



Knowledge and Attitude among Doctors and pharmacists towards Use of Prophylactic Vitamin K in Neonates

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ABSTRACT

Background :

Neonates are vulnerable to fatal vitamin K-deficient hemorrhage. This is easily avoidable with prophylactic vitamin K after delivery. Most vitamin K-deficiency bleeding occurs in children whose parents refuse infant vitamin K. Information from health professionals is one aspect that influences parental decision-making. This study looked at the attitudes and views of key healthcare professionals concerning infant vitamin K .

Methods :

A descriptive cross-sectional study including sixty-six randomly chosen pharmacists and 41 doctors was carried out in March and April of 2023. The availability and adherence to the Use of Prophylactic Vitamin K in Neonates guidelines, as well as parent counseling, were the focus of an interview-based questionnaire used to gather data. Tables were created after data analysis .

Results :

All doctors and 76% of pharmacists agreed with the current Health vitamin K suggestion, according to the poll results. All doctors agree that all babies should be given vitamin K, yet just 55% of pharmacists agree. There were significant differences amongst professions in terms of vitamin K education and risk.

Conclusion:

This study is being conducted to investigate pharmacists' and doctors' attitudes and perceptions of vitamin K prophylaxis in newborns. There are significant differences in attitude, and some pharmacists lack confidence in this intervention. It is unclear how this would affect family education. A better knowledge of this phenomenon, as well as enhanced education and communication with professionals and families, is essential.

Keyword: vitamin K deficiency bleeding, neonatology; vitamin K; prophylaxis vitamin K deficiency

INTRODUCTION

There is a growing demand for higher performance and high reliable heat dissipation mechanisms for electronic devices, which are required. Traditional scaling of heat sinks through for a specific geometry on micro-channels had been employed by many manufacturers. The term "vitamin K" refers to fat-soluble vitamins with comparable structural characteristics. in food and are also offered as dietary supplements. The term "vitamin K" describes a group of chemical substances. They are structurally whereas they differ in the length and saturation of the carbon tail, they are similar in that they share a quinone ring. as well as the number of side chain repeating isoprene units (figure 1). Vitamin K is mostly found in plant sources. Animal-derived foods are high in vitamin K. Vitamin K has various functions: it is an important nutrient that is absorbed from food, it is a product that is produced and marketed as part of a multivitamin It is a prescription medication for specific purposes and is sold as a single vitamin dietary supplement (Marriot et al., 2020).

Vitamin K1 is mostly derived from plants, particularly leafy green vegetables. Animal-sourced foods provide a little quantity. Vitamin K2 is mostly obtained from animal sources, with chicken and eggs being far superior to beef, pork, or fish. One exception is a product created from bacteria-fermented soybeans. It is a reliable source of vitamin K variation MK-7, which is produced by bacteria (Tarvainen et al., 2019).

In humans, vitamin K production in the colon supplies a considerable source of this vitamin. The colon contains a significant reservoir of bacterial vitamin K (2 mg), but it is now clear that this pool represents only about 10% of normal human requirements and is thus insufficient to meet these needs. Furthermore, there is some indication that this intestinal source of vitamin K has low absorption. Bile salts are required for adequate vitamin K absorption but are not available in the colon, and intestinal production of vitamin K is insufficient to compensate for biliary blockage shortage. Furthermore, intestinal menaquinones are encased within bacterial membranes and hence poorly (Lippi&Franchini, 2011) (Sutor et al., 1999) (Puckett et al., 1996).

Vitamin K is crucial for the formation of coagulation factors II, VII, IX, and X, as well as proteins C, S, and Z, which are all necessary for controlling blood coagulation (Lippi&Franchini, 2011)(American Academy of Pediatrics Committee on Fetus and Newborn 2010).A variety of elements raise the possibility of newborn vitamin K deficiency: Due to relatively poor placental transport of vitamin K, immature gut microflora that cannot yet produce enough vitamin K, low intake, and low levels of vitamin K in breast milk regardless of maternal diet, vitamin K stores at birth are limited. (Lippi&Franchini, 2011) (Mckinney et al., 1998) Vitamin K deficiency bleeding (VKDB) is the most significant effect of vitamin K insufficiency on the neonate. This can manifest itself in the first few hours to weeks of life as spontaneous bleeding or bruising (Lippi&Franchini, 2011)(Sutor et al., 1999) (Puckett et al., 1996). The majority of the time, this is very little mucocutaneous or gastrointestinal bleeding, but occasionally, this can occur before catastrophic and/or fatal hemorrhage (Lippi&Franchini, 2011) (Sutor et al., 1999) (Puckett et al., 1996) (Mckinney et al., 1998). There is a consensus statement framework that has been designed to stop VKDB

from happening in other nations (Puckett et al., 1996). The main recommendations are that all newborns receive vitamin K prophylaxis and that a 1 mg intramuscular injection is preferable due to concerns with administration reliability and compliance. VKDB is uncommon in this situation; the frequency is 1 in 100,000 live births, and the risk can reach 1 in 15,000 in the absence of vitamin K (Suttie & Nelsestuen 1980). When cases do occur, they are always limited to newborns who are not given vitamin K, with the majority occurring in infants whose parents refuse to give their assent (Mihatsch et al., 2016). However, one aspect of healthcare professionals' personal beliefs that may affect parents' decision-making is their advice. The purpose of this study was to ascertain how healthcare practitioners regularly engaging with parents during the neonatal period felt about newborn vitamin K prophylaxis.

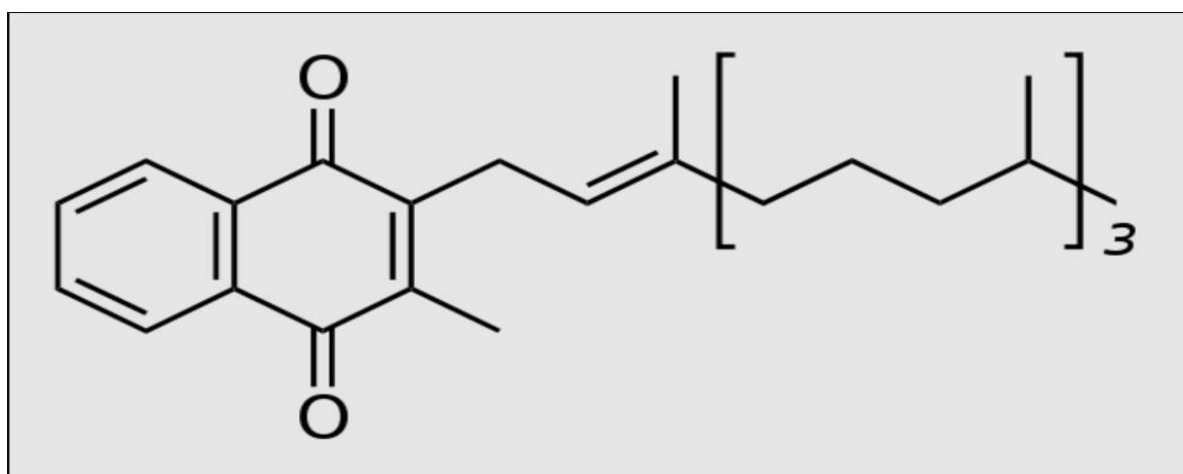


Figure 1 structure of vitamin K

The mechanism of action :

By inhibiting the enzyme vitamin K epoxide reductase, which enables the inactive vitamin K epoxide to be recycled back into the active reduced form of vitamin K, these drugs deplete the active form of the vitamin. The drugs act as competitive inhibitors of the enzyme and have a structure similar to vitamin K. The term "vitamin K antagonist" is inaccurate because the drugs actually promote vitamin K recycling rather than directly opposing vitamin K action in a pharmacological sense (Doherty et al., 2017) (Britt & Broen 2018).

Uses :

Babies receive a vitamin K injection to stop hemorrhage caused by a vitamin K deficiency. Newborn blood clotting factors are 30–60% of adult values; this appears to be caused by insufficient vitamin transfer through the placenta, which results in low fetal plasma vitamin K levels. The prevalence of vitamin K deficiency hemorrhage in the first week of life is estimated to be 0.25–1.7%, with 2–10 occurrences per 100,000 newborns. Human milk contains 0.85–9.2 g/L of vitamin K1 (median 2.5 g/L), whereas infant formula contains 24–175 g/L. Exclusive breastfeeding can induce late-onset bleeding, which can occur 2 to 12 weeks after birth, especially if no preventative medicine was provided. In infants who did not get prophylaxis at or immediately after delivery, the prevalence of late onset was reported to be 35 cases per 100,000 live births. Asians are more likely than Caucasians to

suffer from vitamin K deficient hemorrhage. Infancy bleeding caused by vitamin K insufficiency can be severe, resulting in hospitalization, brain damage, and death. Intramuscular injection, often given shortly after birth, is more successful than oral medication, which requires weekly dosage, in preventing vitamin K deficient hemorrhage (Britt& Broen 2018).

Managing warfarin therapy :

Warfarin is an anticoagulant medication. It works by blocking an enzyme that is in charge of recycling vitamin K into a functional state. As a result, proteins that should be changed by vitamin K are not, including proteins required for blood clotting, and are thus inactive. The drug's goal is to lower the chance of unintentional blood clotting, which can have detrimental, even fatal, effects. Warfarin's optimal anticoagulant effect depends on both the drug's dosage and vitamin K intake. Dosing must be monitored and customized for each patient due to variations in the drug's absorption and levels of vitamin K in the diet. The medical advice is to completely avoid some foods that are high in vitamin K (for instance, collard greens, spinach, and turnip greens), and to consume foods with moderately high vitamin contents as consistently as you can in order to keep the anticlotting activity of warfarin within the therapeutic range (Passmore et al., 1998).

Side effects :

High oral doses are not known to be harmful, hence regulatory agencies from the US, Japan, and the EU agree that no tolerated upper intake thresholds need to be established. When administered intravenously, vitamin K has been linked to serious side effects such as bronchospasm and cardiac arrest. A nonimmune-mediated anaphylactoid reaction, with a frequency of 3 per 10,000 treatments, is how the reaction is described. When polyoxymethylene castor oil was utilized as the solubilizing agent, the majority of reactions occurred (Ansell et al., 2001)

Materials and Methods

In this study, 107 randomly selected participants were conducted in the Children's Teaching Hospital in Karbala. The data was processed and displayed in tables 1 and 2. Individuals were given the option to decline participation in the survey prior to taking part in it. Participation in this study was fully voluntary, without pressure, and without remuneration. As part of the questionnaire, participants supplied informed, written consent. Anonymity and confidentiality were maintained throughout the trial. All data was recorded in a protected file, and only the researchers in charge of the questionnaire had access to it .

Study design :

This was a descriptive, cross-sectional web-based survey conducted using a quantitative technique between -March and April-2023 .

Three methods were used to inform the survey's content:

- 1- To discover publications that were pertinent to the study of the literature and that were published between 2018 and 2023, a MEDLINE search was conducted using the following keywords or phrases: vitamin K, vitamin K deficient bleeding, neonate, vitamin K prophylaxis, and hemorrhage.

- 2- The interviews employed an open-questioning method while also covering the following three topics: perspectives on current guidelines, adherence to current guidelines, and implementation challenges. The same interviewer (SG), who conducted all of the interviews, was used .
- 3- Follow-up open discussions with medical professionals and pharmacists

Data analysis :

Survey responses were transferred from paper form and Google Forms to 2020 (Microsoft Excel) for cleaning and coding. The cleaned data were then imported into IBM SPSS Statistics for Windows, version 25, for analysis. The numerical data were summarized using percentages. The median (interquartile range) for both parametric and non-parametric data was employed. Data in categories were gathered. The data were compiled using frequency and proportions. Chi-square tests were performed to analyze relationships between independent factors and dependent variables, and logistic regression analysis was utilized to assess the variables. Statistics were judged significant at $p < 0.05$.

RESULTS AND DISCUSSION

In total 107 doctors and pharmacists were approached. Table 1 the basic demographics of the survey

Table (1) basic demographics data

		Pharmacists n (%)	Doctors n (%)
Age	21-30	6 (7.8)	6(11.9)
	31-40	12(17.2)	9(19)
	41-50	25(37.5)	13(29.3)
	51-60	18(26.6)	10(21.4)
	≥61	8(10.9)	8(16.7)
Years of experience	< years	16 (23.4)	8(16.7)
	7-12 years	17(25.0)	18(33.3)
	13-17 years	12 (17.2)	8(16.7)
	>17 years	23(24.4)	15(33.3)

Awareness\education:

Overall, 52.3% (56/107) participants were aware of the Ministry of Health (MOH) recommendation for vitamin K in infants, including 27.2% (18/66) of pharmacists and 95.1% (38/41) of physicians. Out of them, 29 pharmacists and 39 doctors (43.9% and 95.1%, respectively) agreed or strongly agreed with the recommendation. 51.1% (48/94) of the respondents said MOH professional education regarding the vitamin K guideline needed

improving, and 59.6% (56/94) thought education for prospective parents needed upgrading. For all descriptive analyses, M SPSS Statistics for Windows, Version 20.0 software was utilized (table 2)

Results in table 2 also showed that When participants were asked how crucial it was that newborns obtain vitamin K supplements, 95.1% (39/41) of doctors and 27.2% (18/66) of pharmacists rated it as crucial or significant. When asked which method of vitamin K administration should be used when it is given prophylactically to neonates, 28 pharmacists and 40 doctors (97.5%) all said intramuscular injection. when questioned about the prophylactic vitamin K dose provided to babies. 38 doctors (92.7%) and 26 pharmacists (39%) provided the accurate response. 95.1% (39/41) of doctors and 43.9% (29/64) of pharmacists responded that all babies should receive vitamin prophylaxis when asked which babies should have it .

Only infants who are "at risk" should receive prophylaxis, according to 56.1% of the remaining pharmacists (29/64); popular clarifications were prematurity, instrumental/surgical birth, and bleeding disease. 100% (40/41) of doctors and 69.6% (46/66) of pharmacists said they would administer vitamins to a newborn if they were to have one or more children. Of the pharmacists who refused to administer vitamin K, 30% (46/66) were unsure. The response "encourage mothers to eat vitamin K-rich foods" showed the highest difference between doctors and pharmacists, with 56.9% (37/66) of pharmacists declaring they would do this compared to only 2.4% (1/41) of doctors (table 2).

Table (2) Concerns from the profession regarding vitamin K prophylaxis

Possible responses	Total (n=107)	Doctors (n=41)	Pharmacist (n=66)	P. value
The indication and importance of vitamin K prophylaxis	(46.7%)50	(95.1%)39	(27.2%)18	<0.01
The route of administration of vitamin K when it is given prophylactically for newborns.	(63.5%)68	(97.5%)40	(42.4%)28	<0.001
The dose of vitamin K is given prophylactically in newborns.	(62.6%)67	(92.7%)38	(39 %)26	<0.001
In Iraq, all newborns are getting vitamin K shots.	(36.7%) 8	(95.1%)39	(43.9%)29	<0.001
It is necessary to improve professional education on vitamin K prophylaxis.	48	(58%)24	(36.3%)20	0.03
Future parents' education must be improved.	56	(65.8%)27	(43.9%)29	0.05

Prophylaxis may be associated with cancer.	2	0	(3%)2	0.51
Another potential hazard related with prophylaxis.	10	(2.4%)1	(13.6%)9	0.08
Would you give vitamin to your baby?	87	(100%)41	(69.6%)46	<0.01

Another study suggested that gabapentin may modulate blood pressure and heart rate via centrally located NOS (nitric oxide synthase) in the NTS (**n**ucleus **t**actus **s**olitair centrally located in the dorsal medulla of the brainstem). These findings suggest new insights into the regulation of BP by the central nervous system and may be of help for further developing therapy for cardiovascular diseases (Britt & Brown 2018). Also in a case study, patient peripheral edema developed on 14th day of treatment with 300 mg/day pregabalin. Since no other chronic disease history and medication were present to explain the peripheral edema, pregabalin was initially held responsible and stopped to use. Due to the existing postoperative story of the patient, we did not associate dyspnea with this picture initially. Upon the lack of an abnormality in hemodynamic parameters and kidney function tests, and the regression in peripheral edema, we did not require further examinations or treatment. However, the thorax CT led to the conclusion that pregabalin causes central as well as peripheral edema (Passmore et al., 1998).

DISCUSSION

In conclusion, there is not any adverse effects of Gabapentin 300 mg/day regarding the Histology of The Heart of the white male rats. This study examines at how doctors and pharmacists feel about giving newborns vitamin K prophylaxis. Some of the pharmacists, however, advocated vitamin K prophylaxis for everyone, and most of the remaining pharmacists were more inclined to advise use in particular situations, such as difficult, interventionist, or traumatic deliveries. Some of the inconsistencies between pharmacy and medical opinions may be both explained by and reflected in these differences between the documents. Many people also emphasized the difficulties they had in communicating with professionals about the MOH recommendations. This might potentially be causing disparities in practice and attitude, and it might also be causing the polarized nature of pharmacists' replies .

The issues surrounding the administration of vitamin K vary different professional groups. Medical professionals' main concern is that some neonates are deficient in vitamin K. One-third of pharmacists agreed with medical opinions, but many expressed worries about safety and potentially harmful future health effects that are currently unknown. Nearly a quarter of respondents think that providing vitamin K interferes with a natural process. Additionally, 69.6% (46/66) of pharmacists approved theoretical vitamin K administration to their own future offspring, compared to 100% (41/41) of doctors. Once more, these characteristics draw attention to significant variations in professionals' confidence in this intervention Two pharmacists in this poll expressed this worry, and it was occasionally brought up in the first thorough interview. These concerns have been thoroughly discussed and debunked

elsewhere (Klebanoff et al., 1993) (Olsen et al., 1994) (Ansell et al., 1996) (Golding et al., 1992). There might also be additional philosophical distinctions. It is unknown what causes the views of doctors and pharmacists to differ in this way. These opinions might reflect earlier cancer-related conflicts, according to one interpretation (Ansell et al., 1996) (Golding et al., 1992). They are more likely to support healthy births and have relationships to the community. In contrast, hospital-based medical involvement is more likely to include complicated and high-risk deliveries. Despite the widespread agreement that pharmacists play a crucial role in educating families about neonatal vitamin K, our study reveals a number of attitudes, educational backgrounds, and professional practices that differ between pharmacists and doctors. This is significant because each of these experts plays a complementary role in informing and guiding families about public health initiatives throughout the neonatal period. The application of stated policy may be impacted by the expertise of different team members. A study from the United Kingdom that shows the vast variations in clinical practice about newborn vitamin K emphasizes this point (Doherty et al., 2017). There is a difference in opinion between pharmacists and physicians over which newborns should get vitamin K. The medical team in this trial accepted this technique without exception. Contrary to the current New MOH recommendations, which indicate that all infants should get vitamin K prophylaxis, is this viewpoint (Puckett et al., 1996) (Strehle et al., 2010).

All participants in this study came from the Children's Teaching Hospital in Karbala. The opinions of all physicians and pharmacists in the country may not be reflected in these results. To see whether these viewpoints are more common, future studies may concentrate on other regions and nations. Furthermore, only one-half of the decision-making team is examined in this study; subsequent research should look into additional factors that influence parents' choices in order to completely comprehend and improve vitamin K prophylactic uptake. Finally, this study will look at how relevant healthcare professionals feel about vitamin K prophylaxis in newborns. We point out significant attitude differences between and within doctors and pharmacists. Particularly among certain pharmacists, there seems to be a lack of trust and faith in this public health initiative. Unknown is how this will impact families' access to schooling. It is necessary to have a better knowledge of these attitudes, as well as better professional education and communication on newborn vitamin K prophylaxis.

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