

## ORIGINAL RESEARCH

# Behavioural management and parental acceptance and attitude towards different behaviour management techniques (BMTs) used in Paediatric Dental Care for children with hearing and visual disabilities—a pilot study

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## Abstract

**Background:** Despite the increasing recognition of the importance of behavior management techniques (BMTs) or behavior guidance in dentistry, there remains a significant research gap regarding the optimal strategies for effectively managing behavior and enhancing treatment outcomes in disabled special children. The objectives of this study were to explore the various behavior management techniques used in children with disabilities and to evaluate their parental acceptance and attitude towards these interventions used during dental treatment. **Methods:** In this cross-sectional study, pediatric patients with hearing and visual disabilities and their parents were recruited from the Dental Hospital. The Specialist Pediatric dentist screened and planned the treatment of each patient and chose the BMTs for them after taking into consideration their age, medical condition, treatment needs and cooperation level. Parents were asked to view a brief video illustrating various BMTs and subsequently complete a validated questionnaire consisting of three parts: sociodemographic information, acceptance of BMTs, and expectations regarding their efficacy. Descriptive statistics, Chi-square tests, and logistic regression analyses were employed for data analysis. **Results:** In this study, 73 children with visual or hearing impairment and their parents participated. The most approved technique was Distraction (82.2%) and the least favored technique was Hand over Mouth (4.1%). Visually impaired children showed a lower likelihood of preferring Tell Show Do, Nonverbal Communication and Distraction (Odds Ratio (OR): 0.54; OR: 0.015; OR: 0.17, respectively) compared to hearing-impaired children. Most parents (87.7%) believed in the importance of applying various behavior guidance techniques, and the majority (95.9%) emphasized the necessity of obtaining informed consent from the child's parent before employing any behavioral techniques. **Conclusions:** The preferred behavioral management techniques for children with visual or hearing impairment diverge slightly from those for typically developing children, with Distraction, positive reinforcement and nitrous oxide sedation emerging as the favored methods.

## Keywords

Parental acceptance; Behaviour management techniques; Behaviour guidance; Disabled children; Dental care for children; Dental management; Child behavior

## 1. Introduction

Children with disabilities, including those with functional limitations due to intellectual, emotional, developmental, sensory or physical impairments [1]. Conditions such as Down syndrome, seizure disorders, visual and hearing impairments, cleft lip and palate and other craniofacial abnormalities are common

examples. The chronic nature of these impairments frequently complicates oral health management, intensifying the risk and severity of dental issues like caries and periodontal disease. Children with impairment often face unique challenges that require specialized care to ensure quality dental treatment [2, 3]. Factors like sensory and communication barriers, heightened distress, and previous traumatic experiences can amplify

their anxiety, leading to increased nervousness. This, in turn, presents significant challenges for both the dentist and the child during dental procedures [4]. Their special condition, requirements and unique needs, demand a personalized approach for their dental treatments [5]. The special need children face issues like sensory processing difficulties and communication barriers. These challenges can exacerbate fear and anxiety, making it difficult for children to feel comfortable and cooperative. Behavior management techniques (BMTs) address these specific needs by providing strategies tailored to reduce distress and support participation in treatment. Behaviour management techniques (BMTs) play a vital role in improving their dental experience and oral health outcomes. With the help of these different BMTs dentist can ease their concerns and fears promote a positive experience and improve their oral health [6].

The application of behavior management techniques depends on the unique needs and capabilities of each child. Traditional approaches such as Tell Show Do, positive reinforcement, and distraction techniques have been widely employed to create a relaxed and cooperative environment during dental procedures [7]. Additionally, the use of non-pharmacological techniques like desensitization, behaviour shaping, and communication aids can aid in reducing fear and anxiety, enabling children to actively participate in their dental treatment [6]. Considering the varied nature of disabilities and the unique challenges they entail, it's essential to assess how effective these techniques are in different situations and understand parents' acceptance of these interventions [8, 9].

Despite the increasing recognition of the importance of behaviour management techniques (BMT) in dental treatment for children with disabilities, there remains a significant research gap regarding the optimal strategies for effectively managing behaviour and enhancing treatment outcomes in this special population. Existing research primarily focuses on the utilization of BMT in typically developing children or those without disabilities, with limited attention given to the unique needs and challenges presented by children with disability, and a comprehensive understanding of the most effective and evidence-based approaches is lacking [2, 10, 11]. Consequently, there is a lack of research specifically investigating the efficacy of behaviour guidance techniques tailored to the diverse range of disabilities encountered in dental settings. Additionally, the majority of studies on BMT for children with disabilities are relatively very small-scale, single-center investigations, limiting the generalizability of their findings [12, 13]. Furthermore, the current literature lacks a comprehensive examination of the long-term impact of behaviour management techniques on oral health outcomes, including treatment compliance, oral health status and the development of positive dental attitudes and behaviours in children with disabilities. Understanding the sustained effects of these interventions is crucial for informing clinical practice and developing evidence-based guidelines for dental professionals. The hypothesis guiding this study is that children with disabilities, especially those with sensory and visual impairments, will demonstrate distinct preferences for BMTs compared to typically developing children. By conducting a comprehensive study that systematically investigates

different BMTs along with their parents' attitudes towards these BMTs, dental professionals can gain valuable insights to develop targeted interventions and protocols that are evidence-based, patient-centered and ultimately improve oral health outcomes for children with disabilities. Therefore, the objectives of this study were to explore the various behaviour management techniques (BMT) used in children with hearing and visual disabilities during their dental treatment and to evaluate their parental acceptance and attitude towards these interventions used during dental treatment.

## 2. Materials and methods

This cross-sectional study was conducted at the Department of Paediatric Dentistry, Dental Hospital of Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), Islamabad, Pakistan from July 2023 to March 2024. The non-probability convenient sampling technique was adopted for this study to recruit children and parents of these children with visual or hearing impairment who attended the dental hospital for dental treatments. Paediatric patients up to 18 years old with hearing and visual disabilities along with their parents who are willing to participate and watch the small videotape of different behavioural management techniques (BMTs) were included in this study. Children with other types of disabilities, such as behavioral problems or intellectual disabilities, and who were not willing to participate, were excluded from the study.

Given the lack of prior studies specifically addressing behavior management and guidance techniques in children with disabilities, this study was designed as a pilot study with the aim of establishing initial insights assessing the feasibility of the research design, and methods, and identifying potential obstacles. Recruiting children with disabilities and their parents for research poses significant challenges, including reaching this specific population and obtaining the necessary specialized consent. As a pilot study, the sample size was sufficient to provide valuable preliminary data.

The ethical approval of this study was obtained from the ethical review board of SZABMU (Ref. No. SOD/ERB/2023/42), and written consent was taken from the participant's parents after providing them with all the information about the study. All the BMTs, Tell Show Do (TSD), Positive Reinforcement (PR), Nonverbal Communication (NC), Voice Control (VC), Parent's Separation (PS), Distraction (Dis.), Hand over Mouth (HOM), Physical Restraints (PhR), Hypnosis (Hyp), Nitrous Oxide Sedation (NO.), Conscious Sedation (CS), General Anaesthesia (GA) used in this study were approved by American Academy of Paediatric Dentistry (AAPD) [14]. The Specialist Paediatric dentist screened and planned the treatment of each patient and chose the BMTs for them after taking into consideration their age, medical condition, treatment needs and cooperation level. The parents of each patient were requested to complete a questionnaire that was adopted by Mahmoud Alammouri (2006) [15]. To ensure its relevance and appropriateness for our study objectives and target population, we conducted a thorough review and validation process. An expert panel consisting of four members—Associate and Assistant Professors of Pediatric

Dentistry, an Assistant Professor of Epidemiology, and an Assistant Professor of Dental Public Health—reviewed the questionnaire items. Their feedback was incorporated into the final version of the questionnaire. The questionnaire's internal consistency was assessed using Cronbach's alpha, yielding a high-reliability score of 0.83, indicating strong internal consistency.

The questionnaire consisted of three parts, and parents were asked to watch a short video before completing it that showed different BMTs. To facilitate understanding of various behavior management techniques (BMTs) and ensure accurate responses to the questionnaire, a new video was created for this study, as the video used in the previous study by Boka *et al.* [16] (2014) could not be used due to copyright restrictions. Three children (two girls, aged 8 years and one boy, aged 9 years) participated in the video with written informed consent from their parents. These children were instructed to react as if they were receiving dental treatment. The video, which lasted 10 minutes, was recorded in the Dental Hospital of SZABMU. It included demonstrations of the above-mentioned BMTs in the same order as presented in this study. By presenting these techniques in a structured manner, the video served as an educational tool, helping parents to better understand the different BMTs. This improved their ability to provide informed responses to the questionnaire regarding the acceptance and attitude towards these interventions for their children.

The first part of the questionnaire collected the sociodemographic information (age and gender of parents and children, education level of parents and type of disability) of the patients and their parents. The second part of the questionnaire determined the parents' acceptability of each BMT in the form of 12 questions with yes or no answers, and lastly, the third part determined parents' expectations and general acceptance of BMTs. This part consisted of 3 questions with yes or no answers which are as follows:

1. The necessity or significance of BMT to be performed in order to achieve a successful treatment (BMT importance in treatment).
2. Was any of the listed BMT used on your child? (BMT exposure or experience).
3. Is informed consent of the child's parent mandatory to be attained to apply any BMT on the child? (Parent Informed consent).

Descriptive statistics, including summary statistics and frequency tables, were compiled. Chi-square and logistic regression analyses were conducted to explore the factors linked to Behavior Management Techniques (BMTs) and parental acceptance of BMTs. All analyses were conducted at a significance level of 5% using IBM SPSS software version 25.0 (SPSS Institute, Chicago, IL, USA).

### 3. Results

A total of 73 children with visual or hearing impairment and their parents participated in this study. Among them, a slightly higher percentage of children had hearing impairment (56.2%) compared to those with visual impairment (43.8%). A significant portion of the children (43.8%) fell into the 14–17 years age group, and the majority were male (53.4%). Regarding

the parents, most were aged above 30 years (65.7%), female (58.9%) and had completed college or university education (76.7%) (Table 1).

**TABLE 1. Sociodemographic characteristics of the participants (N = 73).**

Variable	N (%)
Age of Child (yr)	
6–9	21 (28.8)
10–13	20 (27.4)
14–17	32 (43.8)
Age of Parents (yr)	
18–29	25 (34.2)
30–41	25 (34.2)
>41	23 (31.5)
Gender of Child	
Male	39 (53.4)
Female	34 (46.6)
Gender of Parents	
Male	43 (58.9)
Female	30 (41.1)
Education of Parents	
No formal	5 (6.8)
School	12 (16.4)
College	31 (42.5)
University	25 (34.2)
Disability	
Visual Impairment	32 (43.8)
Hearing Impairment	41 (56.2)

Table 2 displays parental preferences for various behavior management techniques during their children's dental treatment. The top three techniques approved by parents were Distraction (82.2%), positive reinforcement (76.7%) and Nitrous Oxide Sedation and GA (71.2%). Conversely, the least favored techniques were Hand over Mouth (4.1%), Parent Separation (11%) and Physical Restraints (15.1%). However, none of the behavior management techniques included in the study received unanimous acceptance or rejection (100%) from all parents.

The likelihood of preferring Tell Show Do (TSD), Nonverbal Communication (NC) and Distraction (Dis.) were lower in visually impaired children compared to hearing-impaired children (OR: 0.54; OR: 0.015; OR: 0.17, respectively). However, the parents of visually impaired children were more likely to prefer Voice Control (VC) (OR: 8.52) BMTs compared to the parents of visually impaired children (Table 3).

Most parents expressed belief in the importance of applying various behavioural management techniques for successful dental treatment, with 87.7% acknowledging this factor. When asked about their children's past experience or exposure to any

**TABLE 2. The response of parents to various BMTs.**

Technique	Responses	
	Yes N (%)	No N (%)
Tell Show Do (TSD)	45 (61.6)	28 (38.4)
Positive Reinforcement (PR)	56 (76.7)	17 (23.3)
Nonverbal Communication (NC)	43 (58.9)	30 (41.1)
Voice Control (VC)	25 (34.2)	48 (65.8)
Parent's Separation (PS)	8 (11.0)	65 (89.0)
Distraction (Dis.)	60 (82.2)	13 (17.8)
Hand over Mouth (HOM)	3 (4.1)	70 (95.9)
Physical Restraints (PhR)	11 (15.1)	62 (84.9)
Hypnosis (Hyp)	40 (54.8)	33 (45.2)
Nitrous Oxide Sedation (NO.)	52 (71.2)	21 (28.8)
Conscious Sedation (CS)	45 (61.6)	28 (38.4)
General Anesthesia (GA)	52 (71.2)	21 (28.8)

**TABLE 3. Comparison of parental preferences for behavior management techniques (BMTs) in children with visual and hearing impairments.**

Technique (Yes)	Visual Impairment N (%)	Hearing Impairment N (%)	Total N (%)	Unadjusted OR	<i>p</i> -value	Adjusted OR**	<i>p</i> -value
Tell Show Do (TSD)	9 (28.1)	36 (87.8)	45 (61.6)	0.17 (0.003–0.11)	0.001*	0.54 (0.16–1.18)	0.001*
Positive Reinforcement (PR)	22 (68.8)	34 (82.9)	56 (76.7)	0.40 (0.12–1.34)	0.140	0.45 (0.15–1.36)	0.160
Nonverbal Communication (NC)	5 (15.6)	38 (92.7)	43 (58.9)	0.006 (0.001–0.05)	0.001*	0.015 (0.003–0.06)	0.001*
Voice Control (VC)	19 (59.4)	6 (14.6)	25 (34.2)	22.4 (4.46–92.7)	0.001*	8.52 (2.79–26.0)	0.001*
Parent's Separation (PS)	5 (15.6)	3 (7.3)	8 (11.0)	2.39 (0.40–14.1)	0.331	2.34 (0.51–10.6)	0.272
Distraction (Dis.)	22 (68.8)	38 (92.7)	60 (82.2)	0.10 (0.02–0.51)	0.009*	0.17 (0.04–0.69)	0.014
Hand over Mouth (HOM)	0	3 (7.3)	3 (4.1)	0.00	0.993	0.00	0.991
Physical Restraints (PhR)	3 (9.4)	8 (19.5)	11 (15.1)	0.41 (0.09–1.93)	0.260	0.42 (0.10–1.76)	0.233
Hypnosis (Hyp)	18 (56.3)	22 (53.7)	40 (54.8)	1.27 (0.46–3.45)	0.640	1.11 (0.43–2.81)	0.824
Nitrous Oxide Sedation (NO.)	19 (59.4)	33 (80.5)	52 (71.2)	0.33 (0.10–1.04)	0.061	0.35 (0.12–1.00)	0.054
Conscious Sedation (CS)	22 (68.8)	23 (56.1)	45 (61.6)	2.20 (0.76–6.38)	0.143	1.76 (0.65–4.33)	0.271
General Anesthesia (GA)	23 (71.9)	29 (70.7)	52 (71.2)	1.46 (0.47–4.50)	0.510	1.05 (0.38–2.94)	0.910

\*Statistical test: logistic regression analyses, *p*-value < 0.05 indicates statistical significance; \*\*Adjusted for age of child and parents, gender of child and parents, and education status. OR: Odds ratio.

behavioural techniques, there was not a statistical difference between those who had previous experience (45.2%) and those who had not (54.8%). Most participants (95.9%) stressed the importance of obtaining parental informed consent before using any behavioral techniques on the child (Table 4).

#### 4. Discussion

Behavior management is recognized as a crucial aspect of pediatric dentistry, playing an essential role in ensuring effective dental care for children. When a child's behaviour in the dental setting becomes unmanageable, it presents significant challenges that may hinder or even prevent the delivery of necessary dental treatment. Thus, behavior management

remains a cornerstone of pediatric dental care [7, 17]. However, children with disabilities introduce new complexities to this aspect of care due to their unique physical and cognitive impairments. This study seeks to elucidate the distinctive challenges encountered by dental practitioners when providing care for this vulnerable population. It underscores the necessity of tailored approaches to address the diverse needs of children with disabilities. Specifically, the investigation aims to explore the behavioural management techniques (BMTs) utilized during dental treatment for children with hearing and visual impairments. Through our analysis, we have gained insights into the factors influencing both child and parental preferences for these techniques, as well as their perceived efficacy in enhancing the dental experience for these young patients.

**TABLE 4. The response of parental expectation and general acceptance for BMT and its association with sociodemographic characteristics.**

	BMT importance in treatment		BMT exposure or experience		Parent Informed consent	
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)
Total	64 (87.7)	9 (12.3)	33 (45.2)	40 (54.8)	70 (95.9)	3 (4.1)
Age of Child (yr)						
6–9	19 (29.7)	2 (22.2)	9 (27.3)	12 (30.0)	20 (28.6)	1 (33.3)
10–13	16 (25.0)	4 (44.4)	8 (24.2)	12 (30.0)	19 (27.1)	1 (33.3)
14–17	29 (45.3)	3 (33.3)	16 (48.5)	16 (40.0)	31 (44.3)	1 (33.3)
<i>p</i> -value	0.47		0.75		0.93	
Age of Parents (yr)						
18–29	23 (35.9)	2 (22.2)	10 (30.3)	15 (37.5)	24 (34.3)	1 (33.3)
30–41	21 (32.8)	4 (44.4)	12 (36.4)	13 (32.5)	25 (35.7)	0
>41	20 (31.3)	3 (33.3)	11 (33.3)	12 (30.0)	21 (30.0)	2 (66.7)
<i>p</i> -value	0.68		0.81		0.31	
Gender of Child						
Male	35 (54.7)	4 (44.4)	17 (51.5)	22 (55.0)	38 (54.3)	1 (33.3)
Female	29 (45.3)	5 (55.6)	16 (48.5)	18 (45.0)	32 (45.7)	2 (66.7)
<i>p</i> -value	0.56		0.76		0.47	
Gender of Parents						
Male	37 (57.8)	6 (66.7)	18 (54.5)	25 (62.5)	41 (58.6)	2 (66.7)
Female	27 (42.2)	3 (33.3)	15 (45.5)	15 (37.5)	29 (41.4)	1 (33.3)
<i>p</i> -value	0.61		0.49		0.78	
Education of Parents						
No formal	5 (7.8)	0	3 (9.1)	2 (5.0)	5 (7.1)	0
School	12 (18.8)	0	7 (21.2)	5 (12.5)	12 (17.1)	0
College	25 (39.1)	6 (66.7)	13 (39.4)	18 (45.0)	28 (40.0)	3 (100.0)
University	22 (34.4)	3 (33.3)	10 (30.3)	15 (37.5)	25 (35.7)	0
<i>p</i> -value	0.28		0.64		0.23	
Disability						
Visual Impairment	29 (45.3)	3 (33.3)	13 (39.4)	19 (47.5)	30 (42.9)	2 (66.7)
Hearing Impairment	35 (54.7)	6 (66.7)	20 (60.6)	21 (52.5)	40 (57.1)	1 (33.3)
<i>p</i> -value	0.49		0.48		0.41	

*Statistical test: Chi-square, p-value < 0.05 indicates statistical significance. BMT: behaviour management technique.*



This study was conducted at one of the biggest and most prominent public sector dental hospitals providing free dental services to patients meeting specific eligibility criteria. Additionally, the hospital serves as a referral center for a significant volume of disabled individuals originating from various dental hospitals, clinics and primary healthcare facilities across Islamabad and its large periphery areas. These referrals are primarily necessitated by the specialized needs, preparatory considerations, and behavioural management requirements of disabled patients seeking both minor and major dental interventions [18, 19].

In this study, the most favored behavioural management techniques (BMTs) were Distraction, positive reinforcement and Nitrous Oxide Sedation (NO.), in contrast to previous research by Zoubi, Havelka and Lawrence, where Tell Show Do emerged as the most accepted technique in normal children without any impairments [20–23]. A conceivable explanation for this disparity may lie in the unique characteristics of our sample, particularly the presence of visual and hearing impairments. Parents may recognize that dentists face challenges in effectively communicating procedures to their hearing-impaired children through sign language, while children with visual disabilities may encounter difficulties in comprehending visual demonstrations and explanations provided by the dentist. This preference for distraction likely stems from its capacity to reduce sensory overload, which is particularly beneficial for children with visual or hearing impairments who may be more sensitive to unfamiliar or intense sensory inputs in a clinical setting. Distraction techniques can help these children focus on non-threatening stimuli, thereby lowering anxiety and enhancing cooperation. Comparatively, studies involving typically developing children have shown that techniques like Tell Show Do (TSD) and positive reinforcement are often preferred and effective, as these children can generally process visual and auditory cues more easily. However, for children with sensory impairments, techniques like TSD may be less effective due to limitations in sensory reception, highlighting a distinct need for alternative methods, such as distraction, to achieve a similar calming effect. The strong preference for pharmacological techniques such as nitrous oxide sedation observed in this study may be influenced by specific cultural or contextual factors unique to our population. In our setting, parents might perceive sedation-based approaches as safer and more efficient due to prior experiences with sedation in medical treatments for their children. Cultural beliefs about healthcare interventions and parental expectations for minimizing procedural time and discomfort may further shape these preferences.

In this study, the least favored techniques included hand-over-mouth, parental separation and physical restraints. While hand-over-mouth and physical restraints have consistently ranked among the least acceptable techniques in prior studies [16, 24]. Our findings diverge from existing research in the realm of pharmacological interventions, such as nitrous oxide sedation and general anesthesia, which were among the least preferred methods in those studies [16, 17, 24]. Evidently, parents in our study may perceive pharmacological techniques as safe, given their child's previous exposure to such methods for medical treatments related to their

disabilities. Additionally, parents may view pharmacological techniques as less time-consuming for their child, allowing for the completion of all necessary dental procedures in a single visit. This approach may be preferred to minimize the stress associated with multiple hospital visits for their child.

The response reported by the majority of parents in this study was positive as 87.7% believed that behavioural management was essential to providing good treatment for their children. This finding, while consistent with similar investigations conducted previously in Kuwait and Jordan, wherein reported percentages stood at 99.2% and 98.6%, respectively, presents a nuanced perspective [24, 25]. Unlike those prior studies, which involved parents of typical general children population, our research focuses on parents of children with disabilities. This context inherently introduces an additional layer of cautiousness and meticulousness in parental attitudes towards various management techniques, given the unique needs of their special-needs children. These factors may also account for the notable observation of a substantial 96% agreement among parents regarding the necessity of obtaining informed consent from the child's parent before employing any behavioural management technique (BMT) in the present study. This contrasts with the comparatively lower percentages reported in previous studies, which ranged from 65.2% to 71.5% [15, 17, 24]. Obtaining informed consent from parents of children with disabilities before employing any behavioral management techniques for dental treatment is paramount. Such consent ensures that parents are fully aware of the proposed interventions, potential risks and benefits, allowing them to make informed decisions regarding their child's care. Additionally, it fosters trust and collaboration between parents and dental professionals, ultimately contributing to a positive treatment experience for the child and facilitating optimal outcomes. Furthermore, parental satisfaction with BMTs plays a crucial role in treatment success. Satisfied parents are more likely to maintain a positive relationship with healthcare providers, which positively impacts children's adherence to preventive dental recommendations. This underscores the importance of incorporating parental preferences into BMT selection to foster a positive treatment experience and improve long-term health outcomes for children with disabilities [26].

In the present study, a relatively lower proportion of parents, comprising 45.2%, demonstrated prior familiarity with behavioural management techniques (BMTs) or reported their utilization in previous encounters with their children. This contrasts with findings from a prior investigation conducted in Kuwait and Jordan, where the reported percentage stood at nearly 54% [24, 25]. Plausible explanations for this disparity may stem from the limited availability of specialized dental services tailored to the needs of children with disabilities in Pakistan. Additionally, parental hesitancy towards seeking dental treatments for their children, particularly in smaller, inadequately equipped dental clinics with staff lacking sufficient training in managing the unique needs of children with impairment, could contribute to this observation.

This study faces a key limitation in terms of its external validity. The findings may not apply to all children with different types of disabilities. The study focused on specific types of disabilities (visual and hearing impairments), which

may not capture the experiences and needs of children with other types of disabilities. Moreover, this study was conducted in a specific clinical setting (a Dental hospital), which may have particular practices and environmental factors that differ from other dental settings. This study's single-center design presents limitations in generalizability, as findings may not fully reflect populations across varied clinical settings. Different institutions may employ distinct protocols, environments and staff interactions, all of which could influence both parental and child responses. Furthermore, data were collected through self-reported surveys from parents, introducing the potential for recall bias and social desirability bias. Parents may have unintentionally over-reported acceptance of BMTs or underreported difficulties, aiming to align with socially acceptable responses. The future research should consider including more diverse groups of children with impairment to broaden the scope of comparison and understanding of behaviour management techniques across different types of disabilities. Furthermore, the specific sequence and arrangement of techniques in the BMT video vignettes may affect parental acceptance, as they were presented in a single standardized order. Future research should explore the potential effects of varying the order of these vignettes. This study relied on self-reported data from parents, which may introduce biases or inaccuracies. Although self-reported data was critical for understanding parental acceptance and attitudes, future studies could benefit from incorporating objective measures such as direct observations or professional assessments to validate and complement the self-reported data. Moreover, more extensive and inclusive studies are necessary to compare the effectiveness of different BMTs in terms of treatment duration and clinical outcomes. Future studies should include an evaluation of the efficacy of these BMTs techniques in improving clinical outcomes and reducing anxiety in children with disabilities. This will enhance the evidence base and contribute to more effective and tailored dental care practices for this population. We advocate for a thorough explanation of the diverse behavioral management techniques and the prudent selection and application of the most suitable methods by dentists when treating these special needs children and engaging with their parents. Continuous assessment of parental acceptance of behavioral management techniques in children with diverse disabilities is essential to uphold optimal dentist-parent communication.

## 5. Conclusions

The findings of this study indicate that the preferred behavioral management techniques for children with visual or hearing impairment diverge slightly from those for typically developing children, with Distraction, positive reinforcement and nitrous oxide sedation emerging as the favored methods, while hand-over-mouth, parental separation, and physical restraints are avoided. The outcomes of this study enable us to deduce that a significant portion of parents with children with impairment recognize the pivotal role of employing established behavioral management techniques in ensuring successful dental treatment outcomes. Parental informed consent emerges as an indispensable prerequisite prior to the application of any

behavioral management techniques in this population. Further research should explore BMT preferences for children with a wider range of disabilities to ensure inclusive and effective care.

## AVAILABILITY OF DATA AND MATERIALS

The data presented in this study can be made available on request.

## AUTHOR CONTRIBUTIONS

YDS, FAC, MNB, MBA, AE and SHA—collected the data and performed data analyses and wrote the first draft of the manuscript. YDS, FAC, MKA and AI—were involved in the conceptual development of this paper and provided feedback and revised the final manuscript. FAC, YDS, MNB, AI and MKA—co-supervised the project and revised the final manuscript. All authors read and approved the final manuscript.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted in accordance with the Declaration of Helsinki and approval was taken from the ethical review board of Shaheed Zulfiqar Ali Bhutto Medical University (SZ-ABMU) (Reference number: SOD/ERB/2023/42). Moreover, written informed consent was taken from all the participants and their parents/guardian after providing them with all the information about the study.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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