



Midwives' Perspectives about Vitamin K Prophylaxis Against Vitamin K Deficiency Bleeding of the Newborn

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Accepted: 10 March 2022 / Published online: 12 May 2022

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Abstract

Background The American Academy of Pediatrics recommends one intramuscular (IM) vitamin K injection at birth to prevent Vitamin K Deficiency Bleeding of the Newborn (VKDB). Among factors associated with IM vitamin K refusal, investigators have reported an increased frequency of IM vitamin K refusal among parents who select midwife-assisted deliveries. Reasons behind this association are unclear.

Methods To understand the perspectives of midwives on IM vitamin K prophylaxis and approach to counseling parents using qualitative methodology, we conducted in-depth semi-structured interviews of midwives associated with 3 tertiary academic medical centers and surrounding communities in Connecticut, Iowa and Michigan. We used the grounded theory approach and the constant comparative method until saturation was reached.

Results We interviewed 19 white female midwives from different training pathways. Participants who were Certified Nurse Midwives (CNMs) routinely recommended IM vitamin K prophylaxis and Certified Professional Midwives (CPMs) took a more neutral approach. The following 4 themes emerged: (1) Emphasis on an educational approach to counseling that supports parents' decision-making authority; (2) Low-intervention philosophy in the midwifery model of care attracts certain parents; (3) Need for relationship building between midwives and pediatricians and (4) Opportunities for the future.

Conclusions Midwives in our study perceived that the midwifery model of care, the focus on physiologic birth and prioritizing parents' decision-making autonomy appears to attract a sub-set of expectant parents with certain belief systems who question interventions such as IM vitamin K prophylaxis. There are opportunities for better collaboration between midwives and pediatricians.

Keywords Vitamin K in newborns · Midwives' · Perspectives · Qualitative study

Significance

What's known on this Subject: There are reports in the literature that vitamin K refusal among parents of newborns is associated with midwife-assisted deliveries. Reasons for this association are unknown.

What this Study Adds: Our study findings suggest that association of midwife-assisted deliveries and vitamin K refusal by parents of newborns may be due to parents with specific beliefs seeking low-intervention who are attracted by the midwifery model of care.

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Introduction

Newborns have low reserves of vitamin K, putting them at risk of vitamin K deficiency bleeding of the newborn (VKDB), a serious and potentially life-threatening but preventable condition (AAP 2019; AAP 2003). VKDB may present in the first week of life (classic VKDB) with bleeding from the gastrointestinal tract and/or from the umbilicus or after circumcision. Late VKDB typically presents between 2 and 12 weeks of life, but cases occurring through 6 months of age have been reported, and infants may present with intracranial bleeding.² A one-time, prophylactic intramuscular (IM) injection of vitamin K administered shortly after birth, recommended by the American Academy of Pediatrics (AAP) since 1961, had virtually eliminated VKDB in the United States (US) (AAP 2003; Loyal and Shapiro 2020).

In 2019, the AAP listed public education about IM vitamin K administration at birth as one of their top ten public health priorities, in part due to an increase in the number of reports of parents who refuse IM vitamin K for their newborn and a concomitant increase in reports of newborns with VKDB in recent years in both the US and other countries (AAP 2019; AAP 2003; Loyal and Shapiro 2020). The frequency of IM vitamin K refusal in a national network of well newborn units in the US was 0.6% (range 0–2.3%) and refusal rates are higher in birthing centers and out of hospital births (Loyal and Shapiro 2020).

Oral vitamin K is used in some countries to prevent VKDB but is less effective than IM vitamin K particularly with late onset VKDB (AAP 2022). There are multiple oral regimens and there are concerns about parental compliance and oral drug absorption (AAP 2022). In 2022, the AAP reiterated their recommendation to administer IM vitamin K within 6 h of birth (AAP 2022).

Parents who refuse IM vitamin K tend to refuse other preventive measures, including hepatitis B vaccine at birth, prophylaxis against gonococcal ophthalmia and subsequent routine vaccinations (Sahni et al. 2014; Loyal et al. 2018). In one study, mothers who refuse IM vitamin K are more likely to be white, 30 years of age or older, college graduates and/or breastfeeding (Hamrick et al. 2016). Investigators from Canada, New Zealand and the US, also found that refusal of IM vitamin K was significantly associated with planned home births, deliveries in birthing centers and midwife-assisted deliveries (Sahni et al. 2014; Hamrick et al. 2016; Burke et al. 2015; Marcewicz et al. 2017). In a survey exploring attitudes and perceptions towards vitamin K prophylaxis in New Zealand, investigators found that only 55% of midwives surveyed felt that all babies should receive vitamin K compared with 100% of medical staff (Gosai et al. 2014).

In 2017, 9.1% of total births in the US were attended by a Certified Nurse Midwife (CNM) or Certified Midwife (CM) (ACNM 2019). Most out-of-hospital births are attended by midwives (ACNM 2019). An estimated 35,000 births (0.9%) per year occur in the home and the percent of out-of-hospital births in the US, is increasing (1.3% in 2011 to 1.4% in 2012) (ACOG 2017; MacDorman et al. 2014). In the US, there are several pathways to midwifery education and training and 4 main distinctions: CNMs, CMs, Certified Professional Midwives (CPMs) and traditional or direct-entry midwives (sometimes referred to as “lay” midwives).¹³ Most US, midwives are CNMs and are trained in both nursing and midwifery. CNMs have prescriptive authority in all 50 US states and can care for newborns up to 28 days of age (ACNM 2017). CMs have similar training to CNMs, observe the same standards as CNMs, but are not required to have the nursing component. The CM

credential is not recognized in all US states (ACNM 2012). CPM education and clinical training focuses on providing midwifery model care in homes and freestanding birth centers (ACNM 2017). According to one 2008 estimate, at least 1 in 9 (~ 11%) of all nationally certified midwives in the US are CPMs (Issue Brief 2008). Traditional midwives choose not to become certified or licensed and generally attend out of hospital births (ACNM 2017).

There is limited information about midwives’ perspectives about IM vitamin K prophylaxis in the US. We hypothesize that perspectives on IM vitamin K prophylaxis may differ between midwife groups with different training pathways. We expect that CNMs affiliated with academic medical centers are more likely to endorse IM vitamin K prophylaxis. Therefore, we chose a qualitative approach to better understand the counseling process and perspectives of midwives in the US, about IM vitamin prophylaxis against VKDB. We used established standards for reporting of qualitative studies to describe our findings (O’Brien et al. 2014; Tong et al. 2007).

Methods

Research team: All authors (JL, PD and KW) are pediatricians and conducted interviews at their respective institutions. Each member of the research team spends a portion of their clinical time caring for term and late preterm infants. Author JL has experience in qualitative methodology and provided training to the other investigators on interviewing and qualitative analyses. Investigators may have interfaced with some participants in their institution when taking care of mother-infant dyads in the hospital but had no relationship with participants at the other sites. Interviewers had an interest in understanding decision making around IM vitamin K, in part, due to their clinical responsibilities with newborns. Members of the research team endorse IM vitamin K prophylaxis for newborns as standard of care.

Study Design and Sample: We chose grounded theory as the theoretical framework for the study (Charmaz 2006). In grounded theory, hypotheses are developed from the data starting with an inductive approach. Data analysis in grounded theory is an iterative process with concurrent data collection and analysis until no new themes emerge (‘saturation’) (Glaser and Strauss 2008; Strauss and Corbin 1998). Participants were English-speaking midwives recruited from 3 tertiary academic medical centers or surrounding communities in 3 US, states: Connecticut (CT), Iowa (IA) and Michigan (MI). For context, annual delivery volume at each site is ~ 4000 (CT), ~ 2200 (IA) and ~ 4900 (MI). The frequency of IM vitamin K refusal at each site is ~ 0.5% (CT), ~ 0.8% (IA) and ~ 2.3% (MI). At the CT site, at the

time of the study, there were 2 main delivery hospitals in the health system (a tertiary academic center and a birthing center located within a community hospital) and all midwife assisted deliveries occurred at the second site. At the MI & IA sites, all midwifery deliveries occurred at the single academic medical center.

Purposeful sampling was used to recruit midwives at the academic medical centers and snowballing was used to recruit midwives in the community. Participants were approached by email describing the study and were interviewed if they expressed interest in the study. In-depth semi-structured interviews were conducted with 19 midwives. All midwives at each institution were contacted for participation in the study. We did not collect information on the number of midwives approached. Some non-participants were not available for interview due to scheduling conflicts and some non-participants shared that they did not encounter IM vitamin K refusal in their practice and therefore felt that they did not have anything to share. Data was collected in a private office, private clinic space or home. Participants were interviewed alone either face-to-face or via telephone. Demographic data collected included age, race/ethnicity, years of education and practice characteristics. Verbal consent was obtained from each participant prior to the interview. Enrollment continued until saturation, when no new concepts emerged.

Data Collection: An interview guide was created based on review of the literature and expert opinion. The interview guide was revised as additional understandings emerged in the data (Table 1). Interviews were audiotaped and transcribed verbatim by an independent transcription service (ASP.MD Inc., Cambridge MA), except for two interviews which were transcribed verbatim by the authors (JL and PD). Data was collected between March 2019 and December 2019 and interviews lasted from 30 to 60 min. IRB approval at each site was obtained prior to beginning the project.

Data Analysis: Data from the transcripts were analyzed using grounded theory methodology starting with an inductive approach (Charmaz 2006; Glaser and Strauss 2008; Strauss and Corbin 1998). Data analysis was iterative with concurrent data collection and analysis until no new themes emerge ('saturation') (Charmaz 2006; Glaser and Strauss 2008; Strauss and Corbin 1998). In the first part of the analysis, an initial code list was created based on participant data. Codes (words or phrases) served as labels for important concepts. Transcripts were coded independently by each investigator (JL, PD and KW). The initial code list was iteratively revised using the constant comparative method as new data were collected. In the second part of the analysis, codes were clustered to form cohesive categories then reviewed for themes that expressed main ideas. In the third part of the analysis, data were reviewed for evidence

Table 1 Final Iteration of Interview Guide

General Questions	Probing Questions
We'd like to start by learning about your professional and clinical practice.	Tell us about your role and responsibilities What is typical day/week like for you?
Describe your general impression of the topic of vitamin K and newborns.	What is your general practice around vitamin K prophylaxis? What do you believe are the benefits and risks of vitamin K prophylaxis? What are your thoughts on IM versus oral or even no vitamin K prophylaxis? Do you have children? What was your approach to your own children regarding vitamin K prophylaxis?
How do you normally counsel patients prenatally regarding vitamin K and their newborn?	What is the usual timing of your discussions about vitamin K prophylaxis? How do you explain the benefits and risks of IM vitamin K? How do you feel about parents who choose to not get IM vitamin K for their newborn? Where do you direct parents to go to learn more about vitamin K?
What types of questions do expectant parents and new parents ask you about vitamin K prophylaxis?	Do you ever discuss alternative vitamin K prophylaxis with the pediatrician before counseling the family?
What is your relationship with the pediatrician the parents have chosen for their newborn?	
What is your approach to parents who don't want IM vitamin K but want their newborn son circumcised?	
Is there anything about vitamin K prophylaxis - such as evidence regarding IM versus oral vitamin K, or the presentation and risk of vitamin K deficiency bleeding - that you would like to know but haven't been able to find the answer to?	Where do you go to get information about vitamin K? Do you recall what you were taught or learned about vitamin K prophylaxis during your training? Do you recall when learned about vitamin K during your training to become a midwife?
If you had better evidence about IM and oral vitamin K prophylaxis, what would that be or look like?	
Pediatricians often encounter families after the delivery who have decided against the IM vitamin K for the newborn after counseling from their midwife with whom the family has formed a trusting relationship. For the pediatrician, counseling families to accept IM vitamin K in this scenario becomes challenging. What are your thoughts on this scenario?	How can midwives and pediatricians collaborate better when parents elect to not allow the vitamin K injection? How can the collaboration be optimized prior to the delivery or soon after?

of relationships among themes. To establish trustworthiness of data, analysis included monthly debriefing sessions with at least 2 researchers to review emerging themes. We performed member checking by discussing tentative themes and interpretations with a subset of research participants after conducting initial analyses. An audit trail was maintained to document all decisions made throughout the study. Data was organized in ATLAS.ti 8 and COREQ criteria was used for reporting qualitative research (Tong 2007).

Results

Demographics of our participants are described in Table 2. We conducted 19 interviews with white female midwives who were mostly CNMs affiliated with academic hospitals. Our sample also included CPMs and midwives attending home births and in community hospitals. Most participants were in favor of IM vitamin K prophylaxis with CNMs appearing to be more supportive whereas CPMs had a more neutral approach. On the general approach to IM vitamin K counseling, one participant who is a CNM shared, “*my general practice is that we recommend it [IM vitamin K] to everyone...I really wait for patients to bring up that they are concerned or have further questions before I’m launching into the whole ‘if you’re going to say yes to only one thing, let that be vitamin K.’*” One participant who is a CPM shared, “*I try to be very neutral on all of the things including vaccines, eye ointment and all of the other things...I am constantly monitoring, are they making a decision that is actually their choice versus doing it because they are told to.*”

Themes Four main themes emerged on approaches to counseling and perspectives about vitamin K prophylaxis, as described below. Themes and subthemes are outlined in Table 3. For most participants, vitamin K prophylaxis was discussed routinely in the third trimester in preparation for the delivery and in some cases the discussion was initiated by the expectant parents.

Emphasis on an educational approach to counseling that supports parents’ decision-making autonomy: Participants valued their role as educators whose principal role was to provide information to parents about vitamin K and facilitate an open discussion around vitamin K prophylaxis without inserting their own views and opinions (quote #1,3,4). Participants felt that it was important to support and trust parents’ decisions following an educated and informed discussion (quote #1,2). For some participants who worked in resource poor settings affiliated with academic centers,

Table 2 Participant demographics (N = 19)

Demographics	N (%)
Female, White, Non-Hispanic	19 (100%)
Professional Title	13 (76%)
Certified Nurse Midwife	5 (18%)
Certified Professional Midwife	1 (6%)
Traditional midwife	
Primary Practice ¹	11 (65%)
Academic Hospital	4 (24%)
Community Hospital	5 (29%)
Outpatient clinic	5 (18%)
Birthing center/home-births	
Attend home births	12 (71%)
No	7 (29%)
Yes	
Years in practice	10 (47%)
>15	4 (23%)
5–10	3 (18%)
11–15	2 (12%)
<5	
Age (years)	13 (65%)
≥45	6 (35%)
35–44	

¹Participants could select more than one response

vitamin K refusal rarely came up due to competing priorities in their patient population.

Low-intervention philosophy in the midwifery model of care attracts certain parents: Participants shared that they were not encouraging vitamin K refusal but attracted expectant parents seeking a specific kind of birth experience that minimized intervention (quote #6,7,8). The low-intervention approach to birth felt in accordance to the midwifery model of care in which birth as a physiologic process is a focus (quote #5). For some participants, refusal of IM vitamin K by parents choosing midwifery care was not unexpected due to the expectant parents’ philosophy of wanting fewer interventions in their birth experience (quote #6).

Need for relationship building between midwives and pediatricians: Most participants reported inconsistent and indirect contact with pediatricians (quote #12,14). Many participants referred parents to the pediatrician to discuss vitamin K prophylaxis after the delivery without direct conversation with the pediatrician (quote #14). Participants who performed newborn care in their practice sent records to the pediatric practice at the time of transfer of care. Some participants perceived some pediatricians as paternalistic and likely to use scare tactics with parents around vitamin K prophylaxis (quote #9,10). Some participants felt at odds with pediatricians who advocated for IM vitamin K strongly and were perceived to not respect parents’ decision-making autonomy or the midwife’s counseling and education (quote #11,13).

Opportunities for the future: Participants felt that pediatricians and midwives can collaborate better to provide a

Table 3 Decision making about IM Vitamin K administration: Themes and Subthemes

Major Themes	Subthemes	Quotes
Emphasis on an educational approach to counseling that supports parents' decision-making autonomy	Informed decision making	<i>"My role as a midwife is to provide the information and then to let them [parents] make an informed choice."</i> (1)
	Support family's decision	<i>"It's not my baby. It's their baby. If I give them all this information and that's the choice they want to make, then that's fully their choice to me."</i> (2)
	Educational discussion	<i>"Midwives generally spend more time with people, they educate, they place more emphasis on education and listening."</i> (3)
	Neutral stance	<i>"My job is to represent the information in a nonjudgmental and nonbiased way and not to do otherwise. Because if I only do otherwise, you just get people who don't trust you even more."</i> (4)
Low intervention philosophy in the midwifery model of care attracts certain parents	Birth as a physiologic process	<i>"We have more of a focus on physiologic birth and pregnancy and birth is a normal process that patients should go through and a process that should not have intervention unless absolutely needed."</i> (5)
	Parents seeking a low-intervention experience	<i>"They [parents] tend to kind of self-select in that way...that goes along with refusing vitamin K too that those people tend to not want absolutely anything medical or what they deem medical."</i> (6)
	Midwives not encouraging vitamin K refusal	<i>"I let them know that I support whatever they want and choose to do their own research. If they want it, I would suggest that a thoughtfully-done injection might be more appropriate than oral for that reason."</i> (7)
		<i>"...it's not that midwives aren't encouraging them to have vitamin K that's important, I think that the midwifery model of care...focuses is on shared decision making, so ...they [parents] also seek out midwives in that sense to say I'm not going to discharge you from my practice because you are not doing what I'm telling you to do."</i> (8)
Need for relationship building between midwives and pediatricians	Perceived paternalistic views of some pediatricians	<i>"There is the attitude of a maternity unit, especially the pediatricians that come in...that they just play the top card: don't you want your baby to live? And if you're not saying yes to what they want, then somehow you've answered "no"."</i> (9)
	Perception of pediatricians as inflexible	<i>"Parents will just kind of agree to it, as they like the pediatrician enough to not want to be kicked out of the practice..."</i> (10)
	Relationship with pediatrician can feel tense	<i>"From midwifery care perspective, I believe so strongly in the autonomy of the woman and then my pediatrician colleagues believe so strongly primordial over everything else, is our perceived safety for the baby and not the autonomy of the family unit or the parental decision making."</i> (11)
	Lack of consistent direct communication	<i>"I would say that our relationship with the pediatricians is not that close. It probably should be better."</i> (12)
		<i>"They [pediatricians] often see me as obstructive even though I'm not behaving that way and they're just assuming that this client is not doing what they want, that the home-birth midwife derailed them."</i> (13) <i>"I will just let them [expectant mothers] know that you should let your pediatricians know that you're doing this [refusing vitamin K]."</i> (14)
Opportunities for the future	Pediatricians and midwives can collaborate better	<i>"I think that if we're going to offer babies the best care, we [pediatricians and midwives] need to be on a united front. I don't think we should be talking different things at different times in their prenatal course."</i> (15)
	An oral vitamin K protocol	<i>"For oral, I really – I guess like I said I would love to have more of a conclusive protocol to give people."</i> (16)
	A more respectful culture	<i>"...I would just love for people in the hospital setting to...come to the table with the idea that, maybe a person's midwife has given them evidence-based information... sometimes there's a conception that if a parent has opted to decline something like vitamin K and has worked with a home-birth midwife, they've made that decision out of a lack of information or out of misinformation."</i> (17)
	Better recognition of midwives	<i>"I think that if we had...CPM's or home-birth midwives...more integrated into our healthcare system, there would be more collaboration and communication."</i> (18) <i>"...midwives generally had an uphill fight even being recognized as newborn providers, I think we as midwives of all kinds have fallen into step with the disconnects."</i> (19)

more consistent message to parents while being respectful of each other's counseling approaches and priorities (quote #15). Participants felt that this kind of collaboration will help pediatricians understand that midwives are providing relevant information and education to expectant parents (quote #17). From a broader vantage point, participants felt that better integration of CPMs and other midwives who attend home births into the healthcare system would further mitigate the disconnect (quote #18,19). Some participants felt that a more evidenced-based and standardized protocol for oral vitamin K prophylaxis is needed (quote #16).

Participants were asked to share what educational resources are typically used as part of routine prenatal counseling about vitamin K prophylaxis. Resources commonly utilized included hand-outs from professional organizations such as the AAP (2019), Centers for Disease Control (CDC) (2020) and the ACNM "Share with women" series (2016). Some participants utilized articles from PubMed or UpToDate. Additional resources shared with expectant parents included articles from Evidenced-Based birth (Dekkar 2019), the Healthy Home Economist (Pope 2020), Midwifery Matters (2012) and a book written by a midwife in the UK (Wickham 2017). The handouts from the CDC, AAP

and ACNM recommend IM vitamin as standard of care to prevent VKDB. The Evidence-based birth resource provides a more neutral review of the literature and practices in the US and other countries. The remaining resources appear to favor oral vitamin K for prophylaxis against VKDB.

Discussion

Midwives in our study perceived that the midwifery model of care, the focus on physiologic birth and prioritizing parents' decision-making autonomy after the sharing of information and counseling appears to attract a sub-set of expectant parents with certain belief systems who question interventions such as IM vitamin K prophylaxis. Even though most participants in our study did not counsel parents against IM vitamin K prophylaxis, one could argue that a neutral approach to counseling in some cases may create a perception that IM vitamin K may not be necessary. This may, in part, explain the association of vitamin K refusal and midwife-assisted deliveries reported in some studies (Sahni et al. 2014; Hamrick et al. 2016; Burke et al. 2015; Marcewicz et al. 2017). In addition, our findings suggest that silos of care between midwives and pediatricians potentially stem from a lack of understanding of each other's philosophies as well as local and system level barriers that result in asynchronous communication.

To better understand counseling practices and perspectives of midwives, recognizing the differences in midwife training pathways is of value. Our study participants were recruited from 3 US states and licensing of midwives varies by state. In IA, a CNM is an Advanced Practice Registered Nurse (APRN) educated in the disciplines of nursing and midwifery (Iowa code 2020). The CNM in IA is authorized to manage the care of normal newborns and women for gynecologic, perinatal and postpartum care (Iowa code 2020). In MI, a CNM is a registered professional nurse who has been granted a specialty certification in the profession specialty field of nurse midwifery (Michigan legislature 2017). CPMs can be licensed in the state of MI as of 2017 (CPMs legal status by state, 2020). In MI, the practice of midwifery is defined as providing maternity care that is consistent with a midwife's training, education, and experience, to women and neonates during the antepartum, intrapartum and postpartum periods (CT Department of Health 2020). Licensed CPMs in MI are permitted to administer IM or oral vitamin K prophylaxis (CT Department of Health 2020). It is possible that higher rates of IM vitamin K refusal in MI may be, in part, due to the ability of licensed CPMs to provide oral vitamin K prophylaxis. In CT, to be eligible for nurse-midwife licensure, an individual must be eligible for CT registered nurse licensure, hold current certification

by the American Midwifery Certification Board (AMCB); and have successfully completed thirty (30) hours of education in pharmacology for nurse-midwifery (CT Department of Health 2020). CPMs are not currently licensed in CT or IA (CPMs legal status by state 2020). Pediatricians who serve communities with midwife-assisted deliveries should be aware of the different training pathways of midwives in their local community, scope of practice, licensing and approaches to counseling on vitamin K prophylaxis. For example, knowing that a midwife may be licensed in a specific state to administer oral vitamin K is important for a pediatrician to know in assessing an infant's risk for VKDB and discussing the family's plan for additional oral doses after delivery.

In qualitative studies of parents who refused IM vitamin K for their newborn, a commonly reported theme is that parents who refuse IM vitamin K for their newborn seek natural approaches and low-intervention for themselves and their newborn. Examples of approaches perceived to be more natural include using oral vitamin K in lieu of IM vitamin K and women increasing their own dietary vitamin K intake during pregnancy (Miller et al. 2016; Loyal et al. 2019). Examples of beliefs around natural approaches include identifying with an "alternative lifestyle" that lends to beliefs that vitamin K deficiency in newborns at birth is 'natural' and hence normal and in some cases this is supported by religious perspectives (Miller et al. 2016; Loyal et al. 2019). Our study findings suggest that parents with a preference for fewer interventions are drawn to the midwifery model of care. This may, in part, explain why there is a higher frequency of vitamin K refusal among parents choosing midwife-assisted deliveries and warrants further study. This finding can help inform educational approaches to target midwives in each training pathway about the effectiveness and safety of IM vitamin K but also for expectant parents who seek out midwifery care.

Nearly all participants in our study reported inconsistent or no communication with pediatricians. Some participants reported tense relationships with some pediatricians. In response to the tension, some participants directed parents to pediatricians who they perceived were more accommodating to parents who chose to refuse routine prophylactic care such as IM vitamin K. Participants often directed the parents to discuss their concerns around vitamin K with the pediatrician. Midwives spend months educating and counseling expectant parents, creating a relationship and understanding the values and beliefs of their patients. Trust in the clinician has been shown in studies as an important factor in decision making around vaccines, for example (Benin et al. 2006; Wu et al. 2008). Although participants routinely sent medical record information to the pediatric office, a missing link in the communication chain may be information sharing

between pediatricians and midwives around parental values and beliefs that affect decision making which may help the pediatrician understand and tailor their own approach to counseling. Our study also highlights the need to break down silos between clinicians and bring midwives of different training backgrounds together with pediatricians to talk about their philosophies, share the evidence behind topics such as vitamin K prophylaxis and create communities of mutual respect across professions. Another compelling reason for improved communication between midwives and pediatricians is the likely increase in the number of planned home births due to fears around delivering in hospitals during the COVID-19 pandemic (Wyckoff 2020).

Our study is limited by sample size and to the perspectives of midwives in 3 primarily academic medical centers. We attempted to recruit additional CPMs and midwives who attend home-births. Routine administration of IM vitamin K is a potentially sensitive topic and some midwives who chose to not participate may have had stronger opinions that they did not feel comfortable sharing in a research study. We acknowledge that the perspectives of midwives in academic medical settings may be different from those that attend home births. Most of our participants were CNMs in academic medical centers and their perspectives may have been affected by standardized protocols around newborn care in the hospital setting. We conducted interviews until there were no new themes, but it is possible that we have missed themes. We acknowledge our own biases as pediatricians who endorse IM vitamin K prophylaxis and this bias may have affected our understandings of the data. Our sample is a homogenous group of white female midwives mostly over 35 years of age. However, the reported epidemiology of nurse midwives in the US. is similar (in 2018 the average age of midwifery graduates was 43 years, 99.5% were female and the majority were white) (Data USA, 2020).

Our study provides some insight into the reported association of IM vitamin K refusal among parents of newborns and midwife-assisted deliveries. The unique aspects of the midwifery model of care and prenatal education and counseling, combined with parents seeking less intervention for their birth experience and newborn, may contribute to this observation and warrants further investigation. It is important for pediatricians to recognize the different backgrounds and training pathways of midwives in the US. and for both pediatricians and midwives to improve communication and relationships with each other, share best practices and evidence to break down silos of care, which will result in higher quality of care for newborns and families.

Acknowledgements We thank the midwives who participated in our study. There is no external funding for this manuscript.

Contributor's Statement Page Dr Loyal conceptualized and designed

the study and the initial data collection instruments, critically reviewed the manuscript and approved the final manuscript as submitted. Dr. Danziger and Dr. Wood coordinated data collection, carried out analyses, critically reviewed the manuscript and approved the final manuscript as submitted.

Financial Disclosure The authors have no financial relationships relevant to this article to disclose.

Conflict of Interest Drs. Loyal and Danziger have no potential conflicts of interest to disclose. Dr. Wood receives royalties from McGraw Hill Professionals for a textbook she co-edited. This relationship did not affect the work being presented.

Abbreviations None.

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