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Pediatric Nurses' Perspectives on Medication Teaching in a Children's Hospital

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Abstract

Purpose

To explore inpatient pediatric nurses' current experiences and perspectives on medication teaching.

Design and Methods

A descriptive qualitative study was conducted at a Midwest pediatric hospital. Using convenience sampling, 26 nurses participated in six focus groups. Data were analyzed in an iterative group coding process.

Results

Three themes emerged. 1) Medication teaching is an opportunity. 2) Medication teaching is challenging. Nurses experienced structural and process challenges to deliver medication teaching. Structural challenges included the physical hospital environment, electronic health record, and institutional discharge workflow while process challenges included knowledge, relationships and interactions with caregivers, and available resources. 3) Medication teaching is amenable to improvement.

Conclusion

Effective medication teaching with caregivers is critical to ensure safe, quality care for children after discharge. Nursing teaching practices have not changed, despite advances in technology and major changes in hospital care. Nurses face many challenges to conduct effective medication teaching. Improving current teaching practices is imperative in order to provide the best and safest care.

Practice Implications

This study generated knowledge regarding pediatric nurses' teaching practices, values and beliefs that influence teaching, barriers, and ideas for how to improve medication teaching. Results will guide the development of targeted interventions to promote successful medication teaching practices.

Keywords

Medication, Nursing, Pediatrics, Safety, Teaching

Introduction

On an annual basis, approximately 4.3 million people in the United States (U.S.) require medical care for an adverse drug event (Bourgeois, Shannon, Valim, & Mandl, 2010). Furthermore, 70% of adverse drug events are due to errors in medication administration (Zandieh et al., 2008) and pose significant safety concerns as they often result in patient harm. In addition to risks for patient harm, adverse drug events are costly. The financial implications include the need for further treatments, emergency room and urgent care visits, readmissions, and intensive-care unit stays. An estimated \$3.5 billion dollars are spent each year on healthcare costs due to adverse drug events (Institute of Medicine (IOM), 2006). Among children, there are over 500,000 adverse drug events annually in the U.S. (Bourgeois et al., 2010). Approximately 50% of children in the U.S. take one or more medications in a given week (Bailey et al., 2009). Nearly all pediatric outpatient medication errors occur within the home and close family members are responsible for 83% of errors (Taylor, Robinson, MacLeod, MacBean, & Braitberg, 2009). In homes, medications may be delivered to children by a variety of persons such as parents, foster parents, grandparents, babysitters, siblings or the children themselves. In this study, the term caregiver refers to the person who administers medications to children at home. Home healthcare providers, daycare workers, or school personnel are not included in the definition of caregiver for this study. Medication knowledge is essential for caregivers to safely manage children's medications at home (IOM, 2006). Medication knowledge includes knowing how to monitor for side effects, problem solving and determining course of action when encountering issues, and asking a question when understanding is incongruent with instructions received.

Medication administration to children is complex because medications come in a variety of forms including pills, liquids, injections, inhalers, drops, and lotions. Administering liquid medications is especially complex as caregivers must utilize additional skills to deliver accurately. Misdosing is a frequent error in which caregivers over or under dose liquid medications (Beckett et al., 2012, Solanki et al., 2017, Wallace et al., 2012, Yin et al., 2014a, Yin et al., 2014b, Yin et al., 2010). Forgetting medication administration instructions is common. In two studies, one third of parents and 63% of mothers reported difficulty recalling necessary medication administration steps (Bayldon et al., 2013, Wallace et al., 2012). Many adults, including parents, misinterpret prescription labels and written medication instructions which increases the risk for medication errors (Bailey et al., 2009, Yin et al., 2012).

Pediatric nurses play a key role in ensuring that caregivers understand how to properly administer their children's medications at home to prevent medication errors (DiMatteo, 2004, Shone et al., 2010). As part of the transition to home, inpatient nurses provide medication education. Medication education is the process of teaching caregivers about medication regimens, side effects, delivery of medications to the child, and identifying resources for medication related questions (Bailey et al., 2013, Yetzer et al., 2011). This education must be approached in a meaningful way to ensure engagement and understanding.

In previous studies, nurses felt that they received minimal training on providing medication education and reported needing additional knowledge to feel confident to provide medication education to others (Bourbonnais and Caswell, 2014, Murphy and While, 2012). Other researchers also found that nurses felt unprepared to teach and lacked confidence in their abilities to provide education in their everyday nursing practice (Lahl, Modic, & Siedlecki, 2013). These deficits may lead to wide variation in how teaching is performed and what information is provided for each patient and family. Nurses often perceive they know what patients need to know and will provide education based on these assumptions (Barber-Parker, 2002, Maloney and Weiss, 2008). Sometimes nurses do not teach on topics that they consider to be important because they assume that someone else will take care of providing the education to patients and families (Lee and Lee, 2012, Tse and Kwok-wei So, 2008). Furthermore, the amount and type of information provided by nurses to patients and caregivers at discharge often does not meet the patients' needs (Clark et al., 2005). Medication education is no exception. Researchers have found that pharmacists and physicians do not always provide clear instructions when teaching new medications, side effects, or how and when to give medications (Lemer et al., 2009, Serper et al., 2013, Tarn et al., 2006). Caregivers often look to nurses for clarification and additional education.

There is a gap in the literature regarding pediatric nurses' current medication education practices with patients and families. Given the high rate of caregivers' medication errors and misunderstandings, research is warranted. The purpose of this study was to understand the experiences and perspectives of inpatient pediatric nurses to guide the development and evaluation of a targeted educational intervention to promote successful medication education.

Design and Methods

Research Design

This study utilized a descriptive qualitative design to describe inpatient pediatric nurses' current experiences and perspectives on medication education.

Theoretical Framework

Two theoretical frameworks guided this study, Donabedian's model for health care quality assessment (Donabedian, 1988) and Meleis' middle range theory of transitions (Meleis, Sawyer, Eun-Ok, Hilfinger-Messias, & Schumacher, 2000). Three elements of health care quality, structures, processes and outcomes, were described in a seminal paper by Donabedian (1988). Structures are the characteristics of health care settings that support and direct the provision of care. Processes are the interactions between providers and patients undertaken to give and to receive care. Outcomes are the effects of care on the health of patients' and populations and patient satisfaction. In transitions theory, nursing therapeutics influence the nature of transitions, the conditions that facilitate or hinder the transition, and the pattern of the responses to the transition (Meleis et al., 2000).

As applied to our study, nursing therapeutics are the processes of care delivered within institutional structures to contribute to the optimal health outcomes for children and their families. Medication teaching is a nursing therapeutic delivered during a health/illness transition as children move from hospitalization to home management of their health issues. Effective medication teaching during hospitalization may facilitate a positive transition response such as caregivers feeling confident in their abilities to deliver medications appropriately, coping with the medication regime, and having mastery of the knowledge and skills needed to administer the prescribed medications. The positive transition response will lead to the positive outcomes of optimal medication administration, improved health for children, and increased family satisfaction with their care.

Sample/Setting

Approval was received by the hospital's institutional review board before recruitment. Using convenience sampling, participants were recruited at a 298 bed, free-standing Midwest pediatric hospital using unit newsletters, staff meetings and poster solicitation. All nurses who delivered inpatient care were eligible for inclusion. Sessions were scheduled and interested nurses attended. Informed consent was obtained prior to beginning the focus group. Twenty-six inpatient staff nurses participated. Nurses did not receive a stipend for their participation.

Data Collection

Six focus groups ranging from two to six participants were conducted from October 2015 through February 2016. Sessions were held in a conference room set away from the clinical setting to prevent potential unit distractions. Sessions were moderated by the first author using open ended questions (Table 1) to elicit responses regarding current medication teaching practices, and values and beliefs, barriers and opportunities about medication teaching. Detailed field notes were taken by a co-investigator to capture the sequence of speakers, intonations, non-verbals, and group observations.

Focus groups were recorded digitally, transcribed verbatim by a professional transcription service, and transcripts reviewed for accuracy by the first author.

Table 1. Focus Group Question Guide.

Focus Group Question Guide

Current practice

1. Tell me your thoughts about your current practices for medication teaching:

Additional questions to probe for current practices:

- 1) What type of information do you provide?
- 2) How is teaching done?
- 3) When is medication teaching done?
- 4) How much time do you think you spend on teaching about medications for each pt./family?
- 5) Are other disciplines involved in providing medication education? Who? What is their role?
- 6) How do you assess a patient's or family's learning needs regarding medications?
- 7) How do you engage patients and families when teaching about medications?
- 8) How do you evaluate patient and family learning? How do you ensure a caregiver understands how to give medications at home?

Values and beliefs

2. Tell me how you feel about providing medication education to patients and families:

Additional questions to probe for values and beliefs about providing medication education:

- 1) What do you feel a nurse's role is in providing medication education?
- 2) How satisfied are you with your medication teaching?
- 3) How do you think patients and families feel about the medication teaching that is provided to them?
- 4) What do you feel is important for caregivers to know about giving their child's medications at home?
- 5) What parts are hard to teach? Why?

Current challenges

3. Tell me your thoughts about any current challenges to providing medication education:

Additional questions to probe for barriers to providing medication education:

- 1) Is there anything that makes it difficult to provide medication education?
- 2) Are you able to teach everything you want to teach about medications? Why / why not?

Improvement ideas

4. Tell me your ideas to improve medication teaching in the hospital:

Additional questions to probe for ideas to improve medication education:

- 1) What would help you feel more confident in providing medication education?

Focus Group Question Guide

2) What tools would be helpful or useful?

Data Analysis

The research team was comprised of two experts on nursing care for hospitalized children one of whom was a Clinical Nurse Leader and the other a Clinical Nurse Specialist. Two nurse researchers provided expertise in understanding preparation for discharge and facilitating transition to home, and in qualitative methods. One researcher conducted a preliminary review of field notes and verbatim transcripts to make corrections in the transcriptions, remove identifiers, and gain a sense of the whole data (Sandelowski, 1995). Data analysis continued with thematic method including an iterative group coding process (Ravitch & Carl, 2016). The team met and generated a list of four initial main codes based on interview questions and current practice (reflecting current nursing practice regarding medication teaching), values and beliefs, barriers and [suggestions for] improvements. The group coded the first transcript using the four initial codes and generated new codes as data were examined. Each passage was coded by consensus with discussion occurring until agreement was reached. When there were questions about the data, the two nursing practice experts provided context in which to understand the quotes such as the institutional expectations, unit environments, and conventional nursing practices at this institution. Field notes also clarified the context in which the quotes occurred. After the first session, the coding schema included four main codes with 15 sub-codes. A second round of group coding occurred. Each researcher used the current schema to independently code the second transcript. The group met to compare and discuss the independent coding. This second meeting resulted in a final coding schema of four main codes and 22 sub-codes. Each researcher coded one of the remaining four transcripts independently with the finalized coding schema. The first transcript was also re-coded with the final schema.

Transcripts were entered into NVivo (QSR, 2012); coding that was done by hand on paper, was reproduced electronically in NVivo (QSR, 2012). Reports of data within each code were generated and distributed to the research team. These reports included all data from across transcripts within each code. The team discussed the data within each code and across codes to identify patterns, common experiences and issues, and outliers. Eventually three themes were identified that concisely captured nurses' descriptions including medication teaching is an opportunity; medication teaching is challenging; and medication teaching is amenable to improvement.

Results

Nurse Characteristics

Twenty-six inpatient registered nurses participated (Table 2). They were female (100%), mostly from acute care units (73%), and held bachelor's degrees in nursing (69%).

Table 2. Nurse characteristics.

Characteristic	Frequencies (%) (N = 26)
Age in years	

Characteristic	Frequencies (%) (N = 26)
18–25	4 (15%)
26–35	16 (62%)
36–45	4 (15%)
46–55	1 (4%)
Over 56	1 (4%)
Gender	
Female	26 (100%)
Male	0
Nursing education level	
Associate degree	5 (19%)
Bachelor's degree	18 (69%)
Master's degree	3 (12%)
Doctorate degree	0
Main area current practice	
Acute care	19 (73%)
Critical care	7 (27%)
Years working as RN	
0–5	11 (42%)
5–10	11 (42%)
10–15	2 (8%)
15–20	1 (4%)
20–25	1 (4%)
Over 25	0
Years working as RN in pediatric setting	
0–5	13 (50%)
5–10	10 (38%)
10–15	1 (4%)
15–20	1 (4%)
20–25	1 (4%)
Over 25	0

Themes

Focus groups revealed rich data. Three overarching themes emerged: 1) medication teaching is an opportunity, 2) medication teaching is challenging, 3) medication teaching is amenable to improvement. Consistent with Donabedian's framework, the second theme was divided into structural and process challenges and the third theme into structural and process improvements. Structural

challenges included physical hospital environment, electronic health record, and institutional discharge workflow and process challenges were nursing knowledge and skills, relationships and interactions with caregivers, and current resources. Structural improvements included streamlining medication teaching documentation and refining current discharge practices. Process improvements included additional nurse training, promoting collaboration, and enhancing current resources.

Theme 1: Medication Teaching is an Opportunity

The nurses in this study identified medication teaching as an opportunity to maintain children's health and promote successful transitions to home. Medication teaching was valued and recognized as an important task. The nurses recognized that medication education impacted children's health after discharge. As one nurse said, "I think of this (medication teaching) as an essential piece of their discharge as this can impact their child's outcomes or how they do after discharge." Nurses discussed elements provided during medication teaching which included the following: names of prescribed medications, their actions and why the child needed to take it, the dose, how and when to give it, and possible side effects. Nurses reported focusing teaching on home medications. The nurses anticipated that some caregivers would not understand the need for the medications prescribed at discharge. As one nurse said:

I think definitely when the family can explain back to me, when they're taking it, what they're taking it for, and the dosing, and specifics things that they really need to know about the medication that I feel very confident that they will give it at home correctly.

In efforts to encourage caregivers to pick up the prescriptions and give children their medications, nurses stressed:

Why their child is taking the medication so that they understand why they need to fill the prescription, why they need to give the correct dose, why they need to continue giving the dose, and to follow-up with their providers.

Nurses reported using a variety of strategies to assess, engage, and teach caregivers. Strategies included the use of teach-back, inquiry, hands-on practice opportunities, and minimizing distractions. Home medication review is used as a tool to learn about families. As one nurse stated, "I have found that I learn a lot about families and what they know about medications in their home med review. I really realize how involved they are in what they know they take or give their child."

Nurses strived and felt pressured to provide effective medication teaching, especially with vulnerable populations. "Medication teaching falls on the nurses' shoulders and seems like nobody else takes responsibility for that," as one participant stated. Referring to the diabetic population, one nurse stated "We're responsible for pretty much the majority of that medication teaching and it's all brand new to families." Nurses felt they would be reassured knowing caregivers would be able to care for and provide medications correctly at home. One nurse shared:

It would be nice to know, after they go home, are they giving it the right way? Like if I could be the eyes in their house, are they giving the right dose? Did they retain all the stuff that I taught them? It would be helpful to know if the teaching I provided was effective or not. Other than them saying, "No, I don't have any questions. Yes, I understand."

Theme 2: Medication Teaching is Challenging

The nurses in this study described how they experienced structural and process challenges to deliver medication teaching. Structural challenges included the physical hospital environment, electronic health record, and institutional discharge workflow. Process challenges included knowledge, relationships and interactions with caregivers, and available resources.

Structural Challenges

Structure refers to the physical and organizational characteristics where teaching is delivered, such as adequacy of facilities and material resources, human resources, and organizational structures that support and direct the provision of care (Donabedian, 1988). Structural challenges which may hinder medication teaching delivery in the inpatient setting include the physical hospital environment, electronic health record, and institutional discharge workflow.

Nurses reported the hospital environment was challenging for caregivers to learn. The stress of having sick children made it difficult for caregivers to retain important information. One nurse stated: I feel like the environment of being in the hospital is really hard. You're [referring to caregivers] stressed, so no matter how many times you get this information, it still doesn't quite click as it should because you're not all the way there. You're more focused on your child getting better more than like teaching for when you go home.

Nurses also described difficulty in juggling their patient workload with finding opportunities to teach caregivers. Nurses stated they lacked time to teach based on their work assignments and high acuity level of patients. One nurse acknowledged:

I think the biggest thing with med teaching is just having the time in an unstressful situation to try and teach. But we are teaching in a stressful situation. We're teaching on limited time. The most difficult part is just assessing the situation and honestly getting as much of the teaching out as you can. I feel like that's all we do half the time.

Nurses detailed the importance of providing teaching at a time when the family is receptive to learning. Caregivers may not always be physically present or ready to learn about their child's medications. One nurse's account included:

Cause you might have a moment and they might be at lunch, or they might have gone, or they might be on their cell phone, or a million and a half other things, or they might be trying to coordinate somebody picking up their other kid at daycare and they're really not at a moment that they have to learn anything, or they're on their way out the door.

Another nurse shared, "You start to realize that you never seem to get the perfect opportunity, so you have to take whatever moments you have and just keep reinforcing them throughout your encounters."

Current documentation in the electronic health record (EHR) for patient and family education was described as another challenge. Documentation in the EHR was reported as time consuming, difficult to use, and cumbersome. Nurses described the current system as hard to see progression in teaching

from both a content and learner perspective. One nurse stated that the format of the EHR gives “a false sense that medication education is done.”

Institutional discharge workflow was also a challenge. In the majority of the focus groups, nurses shared that providers were often ordering medications and prescriptions at the time of discharge. Furthermore, nurses described the challenges associated with medications that required more time for teaching including those that changed just before discharge (forms or doses) or had complex dosing (titrated or taper). Nurses felt restricted in their ability to do ‘real time’ teaching as many medications were only administered one or two times a day. Families were perceived as anxious to go home which left nurses feeling rushed to finish discharge teaching, especially when teaching was started close to discharge. “We're trying to cram in some really important teaching and the family just wants to get out of here.”

Process Challenges

Process refers to nurse teaching activities and the interactions with caregivers to provide education. Process challenges which may impact inpatient medication teaching with caregivers included nursing knowledge and skill in providing medication teaching, relationships and interactions with caregivers, and available resources.

Nurses stated feeling confident when teaching on familiar medications, such as those they gave on a regular basis or for which they were familiar. Many stated they have received additional training on some medications, such as those used for diabetes and asthma. Additional training boosted their confidence to some extent but acknowledged that they still continued to learn something new about these medications each time they taught on one. Nurses declared they lacked knowledge regarding some medications. A nurse shared, “There's some drugs that I've never heard of a day in my life so it's hard to teach a family on it if I don't know what the drug is.” Another nurse said: Sometimes I feel a little bit under-educated on the meds that we're supposed to be teaching about. Basically, (I) just read the Pedi-Pals sheet and hand it to them. So, I don't really know that I'm giving them much more information than they could just read on their own.

Numerous nurses commented that a lot of medications given in pediatrics may be used for research purposes or off-label use. Medication side effects are a particular challenge for which to teach. As one nurse stated, “I am not an expert in side effects.” Nurses stated they don't know which side effects should be emphasized for the families. For example, “I honestly go in with a sheet and say, please don't ask me questions about some of these side effects.” Nurses reported feeling that they do not get a lot of training on how to teach effectively. As one nurse declared, “There is a lot of assumptions on what we should know how to do” with another who replied, “We can try and teach them the best we know how.”

Nurses stated that they relied on their judgment about how caregivers responded to medication teaching to determine whether the caregiver understood or not. As one nurse explained, “You base a lot of your teaching off of feedback. It's your interpretation of what you feel they understand and what needs reinforcing.” Some nurses shared that “sometimes we assume they already know how to use it

or how to take it” and “we think a parent understands and they really may not.” There was a belief that nurses might insult caregivers by telling them things they [the caregivers] already knew or by asking them to demonstrate a medication task. However, nurses recognized that caregivers may struggle with understanding as one nurse described, “They don't understand as much as you think they do.... I'm surprised how well some parents can do the teach-back but then two days later all of a sudden are flipping doses and amounts and you're kind of flabbergasted.” Yet despite this, nurses shared they often make assumptions that learning occurred as explained by this nurse, “They just say they understand, which we kind of take their word for because they say they feel comfortable with it, but who knows if they actually do.” Other nurses reported feeling some caregivers were disinterested in learning about medications. “A lot of times they [caregivers] don't want to hear what we say. Sometimes they're not willing to listen to what we have to say because they feel they know. And that can be hard sometimes.” Another shared, “We could provide as much information as we need to and talk about as much as we can, but if the families aren't willing to learn or participate in discussions, then there's really no teaching being done.” Nurses felt their teaching would not be successful when caregivers were not motivated to learn. “It makes it difficult to teach if they think they know it already and are against what we're telling them.” Nurses also recognized caregivers were in a vulnerable spot and may not have known what to ask or feel empowered to ask about their child's medications.

Nurses felt that the available resources for medication teaching were inadequate. Medication teaching sheets were reported as complicated and lengthy with ambiguous or too many side effects listed. Nurses felt medication teaching sheets were not helpful since they were too similar to one another. Utilizing interpreter services to address language barriers during teaching was complex and found to be cumbersome as more time and planning needed to take place in order for teaching to be successful. Caregivers with low literacy levels presented additional challenges and required nurses to become creative with teaching methods. “We've had some families who couldn't read or write where we had to color all of the syringes at the level [of medication amount to be given].” Some teaching was withheld by the nurses because of pre-conceived beliefs about pharmacy or outside agency resources in the community and what they will or will not be taught. One nurse stated “We don't know what the pharmacist or the home supply company is going to give them, so you really can't teach them with our supplies, because it could be completely different than theirs.” Another shared: We rely on the pharmacy to teach them, because if I show them on our syringe, if our syringe is graduated in 0.1 increments but the one they get is 0.2 increments...they might be confused and miss-dose because they have a different syringe.

“I guess I always hope or I just assume that the pharmacist, when they pick up the script, is going show them how to properly measure a dose,” was another nurse's thought.

Theme 3: Medication Teaching is Amenable to Improvement

Nurses recommended structural and process improvements, overall suggesting that the utilization of a comprehensive structured approach could improve medication teaching. Structural improvements included streamlining medication teaching documentation and refining current discharge practices. Process improvements included additional nurse training, promoting collaboration, and enhancing current resources.

Many nurses shared recommendations to improve current medication teaching documentation. One nurse suggested organizing teaching documentation in a way that one would be able to easily distinguish hospital medications from home medications and track learning progress. Making documentation of teach-back a “hard-stop” in the EHR for medication teaching was an additional recommendation. Another nurse described how improvement could be made by creating the possibility for medication teaching to be documented at the same time medications were given. Less steps and “clicks” would be needed to document administration of the medication, along with any teaching provided at that time. This would provide a “clearer picture of what the caregiver understood for each medication” and allow nurses to easily document when presented with a teachable moment. Nurses also stressed the importance of having all members of the healthcare team, including providers and inpatient pharmacists, to document their teaching in the same location in the EHR. This would provide a comprehensive record of what has been taught and what still needs to be learned.

Changing current discharge practices could also improve medication education for caregivers. Timing was a topic of discussion among nurses. One nurse suggested that “every time we are giving the medication to the child” medication teaching should be addressed and reinforced. Nurses also commented that having caregivers pick up their child's medications before discharge or having home medications delivered to the inpatient room would allow nurses to provide better teaching earlier. One nurse stated, “We could go over their prescriptions and help them determine how they're going to administer them at home.” Another nurse replied that this would help nurses “know what kind of syringes and having them practice with that beforehand.” Standardizing the current process used for gaining caregiver independence with children's cares and treatments would be helpful and provide another way to document caregivers' abilities to carry out the task of drawing up medications, following a medication schedule, and giving medications safely.

Additional training for nurses was recommended as a way to improve how nurses provide medication education. Topics included: “medications that we frequently give on the floor,” “how to recognize cues that maybe this patient doesn't fully understand,” and how to teach effectively. Nurses also hoped for more collaboration and shared responsibility in providing medication education, making it a “joint effort from everyone, like pharmacy and the doctors” and “doing more of a team approach... so that it's not all on the nurse.” Having these experts assist with education would improve the current process. “It would be nice if the pharmacy maybe had a little bit more of an active role in it and could help reinforce or teach on some of the things we're not as familiar with.” Some nurses also recommended having an additional touch point with caregivers regarding their children's medications when they were back in their home environments. “Calling the family or stopping out at the home and asking if they have any questions regarding the medications or reviewing them, doing teach-back,” was suggested as another safety check which could be done by a case manager or home healthcare nurse.

Improving current resources was reported as another area for improvement. Medication teaching sheets could be simplified to focus on the “need to know” information, making it a more valuable resource for caregivers. Other nurses suggested adding pictures and step by step instructions, especially for certain medications like Lovenox (enoxaparin) and corticotrophin (ACTH). Developing medication videos and using apps to assist nurses with teaching were described as additional

opportunities. One nurse suggested using secondary methods of education could be impactful for the family. Nurses believed that many caregivers were tech savvy. Using medication apps could provide caregivers a “visual reference where they could access at any time at home,” allowing them to learn on their own schedules and at their own paces. Apps would allow families to keep track of their children's medications with “medication calendars you can pull up on your phone.” “The app thing is this huge revolution.” Nurses viewed current medication delivery methods as out-of-date and spoke to capitalizing on technology to find ways to deliver education in smarter, more efficient, and reliable ways.

Discussion

In this study, inpatient pediatric nurses spoke about their experiences and perspectives on providing medication education to caregivers. Their insights led to identification of three themes indicating that medication teaching is an opportunity, challenging, and amenable to improvement.

Nurses in this study recognized the importance of providing medication education to caregivers since it is an important opportunity to ensure knowledge and skill acquisition. Providing education prepared caregivers for the transition to home which is congruent with Meleis' transition theory wherein medication teaching as a nursing therapeutic facilitated a positive transition response (Meleis et al., 2000). Prior studies have also shown hospital nurses recognize and prioritize the importance of providing education prior to discharge (Barber-Parker, 2002, Lahl et al., 2013). Earlier research indicated nurses did not always teach on topics considered important, assuming the pharmacist or physician were providing the information (Lee and Lee, 2012, Tse and Kwok-wei So, 2008). However, in this study, pediatric nurses felt ultimately responsible to teach since they did not know what information was being provided to caregivers from other healthcare team members (pharmacist, physician, and other nurses).

Medication teaching delivered by nurses is structurally challenged by the hospital environment, the electronic health record, and institutional discharge workflow. Current hospital environments are not always conducive to teaching. Shorter hospital stays, high acuity levels, and poor discharge pre-planning leaves nurses feeling they have inadequate time to teach (Beagley, 2011, Kimball et al., 2010). Nurses in this study indicated current workloads, stressful environments, and family receptiveness and availability for teaching were often hindrances to providing medication education. A previous study by Keenan, Yakel, Dunn Lopez, Tschannen, and Ford (2013) found nurses experienced challenges in retrieving and documenting in the electronic health record, which inhibited interdisciplinary communication around the plans of care. Since medication education is an important part of discharge transition planning, improved communication around its delivery is warranted.

In addition to structure, process challenges are evident in the study. Medication teaching is an assumed skill that nurses know how to perform successfully. However, nurses receive limited education on how to effectively teach throughout degree preparation. Often, how to educate is learned through experience or “on the job” training. Because nurses are learning in this type of format, they may not be receiving positive feedback to strengthen their confidence levels. Nurses in the

current study, and in other studies, described medication teaching as a way to promote successful transitions to home but often felt unprepared to teach because of lack confidence in teaching skills, unfamiliarity with medications prescribed, or lack of knowledge of teaching strategies and effective communication skills (Bourbonnais and Caswell, 2014, Lahl et al., 2013). Additional nursing education focused on providing medication teaching is an opportunity for improvement.

Researchers have found that nurses base teaching to patients and families on assumptions such as what nurses' think they need to know or are interested in learning (Barber-Parker, 2002, King, 2004, Maloney and Weiss, 2008). Our study confirms pediatric nurses make these same assumptions as well as assume a caregiver's preferred learning format. A negative attitude towards patients' or families' knowledge about medications or desire to learn may influence the emphasis nurses put on providing education. These assumptions may hinder engaging caregivers in the learning process.

Finding ways to address the structural and process challenges nurses face when providing medication education is imperative to ensure effective teaching practices. Nurses in this study offered streamlining documentation, refining discharge practices, additional nurse training, promoting collaboration, and enhancing current resources and tools as improvement opportunities. These suggested improvements are further discussed as implications for practice.

Clinical Implications

Further research to identify improvements to each of the structural and process challenges discussed is indicated. Changes to the physical hospital environment were not discussed by nurses in the study suggesting that it may be complex and less amenable to change. Streamlining documentation in the electronic health record to allow recording the administration and education provided on a medication in one application would save time. Not only would it save time, but may also offer an opportunity to further imbed and integrate medication teaching into daily practice and promote teachable moments. Developing tools within the electronic health record to help the interdisciplinary team maintain a shared understanding of a patient's and caregiver's learning progress would be beneficial. Standardizing the location of documented education would provide a clearer picture of person educated, content delivered, and overall learning progress.

In terms of the institutional discharge workflow, refining discharge practices such as updating policies and procedures or providing guidelines to support practice are justified. Exploring ways to have prescription medications available or delivered by a service during discharge teaching rather than picking up after discharge would support bedside teaching and the positive transition of the child to the home environment.

Strengthening the teaching skills of pediatric nurses is essential to promoting more effective teaching practices. In order to be successful, pediatric nurses need a better understanding of adult learning principles, learning styles, and teaching strategies. Helping nurses to assess learning needs, individualize content, select appropriate teaching methods, and evaluate understanding has been recommended in prior studies (Barber-Parker, 2002, Beagley, 2011). When nurses provide quality

teaching, parents feel more ready for discharge (Lerret and Weiss, 2011, Lerret et al., 2015, Weiss et al., 2008). Ensuring teaching is individualized, based on caregiver needs and builds on caregiver confidence will support a safer transition to home (Lerret, 2009). In addition to improving the delivery, pharmacology knowledge acquisition has been requested by nurses in this study and other studies (Adhikari et al., 2014, Bourbonnais and Caswell, 2014). Moreover, providing feedback opportunities and positive recognition can foster a nurse's skill and confidence, improving as an educator.

Investigating opportunities for improving collaboration among healthcare team members was offered as a suggestion in this study. Utilization of case managers, pharmacists, and home care agencies may add value. These roles may reinforce education, verify understanding and intervene before discharge or provide timely follow-up after discharge.

Updating current medication teaching materials offers an opportunity to explore the use of multimedia education. This includes incorporating written materials with diagrams, pictures, audio, animation and videos. Multimedia education programs about medications should be incorporated alongside usual care (Ciciriello et al., 2013). Patients and caregivers desire new learning applications and tools using technology. Children and parents endorsed innovative ways, such as technology based, to assist with medication learning which nurses in this study also offered as an improvement opportunity (Abraham, Brothers, Alexander, & Carpenter, 2017). Future patient and caregiver education must address the need for new approaches to providing medication information including the use of web-based environments and use of mobile technology (Hopia, Punna, Laitinen, & Latvala, 2015).

Limitations for this study include a homogenous sample, comprised of pediatric inpatient female nurses with a high percentage as baccalaureate prepared at a single institution. No other disciplines were studied during the focus group sessions despite involvement in medication teaching. Results may not reflect pediatric nurses in other geographic locations or with different demographic characteristics. Exploration of this topic in additional institutions with other disciplines would further provide evidence to add to this body of knowledge.

Conclusion

Effective medication teaching with caregivers is critical to ensure safe, quality care for children after discharge. Nurses face many challenges to conduct effective medication teaching. Therefore, medication education must be approached in meaningful ways to engage caregivers. Medication education should be delivered in ways that allow nurses to be instrumental in the caregivers' learning and advocates for patients and care needs. Improving teaching materials, breaking down barriers to teaching, collaboration among healthcare providers and caregivers, and caregiver assessment would lead to better delivery of medication education. Designing interventions to target teaching improvements are indicated to prevent medication errors from occurring in the pediatric patient population.

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