Dentistry Section

Knowledge and Awareness of Various Physical Restraints and Protective Stabilisation Methods: Parent's Perception towards their use in Children: A Multimedia Pre- and Post-test Quasi-experimental Study

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ABSTRACT

Introduction: Physical restraints are often a debatable and misunderstood aspect of dental healthcare practice. They are frequently used in dental care settings to immobilise children and reduce the risk of injury during procedures. It is essential to assess parents' knowledge, awareness, and attitudes towards physical restraints and provide accurate information about them. This is important to ensure that they are used appropriately and ethically.

Aim: To assess parents' knowledge, awareness, and attitudes towards physical restraints in dental care settings before and after a multimedia intervention, and to provide precise information about the same.

Materials and Methods: The study was conducted at the Department of Paediatric and Preventive Dentistry, Rajarajeswari Dental College and Hospital, Bengaluru, Karnataka, India using a pretest and post-test quasi-experimental study design on 400 parents whose children were between 3 and 16 years of age. The survey was conducted between December 2022 and March 2023. The data collection methods used in the present study consisted of a pre-education questionnaire and a post-education questionnaire administered after a multimedia

educational intervention. The collected data were subjected to statistical analysis, including measures such as mean, Standard Deviation (SD), Chi-square goodness of fit test, Wilcoxon's signed-rank test, and Kruskal-Wallis tests.

Results: When questioned about various stabilisation methods like direct and indirect methods, 379 (94.8%) of the study parents were unaware of them. However, after education, the majority of parents, 393 (98.3%), became aware that there were two types of stabilisation methods. Initially, 294 (73.5%) of parents refused to provide permission for doctors to treat their children using various stabilisation techniques. However, after being thoroughly educated about the various methods and their benefits, 383 (95.8%) agreed to let the dentist employ different stabilisation techniques when treating their children. This assurance helped alleviate concerns about potential harm to the child caused by using these stabilisation methods.

Conclusion: The study suggests that there is a significant knowledge gap among parents. However, the implementation of multimedia educational intervention methods during dental visits by dentists played a crucial role in increasing their knowledge and resulted in a significant improvement in their attitude towards stabilisation methods.

Keywords: Behaviour management, Parental knowledge, Parental perception

INTRODUCTION

All infants, children, adolescents, and individuals with special healthcare needs are entitled to receive the best oral healthcare and services. The American Academy of Paediatric Dentistry has included the use of protective stabilisation in its guidelines on behaviour guidance or behaviour management since 1990 [1]. Protective stabilisation is the term utilised in dentistry for the physical limitation of a patient's movement by a person or restrictive equipment, materials, or devices for a finite period to safely provide examination, diagnosis, and/or treatment. Active immobilisation involves restraint by another person, such as the parent, dentist, or dental auxiliary, while passive immobilisation utilises a restraining device [1].

Physical restraints include the use of body restraints (like papoose boards, Pedi-wrap), head restraints (head positioner), mouth props, and extremity immobilisation (like Posey straps, Velcro straps). Behavioural guidance techniques are commonly used to reduce anxiety and fear, establish a positive attitude, and provide oral healthcare with physical comfort [2]. Therefore, it is crucial for parents to have adequate knowledge of these techniques to ensure their child's comfort and well-being during dental visits [3]. Parents' knowledge, awareness, and attitudes towards stabilisation methods in paediatric dentistry play a vital role in promoting early positive aspects of oral healthcare for their children. However, literature is scarce regarding the perception of different behaviour management techniques among parents [3,4]. Hence, the present study aimed to assess awareness, attitudes, and acceptance toward restraints during dental care among the South Bengaluru population before and after multimedia education.

MATERIALS AND METHODS

The present study was conducted using a pretest and post-test quasi-experimental study design, which was carried out on 400 parents whose children aged from 3 to 16 years sought care in the Department of Paediatric and Preventive Dentistry Rajarajeswari Dental College and Hospital, Bengaluru, Karnataka, India. They were randomly selected to complete the questionnaire. The survey was conducted between December 2022 and March 2023. As it was a questionnaire study, Institutional Ethical clearance was not obtained.

Inclusion and Exclusion criteria: The inclusion criteria were parents who agreed to participate in the questionnaire survey, and

their consent was obtained after describing the goals of the present study. The exclusion criteria were parents who did not consent to participate.

Sample size calculation: Based on the probability that at least 50% of the parents will have adequate knowledge and awareness towards stabilisation methods used during paediatric dental treatment procedures (p=0.50), with a margin of error of 0.05, the sample size was calculated as N=384.06, which was rounded off to 400 at a 95% confidence interval.

Study Procedure

The participants were assured of the confidentiality of their responses. The children were divided into the following age groups: 3-6 years, 7-12 years, and 13-16 years.

Questionnaire: The questionnaire consisted of socio-demographic information and eight multiple-choice questions that assessed the knowledge, awareness, and attitude of parents towards various stabilisation methods used. It included questions regarding the various direct, indirect, full body, head, and intra-oral stabilisation methods. The questionnaire was devised by the authors with assistance from one of the previous studies [5].

The questionnaire was pretested for validity and reliability. Face validity was performed among three subject matter experts, scoring 'good' face validity with a composite score of 3.1 out of four. Few changes were suggested to simplify the language. The content validity of the questionnaire was tested using Aiken's index to measure the appropriateness of the questions in satisfying the study objectives [6]. The Aiken's index score for all study questions ranged between 0.84 and 1.00. The reliability of the questionnaire was assessed using the test-retest method, with a Cronbach's alpha score of 0.83 indicating good internal consistency of the items in the study questionnaire.

A pilot study was carried out on 40 parents (10% of the sample size), and necessary changes were made. The research was conducted through face-to-face interviews with the parents to gather data in either English or the local language, Kannada.

The pretest questionnaire was given to the parents and they were asked to fill it out. After that, educational intervention was conducted with 10-15 parents per day in the Outpatient Department (OPD). The intervention was done to all the parents in groups who were present on that particular day and consented to be part of the study. The post-intervention questionnaire was immediately given to them and collected back. Each question in the questionnaire had only one most appropriate answer, but some of the other options cannot be deemed incorrect if marked. For example, in guestion number 03, "Do you know the various non-verbal communication methods used to treat children?" The most appropriate answer is "all of the above," but "voice control," "modelling," "distraction," and "Hand-Over-mouth-exercise (HOME)" are also various non-verbal communication methods used to treat children. So, if the subject (parent) marked any of these options, they were awarded one point. If they marked "all of the above," they were awarded four points. Hence, the maximum score of 20 could be obtained.

Parents were provided with photographs, handouts, pamphlets, leaflets, brochures, and a video demonstration explaining protective stabilisation by the authors. Their knowledge, understanding, and attitudes regarding stabilisation methods were then evaluated. Parents were explained the various behaviour management strategies that dentists frequently employ in the current study.

The video demonstration included individual stabilisation methods such as direct stabilisation methods by parents, dentists, dental auxiliaries, and restraints. It also covered non-verbal communication methods such as voice control, modelling, distraction, and handover mouth exercise. Indirect stabilisation techniques such as seat belts, loop straps, hook straps, and extra assistance were also discussed. Head positioners (or additional assistance), mouth props, and other intra-oral stabilisation techniques, as well as full body stabilisation methods (like papoose boards, Pedi-wrap), and extremities immobilisation (like posey straps, Velcro straps), were included.

The 15-minute video contained images of each technique with their names shown, along with introductory remarks and a brief explanation. A recorded video of a live demonstration of all the procedures outlined above being utilised on a model was then shown.

The video was reviewed for validity and accuracy of information delivered by the senior professor. Parents then had the chance to voice their opinions and ask questions, and those questions were addressed. The post-education questionnaire was then given to them. The data was obtained and subjected to statistical analysis.

STATISTICAL ANALYSIS

The analysis was conducted using Statistical Package for Social Sciences (SPSS) for Windows Version. The latest version of G Power software (3.1.9.4) Heinrich-Heine-University in Dusseldorf, Germany, and it was released in 2019 by International Business Machine (IBM) Corp in Armonk, New York was utilised. Descriptive analysis was performed on all explanatory and outcome parameters using frequency and proportions for categorical variables, and mean and SD for continuous variables. The distribution of parents' responses to the study questionnaire was compared using the Chi-square goodness of fit test. Total scores were calculated to enable comparison based on the socio-demographic characteristics of the study parents. The mean sum scores of parents' pre- and post-intervention responses were compared based on the age group of the study children using Kruskal-Wallis test, followed by Dunn's posthoc test. The level of significance was set at p<0.05.

RESULTS

The questionnaires were completed by all parents who agreed to participate in the study, demonstrating 100% compliance. A total of 400 participants were surveyed, with a higher number of males compared to females. The participants were divided into three groups, with the majority belonging to the age group of 7-12 years [Table/Fig-1].

Variables	Category	n	Percentage		
Age	3-6 years	52	13.0		
	7-12 years	296	74.0		
	13-16 years	52	13.0		
		Mean	SD		
	Mean	9.77	2.83		
	Range	03-16			
Gender	Males	246	61.5		
	Females	154	38.5		
[Table/Fig-1]: Showing age and gender-wise distribution of study children.					

About 379 (94.8%) of parents were unaware of the various methods of stabilisation used for children. However, after education, the majority of parents 393 (98.3%) became aware that there were two types of stabilisation methods, which was statistically significant at p<0.05 [Table/Fig-2,3].

The majority of the study population 381 (95.3%) were uninformed about full body stabilisation methods. However, after education, 394 (98.5%) of participants became aware that both methods, papoose board and Pedi-wrap, are included in full body stabilisation, which was statistically significant at p<0.05 [Table/Fig-2,3].

Prior to the educational intervention, a considerable percentage (73.5%, 294) of parents refused to allow doctors to treat their children

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Questions	Responses (scores per option)	n	%	χ^2 value	p-value
Do you know the various method of	Direct (1)	21	5.3		<0.001*
	Indirect (1)	0	0	320.410	
stabilisation used for children?	l'm unaware (0)	379	94.8	520.410	
	Both A and B (2)	0	0		
Are you aware about direct stabilisation	Parent (1)	0	0.0	380.300	<0.001*
	Dentist (1)	56	14.0		
	Dental auxiliary (1)	0	0.0		
method used for children?	Restraints (1)	3	0.8		
	All of the above (4) 79 19.8				
	l'm unaware (0)	262	65.5		
	Voice control (1)	80	20.0		
Do you know the	Modelling (1)	0	0		
Do you know the various non- verbal	Distraction (1)	90	22.5		
communication methods used to	Hand over mouth exercise (1)	0	0	32.620	<0.001*
treat children?	All of the above (4)	81	20.3		
	l'm unaware (0) 149 37.3				
Do you know about the indirect	Hook (1)	k (1) 2 0.5			
	Loop Straps (1) 8 2.0 Seat belt (1) 25 6.3				
				stabilisation for	Extra assistant (1)
children?	All of the above (4)	33	8.3	1	
	l'm unaware (0)	203	50.7		
Are you owere	Papoose board (1)	0	0		<0.001*
Are you aware of full body wrap	Pedi-wrap (1)	19	4.8		
stabilisation technique used for	l'm don't know (0)	381	95.3	327.610	
uncooperative child?	Both A and B (2)	0	0		
	Head positioning (1)	47	11.8		<0.001*
Are you aware of head stabilisation	Extra assistant (1)	87	21.8		
methods used for	l'm unaware (0)	266	66.5	204.005	
children?	Both A and B (2)	0	0		
Are you aware of Intraoral stabilisation	Yes, i know (e.g., mouth prop) (1)	101	25.3	00.010	<0.001*
method used for children?	l don't know (0)	299	74.8	98.010	
Are you willing to	Yes (1)	106	26.5		<0.001*
allow the doctors to use various stabilisation methods to treat children?	No (0)	294	73.5	88.360	

(table/rig-2): Showing comparison of distribution of parents responses to the study questionnaire using Chi-square (χ^2) goodness of fit test prior to intervention. *Statistically significant

using various stabilising techniques, as they were mostly unaware of these methods. However, after being thoroughly educated about the various methods and their benefits, the majority of parents (95.8%, 383) agreed to let the dentist employ different stabilisation techniques when treating children. This change was statistically significant at p<0.05 [Table/Fig-2,3].

There was a significant difference in the mean total scores of parents' responses based on the age group of the study children (p=0.002, p>0.05). Multiple comparisons showed that parents with children aged 13-16 years and 7-12 years demonstrated significantly higher scores compared to parents with children aged 3-6 years, with a significant difference at p=0.03 and p=0.001, respectively. Parents of younger children were usually more afraid of these methods, while as the child grows, they understand verbal commands and become more accepting of treatment [Table/Fig-4].

The mean total scores of the responses during the post-intervention period were significantly higher (19.66) compared to the pre-intervention

Questions	Responses	n	%	χ ² value	p-value
Do you know the	Direct	5	1.3%		
Do you know the various method of	Indirect	2	0.5%	758.585	< 0.001
stabilisation used for children?	l'm unaware	0	0.0%	700.000	<0.001
ormarerre	Both A and B	393	98.3%		
Are you aware about direct stabilisation method used for children?	Parent	0	0.0%		<0.001*
	Dentist	6	1.5%		
	Dental auxiliary	0	0.0%	735.365	
	Restraints	5	1.3%		
children?	All of the above	389	97.3%		
	I'm unaware	0	0.0%		
	Voice control	2	0.5%		
	Modelling	3	0.8%		<0.001*
Do you know the various non- verbal	Distraction	5	1.3%		
communication methods used to treat children?	Hand over mouth exercise	3	0.8%	1472.700	
	All of the above	387	96.8%		
	I'm unaware	0	0.0%		
Do you know about the indirect stabilisation for children?	Hook	0	0.0%		<0.001
	Loop straps	0	0.0%		
	Seat belt	2	0.5%	704 400	
	Extra assistant	4	1.0%	764.420	
	All of the above	394	98.5%		
	I'm unaware	0	0.0%		
Are you aware of full body wrap stabilisation technique used for	Papoose board	5	1.3%		<0.001*
	Pedi-wrap	1	0.3%	704 405	
	l'm don't know	0	0.0%	764.465	
uncooperative child?	Both A and B	394	394 98.5%		
Are you aware of head stabilisation methods used for children?	Head positioning	4	1.0%		<0.001*
	Extra assistant	4	1.0%	750 700	
	I'm unaware	0	0.0%	752.720	
	Both A and B	392	98.0%		
Are you aware of Intraoral stabilisation	Yes, I Know (e.g., Mouth Prop)	393	98.3%	372.490	<0.001*
method used for children?	l don't know	7	1.8%		
Are you willing to	Yes	383	95.8%		<0.001*
allow the doctors to use various stabilisation methods to treat children?	No	17	4.3%	334.890	

[Iable/Fig-3]: Showing comparison of distribution of parents' responses to the study questionnaire using Chi-square goodness of fit test post intervention. *Statistically significant

Age (years)	n	Mean	SD	p-value ^a	Sig. Diff	p-value ^b	
3-6	52	2.90	2.18		A1 vs A2	0.02*	
7-12	296	3.90	2.70	0.002*	A1 vs A3	<0.001*	
13-16	52	4.85	2.87		A2 vs A3	0.03*	
[Table/Fig-4]: Comparison of mean total scores of the parents' pre-intervention responses based on the age group of children using Kruskal-Wallis test.							

period (3.90), and the difference between the two time intervals was statistically significant (p<0.05). This indicates a notable increase in knowledge, awareness, and attitude through the usage of multimedia educational intervention [Table/Fig-5].

Time	N	Mean	SD	Mean diff	p-value		
Pre-intervention	400	3.90	2.70	-15.76	<0.001*		
Post-intervention	400	19.66	0.91	-15.70			
[Table/Fig-5]: Comparison of mean total scores of the parents' pre and post intervention responses using Wilcoxon's signed-rank test. *Statistically significant							

DISCUSSION

The results of the present study showed that the majority of parents were unaware of the various methods of stabilisation, and none of the parents were familiar with the indirect method of stabilisation. However, after an audio-visual educational intervention, the majority of parents gained understanding of various direct stabilisation methods.

A previous study found that, in comparison to other dental treatments, physical restraint by parents, assistants, or dentists was more acceptable for getting a child to cooperate during an invasive procedure. Parents may have previously resorted to physically restraining their children, which could have made them accustomed to the necessity of doing so [4]. The presence of an extra assistant caused less fear, even though restraint and holding increased the likelihood of subsequent fear-related behaviour [7].

After the education, almost the entire population gained understanding of non-verbal communication methods. A study by Thirunavakarasu R et al., found that 76.8% accepted voice control, and 60.8% accepted the HOME method [8].

About half of the population was unaware of indirect stabilisation techniques such as seat belts, loop straps, hook straps, and additional assistance for children. The assistant's physical restraint was deemed permissible in more circumstances than the dentist's restraint, which was only considered suitable for injections [4].

During parents' initial visit to a dental clinic, the majority of the population 381 (95.3%) was uninformed about the full body wrap stabilisation technique, and none of them knew what a papoose board was. However, after educational intervention, almost the entire population became aware that it included the Papoose board, Pedi-wrap, and other methods. A study by Frankel RI found high acceptance for passive restraint among mothers whose children had been treated using the papoose board, with 96% stating it was necessary [9]. In a subsequent survey by Vasiliki B et al., the majority of mothers who had used it for their own children expressed high satisfaction with the method [10]. Similar findings were reported by Peretz B and Zadik D in a study on mothers, which showed that most mothers approved of the use of the Papoose Board [11]. Despite the treatment being stressful for the child, they believed the Papoose Board was necessary to complete the procedure. A study by Fields HW et al., revealed that using the Papoose Board during any dental procedures was consistently unacceptable, although its use during an emergency extraction was the most widely accepted [4].

Many parents (74.8%) were not aware of intraoral stabilisation techniques. However, after education, the majority of parents understood that a mouth prop is used as an intraoral stabilisation method. A study by Fields HW et al., found that the use of a mouth prop and voice control were consistently acceptable [4]. Similarly, in another study by Elango I et al., it was found that the mouth prop was accepted by the majority of parents, around 89% [12].

Prior to the educational intervention, the majority of parents (73.5%) refused to give permission for doctors to treat their children using various stabilising techniques. However, after being educated about the various methods and their benefits, most parents agreed to let the dentist employ different stabilisation techniques. This finding is consistent with a study by Muhammad S et al., which evaluated parental attitudes towards different management techniques used during dental treatment. The study found that the majority (99%) of parents believed that using different behaviour management techniques was essential in providing their children with excellent dental care. Additionally, they had a positive attitude towards behaviour management techniques that were properly explained [13]. In another study by Venkatesan R et al., it was found that 52.5% of parents were unaware of protective stabilisation methods, and only 31.8% agreed to let the dentist use protective stabilisation for managing their child's behaviour during dental treatment [5].

A study by Peretz B and Zadik D investigated the attitudes of parents towards behaviour management techniques used during dental treatment of children and found that parents were generally accepting of the use of restraints if they were properly explained [11]. These findings align with the present study, as the results showed that most parents accepted behaviour management techniques after the educational intervention once they had been properly explained. Therefore, parent education should be included as part of routine dental visits to help them understand the importance of these techniques in improving the dental care experience for their children.

In a study by Lawrence SM et al., passive restraint (also known as the Papoose Board) was rated as the least desirable approach [14]. Similarly, passive restraint was ranked as the third least acceptable technique. Another study by Fields HW et al., found that parents considered the Papoose Board to be the least acceptable method of whole-body confinement [4]. The usage of a Papoose Board or Pedi-wrap, as well as physical restraint, was generally disapproved of by the parents. According to Peretz B and Zadik D only 1.1% of parents approved of restriction, making it the least popular strategy [15]. These results conflict with the findings of the present study.

However, managing the behaviour of some children may require more advanced techniques such as protective stabilisation, deep sedation, or general anaesthesia [16]. It is important to note that sedation may not always be the most appropriate option, especially for younger children. Therefore, it is crucial to raise awareness about physical restraint and stabilisation methods and provide parents with the necessary knowledge. Educating parents about the potential risks and benefits of different techniques can help them make more informed decisions about their child's care. Additionally, parents of children with Special Healthcare Needs (SHCN) may be more accustomed to physical restraint and more accepting of protective stabilisation and sedation, as parents often serve as extra assistance for children with special healthcare needs [17].

To improve children's overall oral health, paediatric dentists must emphasise the early benefits of oral healthcare and educate parents about the significance of primary teeth [18,19]. Therefore, dental professionals should publish controlled, user-friendly, and reliable information on their practice websites regarding dental treatment for patients with special care needs. They should also provide evidencebased educational materials to increase parental awareness and knowledge about these treatments, and to foster a positive attitude among parents [20].

The present study highlights the need to educate parents about these methods in order to improve their perception and reduce their anxiety towards dental treatment for their children. The results also suggest that education and awareness about dental procedures should be integrated into dental care facilities, particularly in lowincome communities.

Resources such as brochures, video demonstrations, and consultations with dental professionals should be provided to parents in the waiting room. These materials can address common misconceptions about physical restraints, explain the procedure in simple terms, and highlight its benefits, risks, and side-effects, as well as the steps that dental professionals take to ensure the safety of the patient. There should be a Socratic method of communication with the parents.

Given that the use of multimedia, such as audio-visual presentations, produced remarkable results in the present study, the authors recommend the following for raising awareness on a large scale: Every parent should receive education while waiting in the reception area, in order to increase their awareness and knowledge, and to motivate them to spread the word. By utilising contemporary technology and applications like Facebook, Instagram, and YouTube, short educational videos can be created as reels, along with descriptive information that can be published on the clinic's website. This way, parents can be educated even before they reach the clinic. Other

methods of education include television, radio, newspapers, and social media platforms. Education can also be implemented through patient counselling, parent training programs, awareness programs, and referrals. This will help increase knowledge on a larger scale and spread awareness globally.

Limitation(s)

The questionnaire was prepared only in English but was communicated to parents in the local language, which they did not understand. Further studies can be conducted with a larger sample size and in multiple geographical locations to improve generalisation.

CONCLUSION(S)

The present study indicated that a significant proportion of parents (94.8%) had limited awareness and knowledge prior to the intervention. However, there was a noticeable increase in the percentage of parents (98.3%) who expressed familiarity and showed a significant change in perception. In conclusion, parents' knowledge, awareness, and attitudes towards physical restraints are important considerations. Therefore, implementing these methods in the clinic's reception area will sensitise parents to the various stabilisation methods used in the paediatric clinic and allow them to provide consent for their use on their children. Dental care providers have a responsibility to ensure that physical restraints are used appropriately and ethically to minimise harm and promote positive patient outcomes.

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