

Design and Development of an Intervention to Improve the Quality and Safety of Pediatric Dental Sedation: A Human-Centered Design Approach

Kawtar Zouaidi, MPH, Jan Yeager, MDes,† Suhasini Bangar, BDS, MS,‡
Sayali Tungare, BDS, MPH, PhD,* Urvi Mehta, BDS, MPH,*
Janelle Urata, RDH, MS,§ Alfa-Ibrahim Yansane, PhD,||
Thomas Tanbonliong, DDS,¶ Jungsoo Kim, DDS,# Emily Sedlock, MPH,*
Krishna Kumar Kookal, MS,** Yan Xiao, PhD,††
Tokede Oluwabunmi, BDS, MPH, DMSc,‡‡ Heiko Spallek, DMD, MSBA,§§
Amy Franklin, PhD,||| Gregory W. Olson, DDS, MSc,¶¶
Joel White, DDS, MS,## Elsbeth Kalenderian, DDS, MPH, PhD,***††† and
Muhammad F. Walji, PhD, MS*†††*

Background: There are gaps in understanding the experiences of children, parents, and providers during dental conscious sedation. This study aimed to capture and analyze these experiences to identify opportunities for improvement and enhance the quality and safety of pediatric dental conscious sedation.

Methods: A human-centered design approach was used to examine the conscious sedation experience in 2 US advanced education pediatric dental clinics. Researchers conducted field observations, interviews with providers and parents, and providers focus groups to explore experiential factors. Data were transcribed and analyzed using content thematic analysis. Insights from the data were used to

explore and generate new solutions to improve dental conscious sedation quality and safety.

Results: A total of 25 observations, 18 interviews (9 providers, 9 parents), and 4 provider focus groups were conducted across both sites. The process identified 4 key improvement opportunities: helping providers navigate the ambiguity of patient behavior, facilitating rapport building between providers and patients/parents, aligning expectations and supporting sedation sensemaking, and making the sedation experience more patient-centered. A multi-component intervention was developed to address these needs, including a parent-facing brochure, a patient educational video, and an enhanced set of sedation records for providers to document patient and sedation information.

From the *Texas Center for Oral Healthcare Quality and Safety, UTHealth Houston School of Dentistry, Houston, TX; †Clinical Innovation Center, UCSF, San Francisco, California; ‡Department of Diagnostic and Biomedical Sciences, UTHealth School of Dentistry, Houston, TX; §University of California, San Francisco School of Dentistry, San Francisco; ||Preventive & Restorative Dentistry Sciences, University of California, San Francisco School of Dentistry, California; ¶Pediatric Dentistry, Graduate Program Director, Pediatric Dentistry, University of Washington, School of Dentistry, Seattle, Washington; #Pediatric Dentistry, University of California, San Francisco School of Dentistry, San Francisco, California; **Technology Services and Informatics and Texas Center for Oral Healthcare Quality and Safety, UTHealth Houston School of Dentistry, Houston; ††Colleges of Nursing and Health Innovation and Engineering, University of Texas at Arlington, Arlington; ‡‡Department of Diagnostic and Biomedical Sciences, UTHealth Houston School of Dentistry, Houston, TX; §§School of Dentistry, The University of Sydney, New South Wales, Australia; |||Faculty, and Community Affairs, McWilliams School of Biomedical Informatics, Houston; ¶¶Department of Pediatric Dentistry, School of Dentistry, UTHealth Science Center Houston, Houston, TX; ##Preventive and Restorative Dentistry Science, University of California, San Francisco School of Dentistry, San Francisco, California; ***School of Dentistry, Marquette University, Milwaukee, Wisconsin; †††School of Dentistry, University of Pretoria, Pretoria, South Africa; and ‡‡‡Department of Clinical and Health Informatics, McWilliams School of Biomedical Informatics, Houston, TX.

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Correspondence: Muhammad F. Walji, PhD, MS, Department of Clinical and Health Informatics, McWilliams School of Biomedical Informatics, Houston, TX, and Texas Center for Oral Healthcare Quality and Safety, UTHealth Houston School of Dentistry, 7000 Fannin Street, Suite 600, Houston, TX 77030 (e-mail: muhammad.f.walji@uth.tmc.edu).

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Conclusions: This study used human-centered design to identify key challenges in pediatric dental conscious sedation and develop a multicomponent intervention in collaboration with patients, parents, and providers. The research demonstrates the potential of this approach to enhance sedation quality and safety, with future studies needed to assess its impact.

Key Words: pediatric dentistry, sedation, patient experience, design thinking

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Despite the widespread use of pediatric dental conscious sedation, a comprehensive understanding of the lived experiences of children, parents, and providers remains limited.^{1,2} Existing research investigating the effectiveness of dental conscious sedation predominantly focuses on treatment ease and completion indicators, overlooking patient-centered outcomes such as child experience, anxiety reduction, and satisfaction.^{1–4} Also, research on professional stress and experiences in pediatric dentistry remains limited.⁵

Beyond facilitating treatment, sedation fosters trust, comfort, and confidence, helping children re-engage with dental visits positively. It also supports providers by reducing stress and emotional strain in managing children's behavior.¹ Uncooperative behavior in children during dental visits increases stress for dentists, lowers providers' and parents' satisfaction, and disrupts the patient experience.^{5,6} Yet, many children exhibit adverse behavioral reactions during conscious sedation.^{7,8} A survey conducted among pediatric dentists in the United States revealed that 50% of respondents reported patient agitation during sedation.⁸ Agitation during procedures often leads to incomplete treatments, delayed care, repeated visits, and negative experiences affecting patients, parents, and providers.⁷

Patient experience is a cornerstone of high-quality oral health care.^{9–11} Research showed that a positive patient experience is associated with safer and improved care.¹² By understanding patient needs, values, and experiences, health care professionals can provide a holistic, whole-person approach essential for delivering patient-centered care.^{13,14} Moreover, addressing negative patient experiences supports provider well-being by increasing job satisfaction and reducing burnout.¹⁵ Thus, a comprehensive assessment of the experiences of children, parents, and providers, and the environment in which they interact is essential to improving pediatric dental sedation quality and safety.

Engaging providers and patients as partners in designing quality and safety improvement interventions is essential for creating supportive and effective care environments.^{16,17} Human-centered design (HCD), or design thinking, is an approach used across various disciplines to improve experiences by prioritizing the needs and perspectives of individuals within the systems they engage.^{18–20} HCD engages stakeholders throughout the design process, from needs assessment to solution implementation, emphasizing empathy and collaboration to create solutions that meet the needs of all involved.^{21,22} The Double Diamond Model (DDM) provides a structured framework for applying design thinking principles to generate creative solutions.^{23,24} It has been successfully used in a variety of clinical areas, including the development of interventions in health communication, orthopedics, and radiology.^{25–29}

In this study, we applied the DDM to explore and improve the experiences of patients, parents, and providers during pediatric dental conscious sedation. In this paper, “parents” refers to parents and legal guardians.

METHODS

Setting

This study was conducted at 2 US advanced education pediatric dental clinics, one on the West Coast and the other in the South-Central region. The design period lasted 17 months (September 2021–January 2023), followed by a 1-month pilot test (April 2023). The study received ethical approval from the university's Institutional Review Board.

Participants

Research team: The multidisciplinary research team comprised experts in pediatric dentistry, sedation, patient safety, qualitative and quantitative methods, implementation science, health informatics, human factors, and HCD.

Parent participants: Two research team members recruited parents of children receiving dental care under conscious sedation at both sites. Eligible participants received study details and were assured of voluntary participation. A written informed consent was obtained.

Provider participants: Providers, including faculty and residents directly involved in pediatric dental care under conscious sedation, were recruited at both sites. Participants received study details. A written consent was obtained.

Study Framework: The Double Diamond Model

The DDM includes 4 steps: discover, define, develop, and deliver. It is visually represented by 2 adjacent diamonds.²³ The first diamond, the problem space, clarifies and defines the problem, whereas the second diamond, the solution space, focuses on generating, prioritizing, and developing solutions.^{23,24} The graphic depiction of the DDM in Figure 1 outlines the specific activities within each phase.

Discover and Define

This phase explored the conscious sedation journey through field observations, interviews with providers and parents, and an audit of existing artifacts. The objectives were understanding clinical workflows, the patient journey from referral to recovery, interactions among providers, patients, and parents, and the physical environment. Observations and interviews continued until data saturation was achieved.

At each site, 2 calibrated research team members with expertise in qualitative methods conducted observations during conscious sedation. Calibration involved joint initial observations and a debriefing led by a qualitative and HCD expert. Observations followed a predefined framework assessing physical space for child-friendliness, multilingual resources, and atmosphere for emotional tone, engagement, human interactions, and responsiveness. Workflow sequences were also observed, including history intake, child preparation, consent, and sedation delivery.

Two interview guides were created based on observation insights—1 for providers and 1 for parents. Two research team members, experts in qualitative methods and

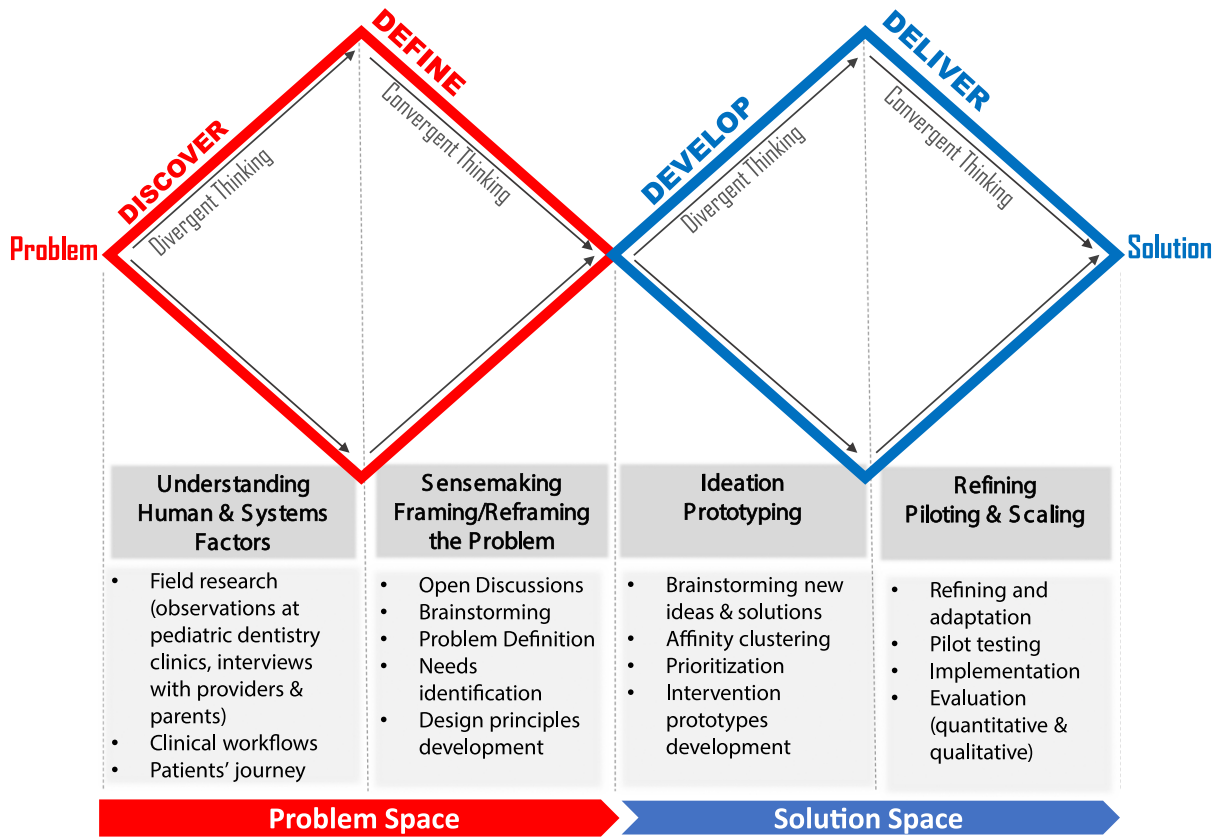


FIGURE 1. The double diamond model (2005, adapted. Source: The Design Council. Licensed under CC BY 4.0.²³).

HCD, conducted virtual semi-structured interviews, with one assigned per site. Parent-focused questions explored their understanding of oral health, pre-sedation and post-sedation instructions, comfort in asking questions, emotional responses, and challenges in following recovery guidelines. Providers were asked about their communication with parents, including the frequency, content, and channels used to set expectations. In addition, providers were asked about their concerns during sedation, patient preparation, and safety protocols. Parent and provider interviews were scheduled for 1 hour.

Observation data were used to create a schematic of the sedation journey, mapping activities and interactions among providers, patients, and parents. This visualization helped identify areas for improvement by illustrating the flow of care and pinpointing potential inefficiencies. Interviews revealed key themes on beliefs, perceptions, expectations, experiences, and challenges providers and patients face during the sedation journey. The research team used these findings to identify key design principles guiding the next steps.

Develop and Deliver

This phase generated ideas and prototypes, enabling exploring potential intervention designs. Participants shared insights and solutions and then prioritized them based on their impact on safety, quality of care, and satisfaction within existing constraints and resources. This was achieved during 2 virtual ideation-prioritization sessions, each lasting 2 hours. The highest-prioritized solutions were selected for prototype development and testing at both sites.

The intervention was pilot-tested over 1 month at both sites to assess feasibility, identify challenges, and gather feedback. The focus was refining the design, optimizing processes, and preparing for a larger-scale rollout. Before testing, providers participated in a 1-hour focus group at each site to review and receive training on the materials. Of note, wide implementation is not covered in this paper and will be reported separately.

During pilot testing, 2 research team members with expertise in qualitative methods conducted field observations to assess intervention delivery at each site. Key aspects included provider roles, time spent on each component, patients and parents' engagement, content consistency and clarity, and challenges faced. Observations continued until data saturation was achieved. At the end of the pilot phase, a 1-hour focus group was conducted at each site to gather provider feedback. Led by 2 team members with expertise in qualitative methods and HCD, the focus groups explored challenges faced using the new materials, including visit length, acceptability, and training adequacy. Providers also identified areas for improvement in content and workflow.

Data Collection and Analysis

Figure 1 illustrates the specific activities undertaken within each phase of the DDM. To maintain the iterative nature of the process, data collected at the end of each phase were analyzed to inform subsequent phases. Data sources included observation notes, transcripts from semi-structured interviews and focus groups, and recordings of design meetings. Interviews and focus groups were audio recorded, whereas design meetings were video recorded. All audio and

video recordings were transcribed. Transcribed data were analyzed using deductive thematic analysis.

RESULTS

Discover and Define

We conducted 10 field observations and interviewed 9 providers and 9 parents across both sites. Data saturation was achieved, ensuring comprehensive insights. Observations revealed communication challenges from limited language resources, technical language, and complex translation processes, often involving dental assistants and other staff. The conscious sedation journey was similar across both sites, with a 1 to 3 month gap between referral and appointment. During this period, the dental team has minimal contact with patients except in emergencies. In the 1 to 2 weeks before the sedation appointment, several touchpoints occur with parents regarding their child’s health and safety. Although standard safety messages were included in the script providers give to parents, they were not always effectively transmitted. These communications are often delivered through phone calls or audio messages with no confirmation of receipt. Figure 2 maps the sedation safety instruction messages received by parents throughout the sedation journey.

The interviews provided insights into providers’ and parents’ experiences with sedation. Providers discussed patient care approaches and challenges, whereas parents shared their expectations, concerns, and feedback. Five themes were identified during thematic analysis: (i) getting a handle on oral health, (ii) getting to sedation, (iii) building patient-provider rapport, (iv) making sense of sedation, and (v) learning paradigm. Table 1 summarizes themes, selected codes, and quotes from interviews with providers and patients.

Theme #1: Getting a Handle on Oral Health

Parents value oral health but struggle with daily oral hygiene implementation. They are surprised by the rapid onset of tooth decay, indicating a lack of awareness of lifestyle impacts on their children’s oral health. Parents also face challenges in implementing preventive practices. We found that (i) parents impose their mindsets, assumptions, and biases, (ii) there are conflicting attitudes and behaviors in multigenerational homes, and (iii) parents have difficulty engaging children in toothbrushing and flossing routines. A parent shared that their dental fear kept them from taking their children to appointments; “I don’t want to go to the

dentist myself unless I need to. I hate dentists, so I don’t want to take him, but I need to take him.” [Parent]

Theme #2: Getting to Sedation

Providers emphasized careful sedation candidate selection using medical and behavioral criteria. Unlike factual medical criteria, behavioral assessments for sedation are subjective. Widely used behavioral assessment tools in pediatric dentistry are insufficient, with many uncontrollable factors affecting sedation outcomes. A provider described the ideal sedation candidate as a cooperative child; “The ideal sedation candidate is someone who wants to help... They’re just really scared...They’re just really nervous, and they just need something to get them over that.” [Provider]

Theme #3: Building Patient-provider Rapport

Providers and parents noted that building rapport requires time to connect and engage. Numerous challenges persist: (i) residents’ clinical rotations limit regular patient interactions, (ii) sedation discussions exclude the child, (iii) providers rely on ‘secondhand’ behavior reports such as behaviors reported by parents and others, so the child is still a ‘black box’ going into the sedation, (iv) children receive limited sedation preparation, and (v) language barriers complicate communication, with translators missing empathetic nuances. A provider stressed that a child’s sedation response is unpredictable and can only be assessed in real-time; “So, until you meet the child, and you try it, you don’t actually know the child’s personality and how they’re going to react and how they’re going to respond to your request.” [Provider]

Theme #4: Making Sense of Sedation

Parents often struggle to comprehend conscious sedation and their role in ensuring safety, such as fasting rules. Moreover, parents with limited English proficiency struggle with technical terms, increasing the burden on time-pressed providers to bridge communication gaps. “Because we have had situations where parents lie, they come in, and they fed their child in the morning, and because they want the treatment done, they lie. I started being more detailed so they understand the seriousness of the rules before we do sedation.”[Provider] Moreover, some messages confuse roles and responsibilities; a parent voiced concern about not being present during their child’s procedure, expressing anxiety over the uncertainty; “But I wasn’t going to be in the room...And I was worried about it because I didn’t know what, you know, if he was going to be scared...he’s not seeing his mom or anyone familiar to him there. Also, it’s

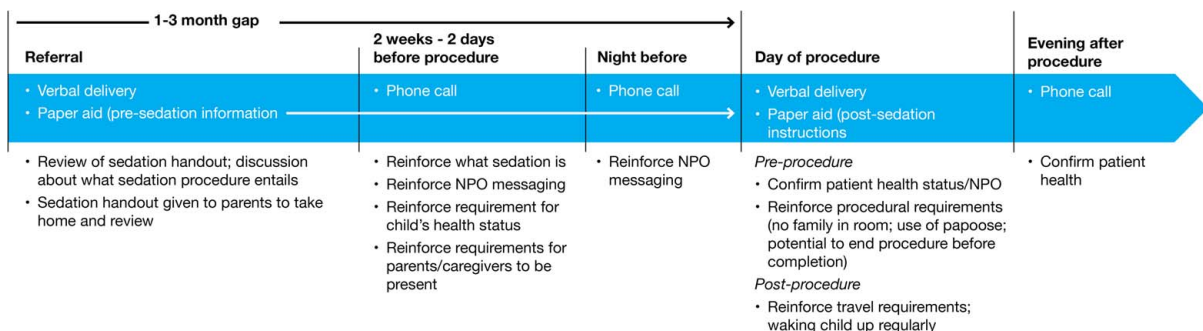


FIGURE 2. Current state journey map of dental sedation-related instruction messages received by parents.

TABLE 1. Themes and Selected Codes and Quotes From Parents and Providers Interviews

Theme	Codes in theme	Interview quotations
Getting a handle on oral health	Patients' sensitivity Importance of a healthy mouth Early dental experience Parental influences	Parent: "The dentist was, like, I can't work on him, he's going have to be sedated in order for anybody to do anything in his mouth". Parent: "When it came down to messing with her mouth very much, she didn't take it well. She has an abnormal fear of needles." Parent: "I think all doctors scare him, because even with his regular physician, he cries even for regular checkups, just being touched" Parent: "I don't want to go to the dentist myself unless I need to. I hate dentists, so I don't want to take him, but I need to take him." Parent: "It's really hard. My parents co-parent with me. My side of taking care of my son is not to have all those candies but their side is here have it all when your mom is not here."
Getting to sedation	Case selection Parent concern	Provider: "The ideal sedation candidate is someone who wants to help. They're just really scared. They're just really nervous, and they just need something to get them over that." Parent: "We were given a choice. It's either they do it in the operating room. They would make him sleep and do everything at once, or they could try to make him calm a bit and then do the procedure. So, I am against making sleep. I try to avoid making sleep for safety concerns"
Building patient-provider rapport	Being comfortable Establishing trust Knowing what to expect Anticipating outcomes Language barrier	Provider: "In residency as the operator, we discuss with the parents before we see the child, so we get comfortable with each other" Provider: "Sometimes someone else saw them and referred them, so you might not have had the chance to get to know them ahead of time. And so, the first time you're seeing them you are trying to build trust with them." Provider: "So, until you meet the child, and you try it, you don't actually know the child's personality and how they're going to react and how they're going to respond to your request." Provider: "The translator is going to translate verbatim, but they're not going to be able to give any of the empathetic or understanding of parents' facial expressions or obvious querying about do they understand something, they're just going to tell what you said." Parent: "Overall, it was so clear what was going to be done or what to even expect afterwards."
Making sense of sedation	The why behind messaging Parents' roles	Provider: "I do get a little bit more detail and I explain why over the phone. Because we have had situations where parents lie, they come in and they fed their child in the morning and because they want the treatment done, they lie." Provider: "I've had parents come back and they're like, oh, I didn't know that I wasn't allowed to be in the room. And I'll be like, well, it's on the form that we gave you. But obviously people forget" Provider: "I think some parents just aren't interested in understanding" Parent: "But I wasn't going to be in the room. And I was worried about it because I didn't know what, you know, if he was going to be scared, he's not seeing his mom or anyone that's familiar to him there. Also, it's traumatizing. So, I kind of was worried about him getting more traumatized than he already is."
The learning paradigm	Managing patient behavior Decision making about outcome of sedation Providers' satisfaction	Provider: "We're usually pretty comfortable with the procedure itself. It's the unknown of the patient behavior and how they'll react to the medication" Provider: "I don't want them to be moving. I need you to be more still. And so those cases I'm like, this is not going to work. And I don't feel comfortable moving forward with this case if they aren't going to." Provider: "I think it's one thing to like kids, it's another thing to feel like you're the one responsible for causing any sort of discomfort or being a source of fear for them. I think that's always a difficult position to be in because we don't want to be the bad guy." Provider: "...there are definitely days where you're like, I feel bad because the kid, even after sitting up just, like, didn't calm down, and they're just, like so scared. I think sometimes that kind of weighs heavy on you..."

traumatizing. So, I was worried about him getting more traumatized than he already is." [Parent]

Theme #5: The Learning Paradigm

Managing patient behavior during conscious sedation is a challenge for dental residents. Unexpected sedation outcomes impact residents' satisfaction and emotional well-being. Balancing patient distress with treatment goals is

complex, requiring residents to navigate behavior as it unfolds while balancing their training and comfort levels. A provider acknowledged the emotional challenges of seeing a child remain distressed even after the procedure; "...there are definitely days where you're like, I feel bad because the kid, even after sitting up...didn't calm down, and they're just, like so scared. I think sometimes that weighs heavy on you..." [Provider]

TABLE 2. Needs and Design Principles

Needs	Design principles
<ul style="list-style-type: none"> • More insight into patients’ behavior to select, plan and set expectations for sedation procedures • Recover from stressful procedures • Formalize information sharing about patients from resident to resident • To feel comfortable with the provider and the setting • Be included in the conversation • To be acknowledged as an active participant • Meet me where I am • Clarity around my role in safety • Better tools for communication with LEP families • Reassurance during the procedure that my child is ok 	<p>Help residents navigate the ambiguity of patient behavior</p> <p>Facilitate provider-patient/parent rapport building</p> <p>Make the sedation experience patient-centered</p> <p>Support sensemaking about sedation</p>

Development of Design Principles

Insights from the discover and define phases shaped 4 design principles based on needs identified through observations and interviews. These design principles served as ‘guideposts’ for the subsequent phases. Table 2 summarizes the identified needs and the design principles developed.

Develop and Deliver

Ideation and Prioritization Sessions: Key Findings

Ideation and prioritization sessions involved all research team members and 4 providers from both sites. A separate session was held for parents, with one attendee and a research team member. Over 300 ideas were generated during the ideation session, including a “5 Things to Know About My Patient” guide, a parental anxiety questionnaire, feedback on children’s stress responses, and shared bonding activities with the child, such as a dance or calming exercises. Figure 3 shows a snippet of ideas from the ideation session. The prioritization session focused on evaluating each idea’s impact on safety, quality of care, emotional well-being, and satisfaction while also considering feasibility within the existing resources. The top-rated concepts focused on aligning expectations among patients, parents, and providers, improving case selection through more comprehensive behavioral assessments, and strengthening rapport-building. These high-priority concepts were used as the foundation to develop intervention prototypes designed to address the identified needs.

Intervention Prototypes

The intervention prototype included 3 components:

Prototype 1. Parent-facing brochure “*Pediatric Dental Care with Conscious Sedation: What-to-Expect*” (Appendix A, Supplemental Digital Content 1, <http://links.lww.com/JPS/A742>): This document provides clear and essential information on what to expect before, during, and after conscious sedation. It highlights key safety messages through simple graphics and information design standards, like typographic hierarchy and plain language. Available in English and Spanish, the brochure is a comprehensive guide to help patients and parents navigate dental conscious sedation.

Prototype 2. Parent and patient orientation “Beni’s Sedation” video: A short, child-friendly video called “Beni’s Sedation” familiarizes patients with the sedation experience using a stuffed animal to simulate the visit from health check to recovery. Available in English and Spanish, it can be accessed through a QR code on the brochure. (Appendix A, Supplemental Digital Content 1, <http://links.lww.com/JPS/A742>)

Prototype 3. Sedation records enhancement: We revised existing clinical forms at both sites, incorporating behavioral data sections. The existing clinical forms at both sites were derived from the American Academy of Pediatric Dentistry (AAPD) procedural sedation record.³⁰ The redesigned forms now include (i) a preoperative sedation paper form with detailed questions about patients’ temperament, behaviors, and attitudes toward dental appointments (Appendix B, Supplemental Digital Content 2, <http://links.lww.com/JPS/A743>), (ii) an intraoperative sedation paper form with a section for recording patient behavior during sedation (Appendix C, Supplemental Digital Content 3, <http://links.lww.com/JPS/A744>), and (iii) a post-discharge form to collect standardized post-discharge information (Appendix D, Supplemental Digital Content 4, <http://links.lww.com/JPS/A745>).

Pilot Testing: Key Findings

We conducted 15 observations of sedation appointments and 2 focus groups with all the providers who used the intervention prototypes across both sites (37 providers). Observations showed that the brochure integrated well with the clinical workflow, with providers confidently referencing it. Providers also referenced Benny’s sedation video QR code to parents. However, sometimes providers omitted to review the brochure content with parents, and non-English-speaking parents were often not informed about the video. In addition, there were challenges in determining an accessible location for the brochure, leading to instances where providers forgot to distribute it.

Observations revealed inconsistent use of the preoperative sedation form, with providers rarely completing it in full. Contrary to its intended purpose, the form was filled out after patient dismissal based on providers’ recollection rather than being used as a real-time communication and rapport-building tool. This component of the intervention was underutilized. Key barriers included time constraints and redundant data entry. During focus groups, providers mentioned having multiple documentation requirements within the patient’s electronic health record (EHR) that conflicted with using the preoperative form. They recommended digitizing the form to improve usability and integration into the workflow.

The intraoperative sedation form was consistently used, with residents showing confidence and consistency. Using the intraoperative sedation record did not require additional time or changes to the workflow, as it seamlessly replaced the previous document. The workflow for patient intake, sedation drug administration, patient monitoring, and discharge remained unchanged. Providers found the

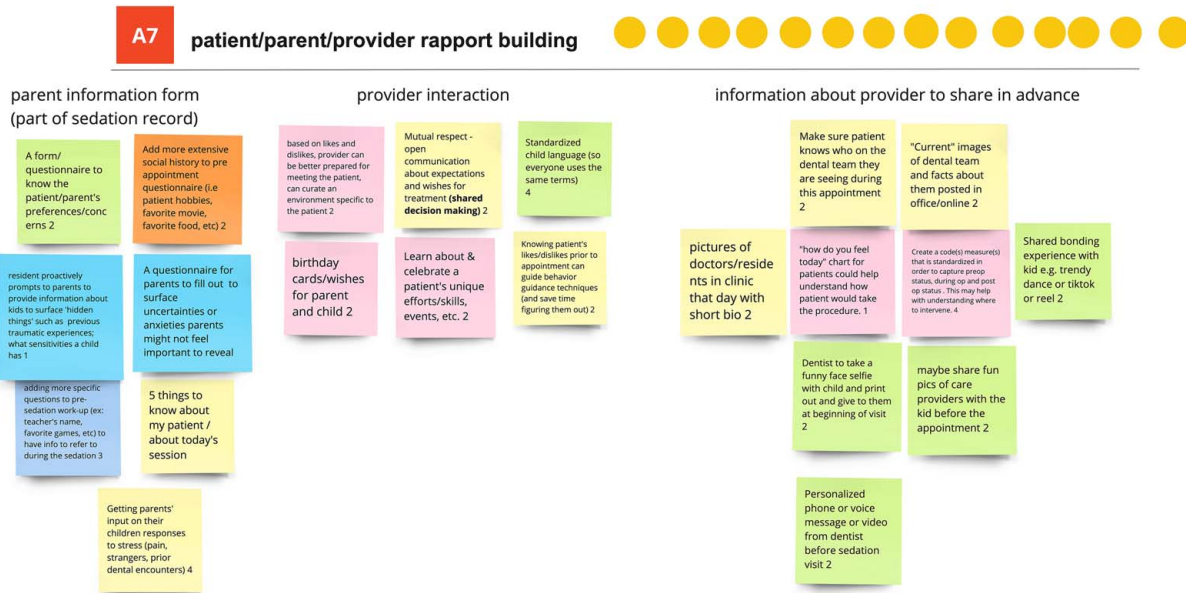


FIGURE 3. Digital whiteboard showing ideas collected during ideation-prioritization sessions. Yellow dots indicate ‘votes’ by participants to prioritize this higher-level concept.

new form easy to use but recommended condensing it to a single double-sided page. The post-discharge sedation form was inconsistently used; providers recommended digital integration into the EHR.

Utilizing the insights from the pilot testing period, prototypes underwent iterative revisions and refinements before wide implementation. Observations of inconsistent form usage and direct provider feedback drove key design and content revisions. Specifically, the video’s QR code was emphasized on the brochure to improve access. In addition, to address workflow challenges and enhance accessibility, both the preoperative and postoperative sedation forms were transitioned to a digital format within the EHR. The final refined intervention and its outcomes will be reported in a separate manuscript.

DISCUSSION

This study used an HCD approach to understand and improve the human experience during pediatric dental conscious sedation. This approach has been successfully applied across various sectors, including health care.^{20,31} Our study gives a comprehensive description of the environment in which providers, patients, and parents interact beyond the traditional focus on treatment completion under conscious sedation. Such description is needed for innovative, adaptive, and participatory approaches to improve outcomes and reduce inefficiencies by engaging multiple stakeholders, managing their expectations, and operating across various interfaces.^{17,32,33} To our knowledge, using design thinking in exploring the experiences around pediatric dental conscious sedation is novel. Our work extends beyond the practical aspects of dental visits to explore the emotional and psychological dimensions that shape patient experiences, such as concerns, fears, and expectations. With growing emphasis on enhancing patient experiences in health care, understanding these perspectives is pivotal for transitioning toward patient-centered care.^{17,34,35} Positive patient experiences correlate with

improved adherence to medical advice, better health outcomes, and improved satisfaction.^{36–38} Moreover, enhancing the patient experience benefits health care providers by reducing stress levels and burnout while fostering greater satisfaction.^{39,40}

Design tools, such as journey maps, allowed the team to examine the conscious sedation experience from the perspectives of patients, parents, and providers. Journey mapping is a valuable tool in health services research.²⁹ It serves as a flexible, user-centered tool that informs the design of interventions and enhances health care experiences. This process revealed key touchpoints and pain points throughout the sedation journey, highlighting moments where communication gaps were most likely to occur. We found that the timing and communication methods, such as last-minute or phone-based instructions, often diluted the effectiveness of safety messages, potentially impacting patient preparedness. Thus, the team developed a brochure and sedation video, providing parents with a tangible resource to reference before the appointment. These materials served as a guide to answer common questions, set clear expectations, and support provider-parent discussions.

In addition, this study identified challenges in navigating ambiguous patient behaviors, establishing rapport, and aligning expectations. The team designed a preoperative sedation form to guide and structure discussions among providers, patients, and parents. The form includes rapport-building and temperament-related questions, helping providers better understand their patients beyond the dental appointment. Simultaneously, incorporating a section on behavioral data collection in the intraoperative form provides a comprehensive view of the sedation process. This reinforces the message that the effectiveness of sedation extends beyond treatment completion and procedural ease. It encourages a more holistic approach that prioritizes the child’s emotional safety, ensuring their experience is considered. Engaging providers in the design process

promoted shared ownership and collaboration, ensuring that interventions were practical and feasible. This collaborative approach enhanced usability and acceptance while fostering a culture of innovation, continuous improvement, and better health care experiences for patients and providers.

The HCD approach highlights the importance of patient-centered care, demonstrating that engaging stakeholders yields practical solutions. However, challenges included balancing diverse perspectives, managing time-intensive iterations, integrating interventions into workflows, and coordinating varied data collection. Moreover, parent participation was particularly challenging due to frequent no-shows during interviews and design sessions. This study has limitations. The findings of this study are not fully generalizable as the study was performed in 2 academic dental settings. Some other limitations stem from the novelty of this work. Unexpected events, such as the opening of a new clinic at one site and the other site's transition to a new EHR system, along with the need to accommodate different institutional schedules, organizational and curricular structures, and IRB approvals, caused significant challenges.

CONCLUSIONS

The potential of HCD in health care is promising. Despite all the challenges, the collaborative design process successfully identified key opportunities for improvement in pediatric dental conscious sedation. This study reinforces the value of actively involving stakeholders in health care design. In future work, we will implement and test the efficacy of the intervention and further assess its impact on the quality, safety, and care experience.

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