

Parental Factors Affecting Pediatric Medication Management in Underserved Communities

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ABSTRACT

BACKGROUND: Medication errors and adverse drug events are common in the pediatric population. Limited English proficiency and low health literacy have been associated with decreased medication adherence, increased medication errors, and worse health outcomes. This study explores parental factors affecting medication management in underserved communities.

METHODS: Using qualitative methods, we identified factors believed to affect medication management among parents. We conducted focus group discussions between December 2019 and September 2020. We recruited parents and health care professionals from local community partners and a tertiary care children's hospital. Sessions were recorded and transcribed. Three investigators created the coding scheme. Two investigators independently coded each focus group and organized results into themes using thematic analysis.

RESULTS: Eleven focus groups were held (n = 45): 4 English-speaking parent groups (n = 18), 3 Spanish-speaking parent groups (n = 11), and 4 health care professional groups (n = 16). We identified 4 main factors that could impact

medication delivery: 1) limited health literacy among parents and feeling inadequate at medication administration (knowledge/skill gap), 2) poor communication between caregivers (regarding medication delivery, dosage, frequency, and purpose) and between providers (regarding what has been prescribed), 3) lack of pediatric medication education resources, and 4) personal attitudes and beliefs that influence one's medication-related decisions.

CONCLUSIONS: The compounding effect of these factors – knowledge, communication, resource, and personal belief – may put families living in underserved communities at greater risk for medication errors and suboptimal health outcomes. These findings can be used to guide future interventions and may help optimize medication delivery for pediatric patients.

KEYWORDS: community health; health education; medication safety

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WHAT'S NEW

The compound effect of parents' medication knowledge/skill gap, poor communication, lack of pediatric medication educational resource or place to get reliable answers, and personal/cultural attitudes and beliefs may put underserved families at risk for medication errors and suboptimal health outcomes.

BACKGROUND

MEDICATION ERRORS AND adverse drug events are common in the pediatric population.^{1,2} Numerous pediatric-specific variables may contribute to medication errors including rapid changes in patient size, weight-based dosing, various liquid formulations, and confusing measurement units and dosing tools.^{3–6} Those with limited English proficiency (LEP) and/or low health literacy

(LHL, defined as the degree to which individuals have the ability to gather, comprehend, and use information to make health decisions⁷) are at greater risk of medication errors and poor medication management such as non-adherence. Unfortunately, these factors can lead to worse health outcomes.^{8–14} Quality of family functioning (eg, parent-child relationship, family communication), parent mental health status, the relationship between parents and the health care system, and low-income status can also affect medication adherence.^{15–19} Improving pediatric medication management has thus been challenging across various settings and populations.

Limited studies have assessed factors disruptive to parents' medication management efforts in underserved populations. While prior reports captured the experience of a single provider-parent interaction (eg, in the emergency department or ward setting) or study the adult population,^{18–20} knowledge of the experiences, values, and perceptions of parents trying to manage their child's

medications, particularly in the home environment, is limited. With an enhanced understanding of factors influencing medication delivery at home, we could tailor community interventions, education, and resources to best serve lower income populations. Therefore, the goal of this study is to identify parent- and pediatric health care professional-reported factors affecting medication management among families living in underserved areas using qualitative methods.

METHODS

RESEARCH DESIGN

We employed qualitative research methods to explore the experiences of families from underserved neighborhoods regarding medication management. Focus group discussions were conducted between December 2019 and September 2020. We recruited participants from three groups: English-speaking parents (ESP), Spanish-speaking parents (SSP), and pediatric health care professionals (PHP). Parents were recruited from local community partners (Young Men's Christian Association (YMCA) and Metro Villa Apartment Complex) or through the children's hospital via convenience sampling. Community recruitments occurred in City Heights, a neighborhood in San Diego, California with one of the lowest median household incomes (average yearly income for a family of four is between \$19,393 and \$24,400) and highest unemployment rates (9.2%) in the county. It is an ethnically diverse neighborhood; 40% of its residents are foreign-born and 19% reported not speaking English well or at all.²¹ Research members conducted in-person recruitment via advertising and tabling at community partner sites. During the event, research members screened parents for interest and eligibility. Recruitment dates and times depended on the availability of the research team members and space provided by the community partner sites.

Hospital-based recruitment occurred at the only free-standing children's hospital in San Diego. We screened parents of hospitalized patients based on patient age and medication history in the electronic health record. If a parent met inclusion criteria, a research team member approached the parent in person by walking to the patient's room and providing the parent with a study information flier prior to discharge. We invited all interested parents meeting eligibility criteria to participate.

We invited PHPs (physicians, registered nurses, and nurse practitioners) from 4 community clinics, affiliated with the Rady Children's Health Network and provided care to underserved populations, to participate. Two clinics were located in Medically Underserved Areas or Medically Underserved Populations; the other 2 were located in Health Professional Shortage Areas, as defined by the Health Resources & Services Administration.²² Our research team had an existing partnership with the lead physician at each clinic, who helped distribute study opportunities to their colleagues via e-mail.

We conducted focus group discussions in person at the community sites (for parents) or medical clinics (for PHPs) to reduce transportation barriers. When the COVID-19 pandemic started, we transitioned in-person discussions to virtual video conferencing (Zoom Video Communications Inc., San Jose, Calif).

PARTICIPANTS

Parent participants met the following inclusion criteria at time of recruitment: had a child between ages 0 to 12 years with medication prescribed within the previous 6 months, primarily managed or co-managed their child's medication(s), and self-identified as an English or Spanish speaker. All PHPs involved in pediatric care at one of the 4 participating clinics were eligible to participate in the PHP focus group discussions. All participants signed written informed consent and received a gift card of \$25 (PHP) or \$50 (parent). The University of California San Diego Institutional Review Board approved this study.

DATA COLLECTION

Practicing pediatricians experienced in qualitative methods (T.R., K.E.R., M.H., and E.S.F.) developed the focus group guide (Table 1). Parent focus group questions were divided into 4 sections: barriers parents encountered with their child's medication(s), responses to barriers, medication resource(s) utilized, and qualities of ideal medication resources. The latter 2 resource sections are not featured in this article. Each focus group lasted up to 90 minutes. Four research members facilitated discussions (T.R. and M.H. for English-speaking groups, B.W. and M.L. for Spanish-speaking groups). At the start of each session, participants completed a demographic questionnaire (Table 2). Focus groups were audio recorded. Research members (T.R. and S.C.) transcribed English focus group audio recordings verbatim. A professional medical translator (M.L.) or translation agency (GoTranscripts LTD, United Kingdom) transcribed and translated all Spanish audio recordings.

ANALYSIS

Demographic questionnaire responses were presented as percentages and medians where applicable. Three investigators (T.R., B.W., and M.H.) created a codebook based on the initial 4 focus groups to provide guidelines for consistent coding across multiple investigators. The codebook was applied to the rest of the transcripts and codes. The authors refined code definitions during the project period through an iterative process. Two investigators independently coded English transcripts (T.R. and M.H.) and Spanish transcripts (T.R. and B.W.). Qualitative data analysis software, Atlas.ti Scientific Software Development GmbH (Germany), was used to organize and analyze codes. The authors discussed discrepancies in coding until consensus was reached. The principal investigator reviewed all codes and generated themes using theoretical thematic analysis. Thematic saturation for parental factors affecting medication management was reached after 7 of

Table 1. Question Guide for Focus Group Discussions

Category	Parent Questions
Barriers parents encountered with their child’s medication(s)	Tell us about problem(s)/concern(s) you have run into in the past with your child’s medication? <ul style="list-style-type: none"> • What did you find difficult about giving your child medications? • Has your child ever spat up a medication? • Has your child ever developed a reaction after taking a medication? • Has your child ever missed a dose of medication? Gotten an extra dose? • Has your child ever received medication at the wrong time? • Has your child ever received the wrong dose of medication?
Parents’ response to barriers	How did you respond to problems with a medication? How did you know what to do in that situation? <ul style="list-style-type: none"> • Did you talk to anyone or go anywhere to find solutions to your problem(s)/concern(s)?
Medication resource(s) utilized by parents	If you were unsure what to do about a medication problem, where did you turn? <ul style="list-style-type: none"> • Education material? Information from the internet? Paper handouts? Books? A friend, family member, or someone else? • What do you like about these information sources?

Category	Health care Professionals Questions
Barriers parents encountered with their child’s medication(s)	Tell us problem(s)/concern(s) you have seen in the past with caregivers and their children’s medication?
Health care professionals’ responses to barriers	How did you respond to the problem/concern? What did you tell your patient’s family? <ul style="list-style-type: none"> • What resources, if any, do you offer patient’s family?
Medication resource(s) for parents	What are other resources in the San Diego community, if any, that can help families manage their child’s medication better? <ul style="list-style-type: none"> • Are there online resources? Hotline? • What do you like about these resources? • What are the things that can improve about these resources?

11 focus groups; however, we continued gathering data through the eleventh group to evaluate for emerging themes.

RESULTS

Twenty-nine parents (18 ESP, 11 SSP) participated across 7 focus groups. We attempted to capture a diverse group of families in the community, recruiting approximately two-thirds of the participants from the community and one-third from the hospital. Sixteen PHPs participated across four focus groups. Five of the 11 focus groups occurred in person; the rest were conducted virtually. The median number of medications per child over the past 6 months (parent-reported) was 4. Thematic analysis revealed 4 main factors affecting parental ability to manage their child’s medications: knowledge/skills gap, poor communication, lack of pediatric medication educational resource or place to get reliable answers, and personal attitudes and beliefs. We organized illustrative quotes by themes and subthemes (Table 3).

(1) Knowledge/skill gap

Knowledge/skill gap referred to parental lack of knowledge or skill to manage their child’s medications. PHPs reported that parents did not know the role of a child’s medications in treating diseases, how quickly a medication takes effect, medication name and dosage, “expected

side effects,” and medication instructions (eg, “which [inhaler] to use and when [to use it]”). Results from parent focus groups corroborated these themes (Table 3). In particular, parents did not understand their child’s general condition, the purpose of the medication, or dosage frequency instructions (eg, “three times a day”). One parent asked, “When [the instruction] says twice a day, is there a timeframe in between the two times?” – a confusion shared by multiple parents. Many parents also recognized that they did not know the names of their child’s medications. One parent expressed “fear” that the doctor might unknowingly prescribe a medication that her child was already taking because the parent did not know the medication names and could not catch the duplication.

A major component of this knowledge/skill gap was low *health literacy* among parents, recognized by both PHPs and parents. For example, parents’ misunderstanding of asthma pathophysiology resulted in medication noncompliance that put a child at risk:

[PHP]: “I have an asthmatic kid that . . . [mom] won’t use the daily [inhaled] steroid because . . . dad thinks he just needs to be more of a man . . . and just breathe.”

Another common misunderstanding among parents was the effectiveness of antibiotics and steroids against viral respiratory infections. Many PHPs also noted that parents “[were] not clear about why they would continue the medication even [when] a child isn’t having symptoms,” particularly referring to asthma and antifungal medications.

Table 2. Characteristics of Parents, Their Children, and Pediatric Healthcare Professionals Participants

Parents and Their Children Characteristics (n = 29)			
	Total	English (18)	Spanish (11)
Age of parent (n = 29), median (range)	37 years (20-59)	-	-
Sex of parent (n = 29)			
Male (%)	4 (13.8)	-	-
Female (%)	25 (86.2)	-	-
Years living in the US (n = 29), n (%)			
All my life	13 (44.8)	11 (61.1)	2 (18.2)
≥ 5 years	14 (48.3)	6 (33.3)	8 (72.7)
< 5 years	2 (6.9)	1 (5.6)	1 (9.1)
Self-identified ethnicity (n = 29), n (%)			
African	2 (6.9)	2 (11.1)	-
Asian	1 (3.4)	1 (5.6)	-
Caucasian	6 (20.7)	6 (33.3)	-
Indian	1 (3.4)	1 (5.6)	-
Latino/Hispanic	16 (55.2)	5 (27.8)	11 (100.0)
Mixed	2 (6.9)	2 (11.1)	-
Other	1 (3.4)	1 (5.6)	-
Self-identified primary language spoken at home* (n = 29), n (%)			
English	12 (41.4)	12 (66.7)	-
Spanish	12 (41.4)	1 (5.6)	11 (100.0)
English and Spanish	2 (6.9)	2 (11.1)	-
English and Other	3 (10.3)	3 (16.7)	-
Self-identified understanding of written English (n = 29), n (%)			
Very well - Well	23 (79.3)	18 (100.0)	5 (45.4)
So-So - Not well	4 (13.8)	-	4 (36.4)
Not at all	2 (6.9)	-	2 (18.2)
Self-identified understanding of spoken English (n = 29), n (%)			
Very well - Well	21 (72.4)	17 (94.4)	4 (36.4)
So-So - Not well	5 (17.2)	-	5 (45.4)
Not at all	2 (6.9)	-	2 (18.2)
Did not answer	1 (3.4)	1 (5.6)	-
Self-identified ability to speak English (n = 29), n (%)			
Very well - Well	19 (65.5)	17 (94.4)	2 (18.2)
So-So - Not well	3 (10.3)	-	3 (27.3)
Not at all	6 (20.7)	-	6 (54.5)
Did not answer	1 (3.4)	1 (5.6)	-
Self-identified preferred language to discuss healthcare			
English	18 (62.1)	18 (100.0)	-
Spanish	10 (34.5)	-	10 (90.9)
English, Spanish	1 (3.4)	-	1 (9.1)
Parent-reported total number of medications prescribed in the past 6 months (n = 29)			
Median (range)	4 (0-10)	4 (0-8)	5 (0-10)
Average (SD)	4.4 (2.5)	3.9 (2.2)	5.1 (2.7)
Age of participants' children (n = 29), median (range)	7 years (0.5-15 years)	-	-
Sex of participants' children (n = 29)			
Male (%)	16 (55.0)	-	-
Female (%)	13 (45.0)	-	-
Pediatric Health care Professionals Characteristics (n = 16)			
Professional role (%)			
Pediatrician/family medicine physician		14 (87.5)	
Registered nurse/LVN		1 (6.3)	
Nurse practitioner		1 (6.3)	

(Continued)

Table 2. (Continued)

Parents and Their Children Characteristics (n = 29)			
	Total	English (18)	Spanish (11)
Years of employment (%)			
< 1 year		2 (12.5)	
1–5 years		5 (31.3)	
6–10 years		4 (25.0)	
11–20 years		2 (12.5)	
> 20 years		3 (18.8)	
Barriers to providing medication education [†] (%)		14 (87.5)	
Time (health care professional)		9 (56.3)	
Time (family)		10 (62.5)	
Language		9 (56.3)	
Resources (handouts, videos)		2 (12.5)	
Comfort/confidence in providing education			
How familiar are you with locally available (in San Diego) pediatric-specific medication education resources? (%)			
I don't know any that exist		13 (81.3)	
I know a few		3 (18.8)	
I know many		0 (0.0)	

*Demographic questionnaires were given at the start of each focus group and were not reviewed for language proficiency or group assignment before proceeding.

†Health care professionals could select more than 1 barrier.

As a result of parents' poor health literacy, parents refused, were noncompliant, or "demand[ed] medications...that [were] not the best for [their] child." In our study, parents acknowledged their own LHL and wanted clear instructions, simplified medical terms, and concrete medication directions. Use of medical "terminology" may have contributed to this lack of understanding as several parents stated that the medical information provided by PHPs was "over one's head."

Skill gaps specifically referred to a parent's inability to know what to do in a specific situation, including the ability to access a medication list and accurately measure a dose of medication. In particular, parents felt ill-equipped to administer medications. The bad taste of medications made it difficult to administer them to their child, leading to an incomplete treatment course.

[ESP]: "There is one medication where... I think more intentionally he throws it up... It doesn't taste bad and so... I am asking the nurse how to trick him."

Administration of inhalers and nebulizers was another commonly reported skill deficiency.

(2) Poor communication

Both parents and PHPs identified poor communication as a factor leading to medication error or noncompliance. Parents noted communication issues between multiple providers or health systems, while PHPs noted poor communication between multiple caregivers. Both parents and

PHPs rarely reported poor communication amongst themselves.

Parents were frustrated with suboptimal communication *between multiple providers or health systems* (eg, between physicians and pharmacists, 2o physicians, or 2 health systems), particularly when there were inconsistent medication instructions.

[ESP]: "I had several physicians taking care of my child and one wrote the prescription. Then I saw the primary doctor who said 'that dosage is way too high. It should be 3mg once a day.' ...When I went to the pharmacist, the pharmacist said 'you need to take this 5mg 3 times a day,' which was the original prescription."

Parents also described scenarios where 2 physicians prescribed medications without knowing what the other had prescribed, leading to concerns about medication interactions. One parent reported poor communication between health systems; she recalled that a pharmacist could not answer her questions because the pharmacist did not know the intended medication indication since "[he] could not see the physician's clinic note."

In contrast, PHPs highlighted poor communication *between multiple caregivers*. PHPs described scenarios where "one parent was aware [of the medication] and [the] other was not." Poor communication between caregivers led to "medicines [getting] lost in the shuffle" or medication dosage getting "accidentally doubled." PHPs described explaining medication instructions repeatedly each time a different caregiver was present as they "[didn't] know how [different caregivers] were giving the medication." Additional quotes are listed in [Table 3](#).

Table 3. Pediatric Health care Professionals' and Parents' Perceived Factors Affecting Children's Medications Management

Themes -Subthemes	English-Speaking Parents Quotes	Spanish-Speaking Parents Quotes	Pediatric Health care Professionals Quotes
Knowledge/skill gap -Health literacy	"For a while, you don't understand the language. So when [doctors] are around [other doctors], you tend to forget that somebody in that group is not like [them] and doesn't recognize the terminology and might not always recognize what all that means to your daily life."	"As moms, . . . there is always a doubt. . . 'maybe I can do something more', but I don't know, maybe [it] is the lack of knowledge, of everything involved with my son's medical condition that . . . limits you on how to take steps [in] fear that something might happen."	"I commonly run into problems with . . . parents not knowing the difference between a controller medication and the emergency medication and which ones, when, and how to use them."
-Administration difficulty	"Nebulizer is difficult. Now they designed easy to administer nebulizer as a handheld device. That was one thing that has been an issue for me."	"It was really hard for my daughter to learn [how to swallow pills]. . . and I couldn't force [her]."	"[What] I see a lot is parents having problems with giving their kids medications. . . and they end up coming [into clinic] because they can't figure out a way to get the kids to take the medication."
Poor communication -Between multiple caregivers			"There is a two-parents household and they have not communicated the best and sometimes one parent is aware and the other is not and so the medicines can get lost in the shuffle."
-Between multiple providers or health systems	"Not all parents have all their information sorted in one place. They have information in multiple sources and doctors don't have access to all those sources. Patient get prescribed a new medication and the doctor don't have access to [those sources] and not recognizing the medication the child is already taking."	"Since [the doctors] keep changing, really, sometimes they do not connect with each other, and it is our kids who don't make progress."	
Lack of pediatric medication educational resource or place to get reliable answers.	"There is not a lot of information out there. So the literature you are reading is geared towards adults."	"If my child simply spits [medication] out . . ., because I feel it's more of a problem to call [the clinic] and say, 'We missed a dose.' [It] is going to take more days, hours, to receive [the answer about what to do]."	"We have a different system but a lot of it is geared towards adult medicine. A lot of . . . autpopulated education is not geared towards children and that can be difficult. I don't translate it into pediatrics. It is easier to offer my own thing." "I am not aware of any pediatric-specific resources with the exception of the antipyretic. I have not been aware of other resources that I can refer families to."
Personal attitudes and beliefs -Parental distrust	"[The doctors] are just trying to get people out and [we are] just another number [in their] charts. They don't have time for each patient and read every single thing in their record."	"[I am] always asking why because the last thing I want is for [the doctor] to make a mistake, right? That's what I do for precaution."	"The other thing that I would point out is parent's lack of trust of their doctor and I think that has to do with professor Goggle. . . a decided lack of respect for the information provided by the physician." "So if you educate [parents] that most of the time it is viral and you don't even need the antibiotics, . . . then we could have avoided [conjunctivitis from expired eye drop] next time."

(Continued)

Table 3. (Continued)

Themes -Subthemes	English-Speaking Parents Quotes	Spanish-Speaking Parents Quotes	Pediatric Health care Professionals Quotes
-Concerns about side effects	"I don't think there is a need to over give antibiotic and I think it breaks his system over time. . . don't include something that could potentially have harmful side effects for children."	"I hadn't given such strong medications to my daughter and I was worried about the side effects these medications would have."	I feel like the parents that are going to go across [the border to Mexico] and get their medications and that is where their comfort zone is." "Everybody always knows somebody who has a bad reaction. In particular, asthma and allergic rhinitis medicine. [Parents] just fear what they don't understand and they have just enough knowledge to be inappropriately scared."
-Desire for alternative options	"I personally would want to be more natural . . . my son has ADHD and my other son with asthma. . . If it were me, I would do it natural like CBD. . . for example, . . . [Doctors] want to prescribe things that are strong." "[Doctors] don't tell people [that] . . . avoid[ing] dairy products. . . will help with asthma. . . Don't just prescribe [and] prescribe strong stuff that has a lot of side effects and our kids bodies." "[Doctors] can research natural things to use. . . If it does not work, then take the antibiotic."		

(3) Lack of pediatric medication educational resource or place to get reliable answers

This theme referred to parents' limited accessibility to written and verbal pediatric-specific medication information. It included not only pamphlets and webpages, but also PHPs with reliable answers to medication-related questions. In their demographic questionnaire responses, 13 of 16 PHPs reported that they "didn't know any [locally available pediatric-specific medication education resources for families] that existed."

[PHP]: "I don't think there are any great resources as far as . . . medicine compliance that I am aware of. . . Most [clinic] sites in our group do not have. . . resources to . . . make those calls and spend time to explain medicines."

Parents noted difficulty with medication compliance when they could not access their provider. Multiple parents stated it was frustrating "to leave a message and [be contacted] in 24 hours [when parents] needed help right at this moment." One PHP recognized that when the clinic "ran out of appointment slots [and] a parent wanted to come in [but] couldn't, [the parent] just kind of improvised at home." Outside of personnel resources, PHPs and parents also noted limited written pediatric-specific resources and that "literature [was] geared towards

adults," which led parents to manage medications based on their own discretion, sometimes incorrectly, or seek help at the emergency department.

(4) Personal attitudes and beliefs

Personal attitudes and beliefs stemming from experience, cultural/societal norms, or education influenced parental decisions regarding their child's medications or deterred them from following PHP instructions.

Parental distrust in health care professionals or the medical system was likely to increase the risk of medication nonadherence.

[PHP] "Anytime a parent has to take a medicine for. . . more than weeks, there is always that level of skepticism. Something happens. . . anything they don't like. They lose a little faith in it. Those are the ones that are at risk of not really finishing [the treatment course]."

PHP attributed parental distrust to their reliance on unreliable resources like "professor Google" and prior negative experiences with medications. Parents, however, reported distrust due to a lack of information provided by doctors or feeling that providers were "rushed" when caring for their child. Many parents wanted doctors to "make [them] more aware [of] why [their child] is taking a

medication” and “pay more attention” to their child or concerns. Given the location of San Diego on the United States-Mexico border, many patients sought care both locally and internationally. Greater trust in international doctors deterred parents from following instructions provided by PHPs in the United States.

Parental *fear of medication side effects*, especially in the presence of distrust, could lead to medication noncompliance. Parents expressed a fear that “the medication may cure what [a child] has but may affect other body organs.”

[ESP]: “My daughter is 9 weeks old and [the doctor] put her on Tamiflu. . . That is scary because there are a lot of side effects. They say ‘oh it will decrease the duration of the flu by 12 hours.’ Are those 12 hours really worth the risk?”

ESP specifically expressed a *desire for alternative options*. They felt that providers should offer natural or herbal products in place of, or prior to, prescribing medication to their child. While most parents did not list a specific example of a “natural product,” some parents mentioned the use of cannabidiol or avoiding certain foods. Such desire was often coupled with a fear of medication side effects.

[ESP] “If there is any kind of alternative. . . any sort of over-the-counter natural remedy, [doctors] should also say ‘you can [use] this syrup.’ . . . It doesn’t always have to be medication.”

DISCUSSION

To our knowledge, this is the first qualitative study identifying parental factors affecting medication management in underserved communities. While prior studies have examined medication management barriers, most were conducted via provider surveys or targeted

adults.^{23–25} Of those reflecting parents’ perspectives, most have been disease-specific (eg, HIV, asthma).^{26,27} Given most children taking medications do not have a chronic diagnosis, it is important to assess factors affecting medication management in all children, particularly in the community setting and underserved areas.

A prominent factor affecting parental medication management was a knowledge/skill gap. Interestingly, parents recognized their deficit in medication knowledge/skill and expressed desire for more education and hands-on training, which has also been noted in literature for children with medical complexity.²⁸ In our study, parents wanted simplified terminology and digestible information. Common instructions, such as “three times a day,” were not as clear to parents as providers believed. It is important for providers to avoid medical jargon, conduct a thorough review of medications, and assess parental understanding (eg, utilizing teach-back or family follow-up) to decrease confusion. A joint education effort between physicians, nurses, and pharmacists with built-in repetition could benefit LHL families. We have compiled these suggested interventions in Table 4. LHL is strongly predictive of decreased medication adherence and is associated with poor child health outcomes.^{29–31} For many underserved families, parents not only have LHL, but also LEP, a combination that may put families at higher risk of making a dosing error than those with only one barrier.³² Future development of targeted education interventions appropriate for resource-restricted, LHL, and LEP families are much needed.

While poor communication is a known barrier to effective medication management, our study highlighted the pervasiveness of this problem across different groups. Parents desired better communication among their child’s health care team members, while PHPs desired the same between multiple caregivers. When parents receive contradictory advice from multiple providers, their confidence in both treatment and providers decreases.¹⁷ Such

Table 4. Suggested Interventions to Improve Medication Management

Factors	Suggested Interventions
Knowledge/skill gap	<ul style="list-style-type: none"> • Avoid medical jargon, conduct a thorough review of medications being prescribed, and assess parental understanding (eg, teach-back method, family follow-up) • Targeted educational interventions appropriate for resource-restricted, LHL, LEP families • Joint education effort between physicians, nurses, and pharmacists
Poor communication	<ul style="list-style-type: none"> • Improve healthcare information interoperability to integrate flow of information between physicians and health systems • Increase utilization of online patient portal among multiple caregivers • Re-educate family members at every pharmacy medication pick up to help reinforce information for all caregivers involved
Lack of pediatric medication educational resource or place to get reliable answers	<ul style="list-style-type: none"> • Create written educational resources • Expand family’s access to medical providers, including virtual platforms
Personal attitude and beliefs	<ul style="list-style-type: none"> • Consider and address parents’ beliefs for alternative options in a non-judgmental manner • Listen to parents’ concerns, fill in knowledge gaps, and address medication fears and misinformation.

LEP indicates limited English proficiency; LHL, low health literacy.

inconsistency combined with LHL may instill distrust that negatively impacts their medication-related decision-making. The disjointed flow of information between physicians and between health care systems call for improved health care interoperability; allowing data to be readily accessed by all providers may address this deficiency. Among children with multiple caregivers, family re-education by a pharmacist with every medication dispense, not only at the first prescription, could help reinforce information for all caregivers involved. The utilization of an online patient portal could allow for consistent information sharing and ready access to educational material by multiple caregivers, although access to this resource may be limited in underserved population.

Parents also faced another challenge: the lack of pediatric medication educational resource or place to get reliable answers. Limited studies have investigated parental and provider awareness of pediatric medication resources available in underserved communities where multiple languages are spoken.³³ In our study, parents expressed having limited access to both written resources and medical personnel who could answer questions. Difficulty getting a doctor's appointment has been found to negatively impact medication adherence.¹⁷ This resource gap, especially in LHL and LEP communities, could drive parents toward taking advice from non-medical personnel or unverified websites. Pediatric-focused written medication material should be developed and readily accessible to underserved families. Additionally, improving access to providers through telehealth or online patient-portal is imperative.

We also found that personal attitudes and beliefs surrounding medications, medical providers, and the health system influenced parents' medication decision-making. Such factors have been associated with volitional non-adherence in pediatric asthma.^{17,34} Fear of medication side effects made parents reluctant to adhere to medication regimens. While some of this fear might stem from unregulated internet resources, it was exacerbated by parent perceptions of withheld medical information, rushed providers, and unmet desire for natural/herbal alternatives. The relationship between alternative medicine use and medication adherence is unclear in pediatric practice. It is important to consider and address parents' beliefs in a non-judgmental manner by listening to parents' concerns, filling in knowledge gaps, and addressing fears, as recommended in the recent American Academy of Pediatrics policy statements on preventing home medication errors.³⁵

While this study shed light on medication management issues in the community setting, there were several limitations. We conducted this study in a neighborhood with unique patient sociodemographic factors in an effort to obtain views understudied in literature. However, participants' experiences and perspectives may not be representative of the entire community. Parents without English or Spanish proficiency were not represented in our study, which may have limited the range of perspectives obtained. The transition from in-person to virtual

discussions during the COVID-19 pandemic limited our ability to recruit participants on site, excluded parents without Zoom access, and limited facilitator ability to observe body language that could have cued more robust discussion. Future studies should capture pharmacists' perspectives, as they are often involved in medication counseling with families.

CONCLUSIONS

Parents and PHPs in underserved communities described 4 factors affecting parents' medication management: knowledge/skill gap, poor communication, lack of pediatric medication educational resources, and personal attitude and beliefs. The compounding effect of these factors may put underserved families at risk for medication errors and suboptimal health outcomes. Our next step is to create pediatric medication educational resources tailored to LHL, LEP, and resource-limited populations and determine their impact on medication errors or health outcomes. Further studies addressing racial/ethnic disparities in accessing resources and optimizing provider-parent communication are warranted.

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