al. (2015) found that only 7.4% of the Saudi mothers and 29.6% of the Irish mothers had taken Vitamin D supplements during their pregnancy (1). The prevalence of vitamin D supplementation during pregnancy was higher in this study compared to that reported in other studies. This could be related to the free-of-charge delivery of vitamin D during pregnancy by the Turkish Ministry of Health. In addition, in this study, vitamin D supplementation was higher in the mothers who had received education on the use of vitamin D during pregnancy, the results of which decreased the risk of vitamin D deficiency/insufficiency.

It was reported that a majority of mothers (63.1% - 82%) did not take vitamin D supplementation during brestfeeding period (17,24). In this study, it was similarly found that a majority of the breastfeeding mothers (65%) did not use vitamin D. It is particularly remarkable that although vitamin D supplementation was shown to be higher during pregnancy, most of the nursing mothers did not take any vitamin D supplementation during the breastfeeding period but only gave their babies daily supplements of vitamin D. Similar to the literature (1), this study found that the mothers-to-be did get enough sunshine for vitamin D while pregnant.

In this study, the mothers were asked whether they gave vitamin D supplementation to their infants, and if so, then the dosage and the starting time. Research findings suggest that almost all mothers give vitamin D supplements to their infants, and four out of every ten mothers start to give vitamin D on the 15th day of the baby's life. Seven out of every ten mothers who give vitamin D supplements to their infants give vitamin D on a daily basis, but only half of them use the proper dose.

Certain studies have reported that while the vitamin D supplementation mothers give to their infants is at good levels, the percentage of mothers who give proper doses is very low (17,31). Al Marzooqi et al. (2016) reported a higher proportion of mothers who started to give vitamin D supplementation to their infants at the correct time than that found in this study (17). A study by Tarrant et al. (2011) found that only 4.4% of infants had received vitamin D drops (32). This lower rate can be attributed to the study having been conducted between 2004 and 2006, when there was no call from international organizations nor any policy implementation regarding the recommendation of vitamin D supplements for infants in the first year of life.

Sunscreen applications and wearing clothes covering the skin are among the negative factors affecting the intake of vitamin D for infants (27,28). It has been stated that wearing a sunscreen with a sun protection factor of 30 reduces vitamin D synthesis in the skin by more than 95% (28). The present study found that three out of four infants sunbathed outside for the intake of vitamin D, and that half of them were exposed to sunlight during the recommended time slice (10.00-16.00). However, only two out of ten infants wore sunscreen and a majority wore hats (60.8%) and gloves (23.4%) before going outside. Therefore, although the mothers put their babies in direct sunlight

outside within the correct time slice, they nonetheless practiced habits that increase the risk of vitamin D deficiency (i.e. wearing sunscreen, hat or gloves).

Low intake of breast milk is another risk factor for vitamin D deficiency/insufficiency for infants (10,12,14). The World Health Organization recommends mothers to exclusively breastfeed infants for the child's first six months (33). In this study, the average breastfeeding time was almost six months. As longer breastfeeding duration is associated with various benefits for infants, including reducing the risk of vitamin D deficiency, it is very important that nurses serve as lactation consultants and follow up on mothers.

Results from the question on the mothers' source of knowledge on giving vitamin D supplementation showed that this knowledge was derived largely from nurses/midwives (49.7%), followed by doctors (1,17). These results reveal that the nurses/midwives who work in the institutions where the research was conducted perform their consultative and educative roles well.

In response to the question on the best vitamin D resources, a majority of the mothers answered sun light (78.3%); other studies too have indicated that sunlight is the most known vitamin D source (17,34). Only two out of ten mothers knew all the vitamin D resources. As it is important to improve the level of knowledge mothers have on vitamin D resources, healthcare professionals should explain that in addition to the primary source of vitamin D, sunlight, there are other sources, like vitamin D enriched foods and vitamin D supplements, to name a couple.

The American Academy of Pediatrics recommends vitamin D supplementation for infants during the first year of life (13). Almost half of the mothers believed that they should give vitamin D supplements to their babies for 7-12 months, a finding indicative of the lack of knowledge the mothers had regarding how long they should give vitamin D supplements to their babies.

In a study by Al Marzooqi et al. (2016), mothers were asked about the consequences of vitamin D deficiency, and only a limited number (10.6%) were able to give the correct answer (17). In this study, the number of mothers who were able to correctly identify all the potential health problems was low (17.8%). Overall, the results suggest that the mothers' level of knowledge about the potential negative outcomes of vitamin D deficiency is poor. It is believed that if mothers understand the potential health problems that can arise from vitamin D deficiency in infants, there will be a greater number who give vitamin D supplementation for infants. Therefore, education programs and/or consultative sessions that aim to increase vitamin D awareness should include this issue as well.

Breast milk usually contains much less vitamin D, having values of 20 IU per liter, and infants born to mothers who have a deficiency of vitamin D take much less than this amount (35). Almost three-quarters of the mothers who participated in this research stated that breast milk did not contain enough vitamin D for infants. In addition, a majority of the mothers (66.1%) thought that excessive vitamin D may be harmful for their babies. Considering that the mothers mostly gave correct answers to these two questions, it can be said that they have adequate knowledge on that matter.

Studies have shown that mothers are mainly aware that vitamin D supplementation during infancy can help to prevent musculoskeletal diseases (1,17). In this study, three of four mothers stated that vitamin D supplementation in infancy mitigated the risk of children getting bone fractures later in their lives. However, only three of ten mothers knew that vitamin D supplementation had preventive effects for various chronic diseases, such as cancer, diabetes, and multiple sclerosis. Research findings suggest that mothers understand the general benefits of vitamin D but lack adequate information on the more recently identified benefits of vitamin D. It has been reported in research analyzing the factors affecting the use of vitamin D during pregnancy that ethnicity, distance of the health institution from the place of residence, the monogamy of the mother, and education level are related factors (17,31,34). This study found that mothers who had received education on the use of vitamin D used Vitamin D supplementation at a higher rate than that of the mothers who had not received education. To conclude, seven out of every ten mothers who participated in this study have a lack of knowledge on vitamin D. Three out of every ten infants in the study are at risk of vitamin D deficiency.

Conclusion and suggestions: The level of knowledge of mothers regarding the use of Vitamin D supplementation for infant health is low. The use of vitamin D supplementation was low in the lactating mothers, but the mothers' provision of vitamin D supplementation to their babies was high during infancy. It is important that the right attitudes be developed in mothers to help ensure that they start and maintain vitamin D supplementation, with proper doses and frequencies, for their babies. Physicians, public health nurses, midwives, gynecologists and nurses who frequently communicate with mothers during the pregnancy and postpartum period should take the responsibility to improve the knowledge and the awareness of mothers on the importance of vitamin D for infant health. To protect and improve the health of mothers and infants, it is important that healthcare professionals follow the mothers' practices on the use of vitamin D and correct any wrong practices through education and counselling. Although in this study it was determined that the mothers largely received information regarding the use of vitamin D from nurses, there are several studies that have indicated mothers considerably use radio, television and the Internet as information sources. Therefore, the use of media and the development of national policies can be recommended to raise social awareness on this issue.

Limitations and strengths: While the questionnaire included questions on the pregnancy and the postpartum period to help the mothers recall previous practices, the time passed still may have contributed to the possibility of incomplete/wrong information be given by the mothers. The development of a data triangle by collecting data from various institutions can be considered as one of the strong features of this study. Further, although studies to determine serum vitamin D levels in different age groups have increased in recent years, in the literature review, no study was found on the knowledge and practices of mothers regarding vitamin D supplementation. This study is the first to analyze these variables in terms of the importance of vitamin D supplementation on infant health in Turkey.

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