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Physician perspectives on discussions with parents of infants with suspected ureteropelvic junction obstruction

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ABSTRACT

Introduction: The purpose of this study was to understand pediatric urologists' perceived role of patient characteristics on discussions about treatment of infants with suspected UPJ obstruction.
Methods: We conducted semi-structured interviews with pediatric urologists from three geographically diverse sites. Interview domains included: clinical indications for surgery, discussions with parents, and consideration of parent socioeconomic factors. Transcribed data and field notes were analyzed using a team-based, inductive grounded theory approach.
Results: Thirteen physicians were interviewed. Physicians reported a standardized approach to discussions to facilitate parental understanding. While they did not report overt consideration of demographics, they tailored discussions based on educational and cultural background and language barriers.
Physicians also reported that concerns about risk of loss to follow up contributed to their treatment recommendations. Most physicians recognized that the lack of clear data often led to use of personal experience to guide recommendations.
Conclusion: Physicians recognize a gap in data to guide surgical decisions and utilize personal experience to augment this gap. They also recognize the influence of educational and language barriers on discussions with families and consider risk of loss to follow up when making recommendations, suggesting an implicit consideration of demographics. These findings suggest that development of evidence-based guidelines may reduce treatment variations.
Level of Evidence: Not applicable (qualitative research study written in compliance with COREQ guidelines).

Ureteropelvic junction (UPJ) obstruction is the most common etiology of high-grade hydronephrosis, affecting approximately 4000–10,000 infants annually [1,2]. While the goal of surgery is to minimize the risk of kidney damage, the benefits of early surgery compared to initial non-operative management have not been well-defined, and evidence-based guidelines for intervention are lacking [1,3,4]. Consequently, rates of surgery in the first year of life are widely variable [5–10]. Furthermore, racial differences in timing of surgery have been identified, with racial and ethnic minorities having a higher likelihood of early surgery [11,12].

Prior work by our team suggests that both parents and pediatric urology surgeons prefer that the decision for surgery in these infants to be directed by the surgeon, who often relies on personal experience to guide surgical decision-making [13]. Additionally, studies in the adult setting suggest that physician decision-making may be influenced by patient race and ethnicity, leading to disparities in care [14,15]. These findings suggest that previously described demographic variations in treatment of UPJ obstruction may be surgeon driven. The purpose of this study was to understand the role of patient demographics on surgeons' discussions about diagnosis and treatment for infants with suspected UPJ obstruction as perceived by pediatric urologic surgeons.

1. Methods

1.1. Study design

To understand surgeon perspectives on the role of patient demographics on discussions about and recommendations for surgery in infants with hydronephrosis concerning for UPJ obstruction, we analyzed surgeon interviews previously conducted as part of a qualitative study of parent and surgeon perceptions of the surgical decision-making process [13]. To better understand the influence of parent sociodemographic factors on how physicians approach clinical discussions and treatment recommendations for these infants, secondary

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analysis of the interview data was conducted through the lens of the health disparities framework developed by Kilbourne et al. [16]. This framework incorporates a multilevel approach to disparities including healthcare system, provider, and patient level potential determinants of disparities [16].

We utilized Grounded Theory methodology to guide both initial and secondary analyses. Grounded Theory, developed by Glaser and Strauss in 1967, is a systematic, qualitative approach using inductive and deductive methods to generate hypotheses based on underlying concepts embedded in the collected data [17]. The analysis process is comprised of four steps: (1) identification of key points in the data through the use of codes; (2) use of memos and field notes to enrich recorded data with the interviewer's observations and insights; (3) grouping of coded data into related concepts; and (4) integration of concepts to develop a theoretical model that is then evaluated and modified based on subsequent gathered data [13]. This methodology was chosen based on the primary purpose of this study: to better understand previously identified variations in treatment and to utilize this understanding to inform future quantitative studies in this population.

1.2. Participants and setting

After institutional review board approval was obtained (COMIRB #15–0854), pediatric urologic surgeons at three geographically and demographically diverse tertiary referral centers (Rady Children's Hospital San Diego, Texas Children's Hospital, and Children's Hospital Colorado) were interviewed as part of a larger mixed-methods study assessing variations in treatment of infants with UPJ obstruction. Sites were chosen based on regional and demographic patient diversity and number of pediatric urology faculty to ensure diversity of surgeon background and experience as well as diversity of the patient population seen by participants. Surgeon interviews were conducted either in-person or by telephone. Participant recruitment was discontinued once analyses indicated thematic saturation.

1.3. Data collection

Semi-structured interview guides were developed a priori based on a shared decision-making conceptual framework informed by current literature and then modified based on initial surgeon interviews [13]. Physician interview guides included domains focused on: clinical indications for surgery, surgeon discussions of diagnosis and treatment options with parents, and consideration of patient socioeconomic factors and perceived parental preferences during discussion and development of treatment recommendations.

Interviews were conducted and digitally recorded by one of two interviewers (MKH, MAM) with training in qualitative research and no personal or professional relationships with the interviewees. All interviews were professionally transcribed verbatim. Field notes taken during the interview process and memos taken during transcript review were also included as primary data for analysis.

1.4. Data analysis

Thematic analysis was conducted using a reflexive, team-based inductive approach informed by a conceptual model previously described by Kilbourne, et al. to understand health care disparities through the lens of health services research [16]. The analytic team included perspectives from public health, urology, and the social sciences (MKH, VMV, MAM). Each transcript was coded independently by at least two research team members who met regularly to develop a coding structure and resolve discrepancies in coding. Analytic notes were compiled and reviewed after each group of transcripts were coded (3–5 transcripts/group) to refine the codebook and determine when thematic saturation was reached. Atlas.ti (v7, GmbH, Berlin) was used to assist with data management and coding. Final coded transcripts were reviewed by the entire team to identify concepts, and key themes, and to develop a theoretical model encompassing surgeon perspectives about the discussion concerning diagnosis and treatment options as well as recommendations for care (Fig. 1). Synthesis and visual mapping techniques were used to display emergent concepts and themes. Investigator and methods triangulation were utilized to enhance analytic rigor. Results were confirmed via triangulation by physician members of a stakeholder advisory committee.

2. Results

2.1. Participants (Table 1)

A total of 86% of eligible pediatric urologists were interviewed (4 in person and 9 by telephone). Two eligible pediatric urologists could not be reached to participate: a female surgeon on maternity leave and a retiring male surgeon. A majority of physicians were male and white. Physicians were well-distributed across institutions and years in practice.

2.2. Key themes (Table 2)

We identified three primary themes across data gleaned from interview transcripts: *(1) Standardization of physician communication; (2) Impact of parental factors on physician communication;* and *(3) Impact of physician factors on physician recommendations.* While

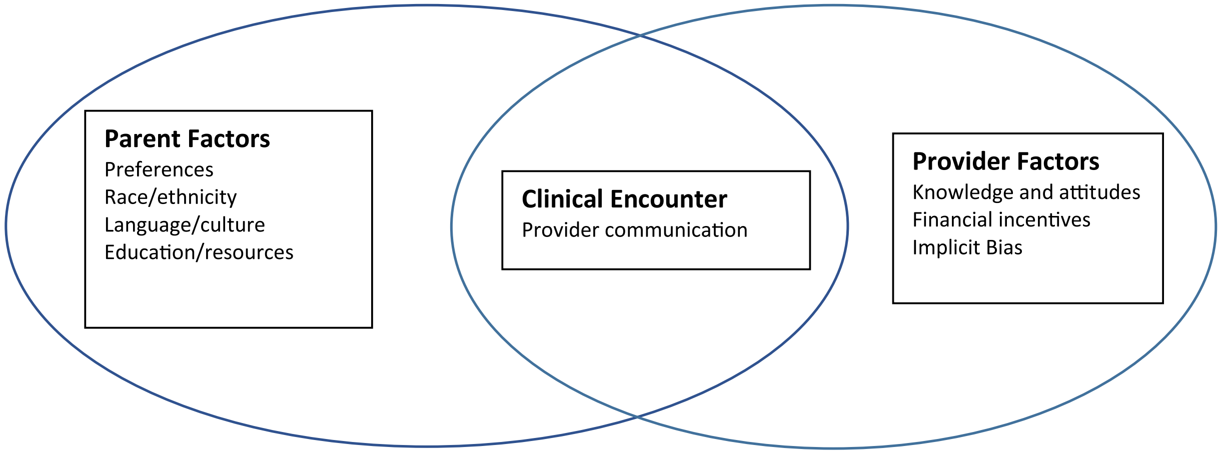

Fig. 1. Health disparities framework (adapted from A.M. Kilborne et al., *Advancing health disparities research within the health care system: a conceptual framework* [16]).

Table 1
Physician demographics.

Physician characteristics	N (%)
Male	9 (69%)
Non-White	5 (38%)
Years in Practice	
<5	5 (38%)
5–15	5 (38%)
>15	3 (23%)
Institution	
CHCO	4 (31%)
RCHSD	4 (31%)
TCH	5 (38%)

physicians in general reported utilizing a standard approach to initial discussions with parents about their child's diagnosis and treatment options, they also acknowledged that they may deviate from this approach based on sociodemographic factors that could affect parental understanding, including cultural background, language, and educational background. Physicians were reluctant to acknowledge consideration of sociodemographic factors when making treatment recommendations but did acknowledge that concerns over potential risk of loss to follow up as well as perceptions of parental preferences may impact their recommendations for surgery. Finally, physicians acknowledged the role of personal experience and the potential impact of competing demands on treatment recommendations.

2.2.1. Standardization of physician communication during the clinical encounter

2.2.1.1. Discussion of diagnosis and treatment options. In general, physicians reported using a standardized approach to initial discussions with families. Discussions started with an overview of hydronephrosis and potential associated diagnoses: "I usually approach discussion with general discussion about…all the options of what can happen before we decide what imaging will occur. I also try to talk to them about their expectations of things along the way." Physicians also reported using standardized grading systems to frame the discussion: "I would discuss the severity of the hydronephrosis using the SFU grading system and then speculate as to what I believe the etiology of the hydronephrosis is." In general, physicians reported avoiding use of statistics in conversations with families due to concerns about ability of parents to understand what those statistics meant: "giving percentages … probably wouldn't help the process; you'd just make it more confusing."

Physicians also reported standardizing their approach to discussions of the treatment options and prognosis. Overall, physicians stressed that infants with this condition generally do well: "I try to emphasize … the good prognosis that in general most of these children [have]." Physicians also included discussion of the potential risks of treatment. As one participant reported: "I think everybody needs a heavy risks and benefits talk." However, the perception of the risks of observation and surgery differed among participants. One stated he would: "tell them the reality of things, that there's a strong possibility if you don't watch him closely … it could be a significant detriment to that kidney." Conversely, another participant described the following: "I quote to them a couple of articles saying there's no significant discrepancy in renal function loss [with] observation."

2.2.1.2. Use of visual aids/analogy. To help with parent understanding of the underlying diagnosis and treatment options, many physicians utilized analogy. One provider reported: "I'll say obviously this [surgery] is less risky than the flight to Mexico." Similarly, a second participant described the diagnosis using a different analogy: "it's like if you run your sink with the drain relatively closed it's not going to necessarily overflow but it's going to retain a certain amount of fluid." Physicians also used visual aids to help explain the diagnosis. Providers utilized radiographic images but several also used hand-drawn representations of the kidneys during their discussions of the diagnosis. As one provider described: "I draw it. On the bed paper and show them what it means …Then I talk to them about the reasons that I would be pushed to do surgery." In general, physicians believe that use of these adjunct aids improved parental understanding of the diagnosis and plan: "I mean when you show them those pictures, it's almost like an 'aha moment', even if you've been talking about it for months."

2.2.1.3. Assessment of understanding. Although the majority of physicians did not use formal techniques to gauge parental understanding, they did report use of other parental nonverbal cues. One participant reported: "We get pretty good at reading body language … You know they nod or smile or look horrified." A minority of physicians asked families to repeat back information about the treatment plan to gauge parental understanding: "you ask them to repeat it to you … because then they have to think about information." Physicians also encouraged families to contact them outside of the clinic visit or to set up an additional visit to gain more information if needed: "I also tell them … they can email and talk to me if they have questions."

2.2.2. Impact of parental factors on physician communication with parents

2.2.2.1. Language and culture. While physicians did not report overt consideration of parental race in tailoring discussions with families, they acknowledged the impact of cultural background on surgical discussions. One participant noted: "I think … some cultures tend to be more accepting of my advice than others." Similarly, a second participant remarked that: "It might be a cultural thing, but a lot of [Hispanic patients] tend to rely on the doctors' decisions more." Additionally, physicians noted the impact of language on surgical discussions and ultimately on surgical decision-making. One physician noted: "I don't think as much information is conveyed to [non-English speaking] parents;" while a second remarked: "I think I tend to be more, I suppose, directive [when counseling non-English speaking parents]".

2.2.2.2. Education and socioeconomic status. Physicians acknowledged the effect of educational and socioeconomic status on their conversations: "I think level of education does inherently [matter] just because you're able to relay more abstract concepts … And I think, frankly, higher socioeconomic classes feel empower[ed]." Physicians also recognized the association between socioeconomic status, sociodemographics, and patient involvement in the conversation. As one provider noted: "I mean, your rich start-up millionaire is going to respond way differently from your person that crossed the border from Mexico." Physicians also noted the association between education and parental engagement in the decision-making process: "I think you've got your crowd of people who are less educated [and] are very overwhelmed. Then … you have your really educated people who … want what you think is best. Then you have the people who are just smart enough to be dangerous."

Although physicians reported use of a standardized approach to discussions and avoidance of statistics in general, when conversing with parents from a medical background, physicians were more likely to provide a more in-depth and nuanced discussion of the diagnosis and treatment options, including statistics. One participant noted: "if a person's a medical provider, I give them a lot more statistics." Similarly, a second provider noted: "If they have some kinda medical background … They'll probably come away with … more information than others." These findings suggest both a potential difference both on surgeons' approach to conversations with patients as well as a surgeon-perceived difference in how patients receive information based on socioeconomic status, vocation, and education level.

Table 2
Physician-reported factors guiding communication strategies and treatment recommendations (representative quotes).

Theme	Quotes
Communication during the clinical encounter	
Diagnosis and treatment	“I usually [start] with a general discussion about hydronephrosis versus most likely things…based on imaging that we have;” “I tell the possibilities of what the hydronephrosis means… and the likelihood of each [diagnosis], depending on how severe the hydronephrosis is;” “I would discuss the severity of the hydronephrosis using the SFU grading system and then speculate as to what I believe the etiology of the hydronephrosis is;” “We have a grading system and I'll talk about the grading system at that point.” “I basically present the information and offer them…options. I'll also offer them my opinion;” “I always talk about and try to stress that they need to come see me;” “I usually really try to emphasize…the good prognosis that in general most of these children [have].” “[I] tell them the reality of things that there's a strong possibility if you don't watch him closely…it could be a significant detriment to that kidney;” “I quote to them a couple of articles saying there's no significant discrepancy in renal function loss [with] observation;” “It's somewhat how you present it. If you really reassure them and say, “Look, everything looks okay, the function is preserved. There is risk if we watch it, and there's risk if we do surgery now.”
Visual aids/analogy	“I usually use some analogy…If I've learned in the course of conversation that they've recently flown to Mexico on vacation I'll say obviously this is less risky than the flight to Mexico;” “I'll say, you know this is a plumbing problem;” “that would be like if…you asked me if I could tell if your car was running by your just taking a picture of it;” “it's like if you run your sink with the drain relatively closed it's not going to necessarily overflow but it's going to retain a certain amount of fluid;” “this [is] much like driving down a three-lane highway that narrows down to two lanes.” ”well, I say “Here's the ultrasound today. This is the ultrasound 3 months ago;” “Well I think show them the X-rays… and most people understand it;” “I usually draw pictures of what a kidney and a blockage look like. We do have preprinted diagrams that we can give to patients;” “I do draw pictures to explain…My tools would be my pictures that I draw;” “I draw it. On the bed paper, and show them what it means…Then I talk to them about the reasons that I would be pushed to do surgery;” “I usually pull out a marking pen and just start drawing for them and I think it really helps;” “I mean when you show them those pictures, it's almost like an aha moment, even if you've been talking about it for months.”
Assessment of understanding	“You ask them to repeat it to you…because then they have to think about information;” “I make every parent tell me, in their own words, what I'm gonna do and why;” “Sometimes if I think they don't have all the information I'll have them rephrase things to me…But it's a hard thing to know whether they have all the information that they need.” “You know you get clues. They're nodding. They're smiling. They're looking completely hopeless and lost;” “I try to gauge as best I can how much they're understanding and will repeat things if I sense they're uncomfortable;” “I also tell them…they can email and talk to me if they have questions;” “we say if you have additional questions, don't hesitate to call;” “I'll offer to have them come back and see me another time…I also always give them outlets to reach back to me.”
Parental factors	
Language and culture	“[Non] native speakers or native cultural Californians…have a higher likelihood of deferring to the physician for their choices;” “I think sometimes with…a language barrier, tones and subtleties can definitely be lost;” “whenever you use a translator, that interferes with the conversation…you lose nuances, you lose questions;” “I think I tend to be more, I suppose, directive [when counseling non-English speaking parents]…It goes on and on and on and you think let's make a decision and move on;” “I think…some cultures tend to be more accepting of my advice than others;” “we have a lot of Hispanics [with] limited access to health care and some of them have to travel far. It might be a cultural thing, but a lot of [them] tend to rely on the doctors' decisions more.”
Socioeconomic status	“families who are less savvy with medical care in general…are more likely to defer to me for their ultimate decision-making;” “the Boulder family, you know, are more likely to wait because they can. They're well prepared. They're well-educated. They don't want to do anything…Then the opposite is true.” “I think you've got your crowd of people who are less educated [and] are very overwhelmed. Then…you have your really educated people who want what you think is best. Then you have the people who are just smart enough to be dangerous;” “I mean your rich start-up millionaire is going to respond way differently from your person that crossed the border from Mexico…or is an immigrant from Iran or Iraq;”
Other sociodemographic factors	“If they have some kinda medical background…[t]hey'll probably come away with a little more information than others;” “if one is more fluent in medical terms…there would be…more medical terminology;” “if a person's a medical provider, I give them a lot more statistics.” “I hope we try to take these [demographic] factors and put em outta the equation;” “I try to stay as agnostic to the financial stuff as I can;” “unfortunately you do have to consider…limited access to health care an risk of compliance;” “Every time, if I thought a kid was gonna disappear…I would pick to go ahead and fix them;” “If they really have these external factors…then it doesn't make surgery so bad. Worse things can happen than if you did surgery;” “[treatment's] based on the other comorbidities of the child…as well as the family social background regarding ability to access medical care;” “Extreme social factors like they're homeless could potentially factor in…I've had a family that didn't follow up…I believe they were deported or moved back to Mexico.” “I try to gauge who's gonna behave and who's not when I first meet them…;” “whether it's a single parent or a foster family…you're trying to figure out the…dynamics of the family;” “if kids are in foster care…then probably we'd lean towards [surgery] cause we're not sure if they're gonna fare well or not;” “Like I have [a patient] who's going to India for 6 months, and, you know, at that point I don't know what the care is going to be like some other place;”

(continued on next page)

Table 2 *(continued)*

Theme	Quotes
Physician factors	
Perceptions of self as compared to other pediatric urologic surgeons	"I feel like I'm om more of the conservative spectrum of things" "in my personal practice I'm not as aggressive about operating" "there are people that are overly aggressive." "I guess I... have a different viewpoint than others, but I think UPJ obstruction is a surgical disease." "I think that some people…have not challenged themselves with emerging literature or challenges to convention;" "there are financial incentives for operating…that is troubling to me;" "one question…is how does your surgery waiting list impact your decision?"

2.2.2.3. Consideration of other sociodemographic factors during decision making. In general, physicians reported not considering demographics or financial considerations when recommending treatment: "we try to take these [demographic] factors and put em outta the equation;" However, many physicians reported that unstable social circumstances and concerns about loss to follow-up may influence them to recommend earlier surgical intervention. One participant reported: "I think that lack of follow-up can lead to poorer outcomes and so yes I worry about those patients." Similarly, a second provider stated: "If they really have these external factors that can affect their [ability to be observed] … then it doesn't make surgery so bad. Worse things can happen than if you did surgery." Physicians reported that this perception of risk of loss to follow-up is often based on their perception of familial social structure or circumstances during the initial encounter rather than personal experience with familial adherence to recommendations over time: "I try to gauge who's gonna behave and who's not when I first meet them."

Physicians also reported that socioeconomic factors may lead *parents* to prefer surgery over observation. Factors that surgeons perceive as influencing parental decision-making include distance from the hospital, insurance status, and time off work. Physicians also noted the role of perceived parental expectations on recommendations for surgery: "I mean sometimes we get international families that come in [expecting] surgery … That probably does affect [my recommendations]."

2.2.3. Impact of physician factors on physician recommendations to parents

Physicians recognized that there is a lack of data to guide surgical decisions: "I think uncertainty is what eats away at the confidence of your decisions;" "There's not a good [test for UPJ obstruction] so I think that's why there's a lot of variability in practice." To address this gap, many physicians report using personal experience to guide decision making: "I almost always balance my personal experience and expertise from my own patient population. I've seen what works and what doesn't so that actually trumps the literature for me;" "Usually I know pretty well whether they're gonna need surgery or not on [their] first visit."

Physicians compared their decisions to those of their peers, oftentimes considering themselves more "conservative" than their peers: "[I]n my personal practice I'm not as aggressive about operating;" However, some of the older physicians acknowledged that they may be more likely to operate than their peers: "if … I think … there's a very good chance [of surgery] in the future then I might not wait quite so long as somebody else;" "I guess I ... have a different viewpoint than others, but I think UPJ obstruction is a surgical disease."

Many of those who identified themselves as more" conservative" attributed more "aggressive" decisions to physicians' not keeping up with current literature: "I think that some people … have not challenged themselves with emerging literature or challenges to convention." Physicians also pointed to the potential influence of financial incentives associated with recommending surgery: "there are financial incentives for operating … that [are] troubling to me;" "one question … is how does your surgery waiting list impact your decision?"

3. Discussion

The primary goal of this qualitative study was to better understand physicians' perspectives on their role, as well as parents' role in making decisions for infants with suspected UPJ obstruction. For purposes of this study, we focused on three domains identified through physician interviews that contributed to physician discussions with and recommendations to parents: standardization of physician communication during the clinical encounter; impact of perceived patient factors on physician approaches to communication; and impact of physician factors on treatment recommendations. Prior studies of surgical treatment in children with suspected UPJ obstruction have shown that non-white children are more likely to undergo early surgical intervention compared to their white, non-Hispanic counterparts [11,12]. Additionally, earlier age at surgery has been associated with an increased risk of post-operative readmission and reoperation, suggesting that these demographic variations may be associated with differences in health outcomes [12]. Despite identification of non-clinical variations in treatment for children with suspected UPJ obstruction, the underlying reason for these variations is not clear. In this study, we found that physicians recognized the impact of parental sociodemographic factors on their discussions with families and recommendations for treatment, suggesting that differences in treatment may in part be due to differences in physician approach to families of different sociodemographic backgrounds.

While physicians generally utilized a standardized approach to communication and reported use of visual aids and analogy to improve parent understanding of their child's diagnosis, they recognized potential barriers to communication, such as language barriers and cultural differences. Despite these barriers, physicians did not report assessment of parental cultural beliefs to tailor communication with parents and a minority of physicians reported formal assessment of parental understanding of their child's diagnosis or treatment options. Despite not formally tailoring communication style based on parental preferences or values, physicians reported being more directive in their discussions with non-English speaking and minority parents. Additionally, physicians reported providing a more nuanced, interactive discussion with parents from higher educational backgrounds compared to those who were less educated, again suggesting different engagement of parents in the discussion of their child's treatment based on underlying sociodemographic characteristics. These demographic variations in communication style mirror those reported in adults and have been identified as a potential target for increasing patient/parent adherence to treatment recommendations and reducing health disparities [16,18,19].

Physicians were reluctant to identify race or socioeconomic status as influencing their treatment recommendations, similar to findings in prior qualitative studies [20]. However, they did recognize a lack of clear objective evidence on which to based surgical decisions for these patients and reported augmenting existing gaps in the literature with personal experience, leading to provider-level variations in care. Physicians also reported that concerns about patient lack of adherence and loss to follow up did affect their recommendations for surgery. Additionally, they did identify use of perceived social circumstances as a proxy for determining risk of loss to follow up, suggesting the potential of implicit bias influencing their assessment of potential risk of non-adherence. Physicians also utilized parent sociodemographic characteristics, including immigration status and distance from the hospital, as a proxy to determine parental preferences. These findings suggest, that while physicians do not explicitly consider sociodemographic characteristics when making treatment recommendations, these characteristics may have an implicit role on provider recommendations, leading to underlying disparities in care [20,21].

Our study has several limitations. First, although we did interview almost all pediatric urologists from three tertiary pediatric centers, our sample size is small, potentially limiting the generalizability of our findings to the broader pediatric urology community. Second, our sample of pediatric urologists was primarily white and male, limiting our ability to assess how underlying demographic and cultural differences of providers affected their approach to demographically diverse patients and families. Third, we focused on a small population of patients (infants with prenatal hydronephrosis suspicious for UPJ obstruction), potentially limiting the generalizability of our findings to a broader pediatric urology patient population. Despite these limitations, we believe that this study confirms prior qualitative work in the adult setting that suggests that physician communication and treatment recommendations are influenced by parental sociodemographic factors, including race/ethnicity [21].

This reliance on demographic characteristics to guide decisions may in part be due to the lack of clear guidelines for surgery in this population and may lead to potentially suboptimal outcomes, a concern raised by physicians in our study. As a result, we believe that clearer evidence-based guidelines, coupled with improved physician cultural competence and strategies to optimize communication with patients, may help to address demographic disparities in care and improve overall outcomes in these patients [21]. Further studies are needed to clarify the applicability of our findings to the broader pediatric surgical physician and patient population and to assess the potential impact of these interventions on previously described demographic variations in care.

4. Conclusions

In this study, physicians reported utilizing personal experience to address current gaps in the evidence for surgical decision-making in infants with suspected UPJ obstruction. Although physicians do not identify overt consideration of parental sociodemographics when making treatment recommendations, they do recognize the influence of educational, cultural, and language barriers on their communication with families. Additionally, physicians' consideration of risk of loss to follow up and attribution of parental preferences based on sociodemographic characteristics suggests an implicit consideration of demographics in treatment choice that may contribute to previously described demographic variations in care. These findings suggest that development of clearer, evidence-based criteria for surgery in infants with suspected UPJ obstruction and may reduce existing variations in care.

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Declaration of competing interest

The authors have no conflicts of interest.

Ethical approval

institutional review board approval was obtained for this study (COMIRB #15–0854).

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