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# Perception of Behaviour Management Techniques for Paediatric Patients among Dental Officers

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## ABSTRACT

**Introduction:** Dental anxiety can be effectively managed by applying pharmacological and non-pharmacological behavioural management therapy approaches (BMT). This study investigated the dental officers' perception of behaviour management techniques practiced in managing paediatric dental patients in primary dental clinics.

**Materials and methods:** A quantitative study using structured online English questionnaires among dental officers serving in primary dental care services under the Ministry of Health Malaysia (MOH Malaysia) in Sabah. The acceptability of applied behaviour management techniques was measured using Likert scale from 0 to 10. Data was analysed using SPSS version 29 and descriptive data was presented.

**Results:** Seventy-four dental officers involved in this study (Male= 14, Female= 60). Positive verbal reinforcement, tell-show-do, and offering an exact explanation of what the findings indicate are the most widely accepted behaviour management strategies (BMT), with mean scores of 9.5, 9.1, and 8.7, respectively. The least accepted BMT among dental officers in Sabah are immobilisation with a papoose board, preventing the child from speaking during treatment, and hand over mouth (HOM), with mean scores of 4.6, 3.6, and 3.2, respectively.

**Conclusion:** The study concludes that the most recognized BMT is positive reinforcement technique regardless of age, experience and gender. This finding provides information in the development of modules for continuous professional

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development training among dental officers in the Ministry of Health Malaysia.

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## INTRODUCTION

Dental officers are frequently confronted with anxious, crying children, which compromises the delivery of dental care. It's important to remember that children aren't miniaturised versions of adults because they differ in so many ways, including cognitive abilities, psychological maturity, and thinking maturity. According to a review, 8% of 9-year-old children are afraid of the dental officer (Dahlander et al, 2019). Another study has stated that 53.9% of preschool children do suffer from dental anxiety (Esa et al, 2020).

Dental anxiety may end up causing patients to be absent or postpone dental treatment (Skaret et al. 1999). Patients with dental anxiety have a tense relationship with their dental officers, which can lead to misdiagnosis (Eli, 1993). Dental anxiety can be effectively managed by combining pharmacological and non-pharmacological behavioural management therapy approaches (BMT) (Hisham et al., 2022). The key factor in reducing patients' anxiety and providing optimal dental care for children is behavioural management therapy/technique (Singh et al., 2014).

The techniques used in basic behavioural management are positive pre visit imagery, direct observation, tell-show-do, ask-tell-ask, voice control, nonverbal communication, positive reinforcement and descriptive praise, distraction, memory restructuring, desensitization to dental setting and procedure, enhancing control, communicative technique for parents (and age-appropriate patients), and parental presence or absence (AAPD, 2020).

Thus, this study was designed to assess dental officers, serving in Sabah under the Ministry of Health Malaysia (MOH Malaysia), on their perceptions of behaviour management techniques. This finding provides information for potential usage in the development of modules for continuous professional development training among dental officers in the Ministry of Health Malaysia.

## MATERIALS AND METHODS

This was a questionnaire based cross-sectional study conducted in Sabah under the Department of Health of Sabah State (Bahagian Kesihatan Pergigian Negeri Sabah, BKPN Sabah), Ministry of Health (MOH) Malaysia. This study was conducted from December 2022 to January 2023. Dental officers serving in primary dental care services under the MOH answered an electronic questionnaire through online google form by BKPN Sabah, MOH Malaysia. Only dental officers who are registered with Malaysian Dental Council (MDC) and serving with the MOH Malaysia in Sabah, Malaysia are included in this study. Dental officers working in specialist-based centres and administrative offices are excluded from the study. Dental officers may or may not have already undergone Paediatric Dental Compulsory Attachment (PDCA). For the purpose of this study, the age group of the dental officers are divided into either young adult (24-30 years of age), middle aged adult (31-45 years of age) and older age adult (above 45 years of age).

The validated questionnaire was based on the structured study done by Sotto et al (2008) and Ali et al (2021). The questionnaire contained 22 questions including questions that inquired on participants' socio-demographic characteristics (5 questions) and acceptability on behaviour management techniques (17 questions). The questionnaires includes the following techniques: a) Reinforcement techniques (positive verbal reinforcement, promising a toy, encourage child no to be a coward); b) Aversive techniques (voice control, hand over mouth (HOM), immobilization by staff or parent, immobilization by Papoose board); c)

Desensitization techniques (tell-show-do, providing exact explanation, using music or video distraction, using the child's imagination, use of euphemisms); d) Pharmacological techniques (Nitrous oxide, using sedation, general anesthesia); e) Communicative techniques (disallowing child speaking during treatment, mentioned the possibility of pain). The questionnaires on the acceptability of applied behaviour management techniques were measured on a Likert scale from 0 to 10 (0 being completely unacceptable and 10 being completely acceptable).

Let's Statistics SA 2.2 was used to calculate the sample size based on a single proportion according to study by Kawia (Kawia et al., 2015). Using the  $\alpha = 0.05$  (95% confidence interval) and precision = 0.05, a sample size of 60 was calculated. With an additional 20% of drop-out rate, 72 subjects were required for this study. Data was analysed using SPSS version 29. Descriptive statistics used to summarize the socio-demographic characteristics of subjects. Numerical data was presented as frequency and percentages. The 11-point Likert scale was treated as interval scale (Wu and Leung, 2017).

This survey has been approved by National Medical Research Register (NMRR), with implementation of the National Institute of Health (NIH) guidelines on the conduct of research in the Ministry of Health Malaysia (MOH). The registration number of this research paper is: NMRR ID-22-01639-IL3.

## RESULTS

A total of 74 dental officers responded in this study. The sociodemographic characteristics of study as in Table 1.

Table 1. Socio-demographics distribution of participants (n=74)

Variables	Categories	n (%)
Age	Young adult (24 - 30)	59 (79.7)
	Middle aged adults (31-45)	15 (20.3)
	Old Adults (above 45)	0 (0)
Gender	Male	14 (18.9)
	Female	60 (81.1)
Graduate	Local university	45 (60.8)
	Oversea university	29 (39.2)
Received Paediatric Dentistry Compulsory Attachment (PDCA)	Yes	66 (89.2)
	No	8 (10.8)

n= number of respondents

## Reinforcement techniques

Positive verbal reinforcement is the most widely accepted among dental officers in Sabah behaviour management strategies (BMT), with mean scores of 9.49 (Table 2). The data showed that most participants from the 'received PDCA' group and 'not received PDCA' group accepted the positive reinforcement technique with mean scores (SD) of 9.5 ( $\pm 0.93$ ) and 9.3 ( $\pm 1.39$ ) respectively (Table 3). The male and female dental officers have chosen the positive reinforcement technique as the most favourable technique, with a mean score (SD) of 9.1 ( $\pm 1.46$ ) and 9.6 ( $\pm 0.83$ ) respectively (Table 4). The participants from across the age have chosen positive verbal reinforcement as the preferable technique (Table 5).

Table 2. Ranking of preferred behaviour management techniques among dental officers in Sabah.

Behaviour guidance techniques	Mean acceptability score (SD)
<b>Reinforcement techniques</b>	
Positive verbal reinforcement	9.5 ( $\pm 0.98$ )
Promising a toy	6.8 ( $\pm 2.68$ )
Encourage child not to be a coward	7.2 ( $\pm 2.78$ )
<b>Aversive techniques</b>	
Voice control	8.1 ( $\pm 1.95$ )
Hand over mouth (HOM)	3.2 ( $\pm 3.01$ )
Immobilization by staff or parent	6.2 ( $\pm 2.77$ )
Immobilization by Papoose board	4.6 ( $\pm 3.30$ )
<b>Desensitisation techniques</b>	
Tell- show-do	9.1 ( $\pm 1.29$ )
Providing exact explanation	8.7 ( $\pm 2.00$ )
Using music or video distraction	8.3 ( $\pm 2.18$ )
Using the child's imagination	8.5 ( $\pm 1.68$ )
Use of euphemisms	8.7 ( $\pm 1.72$ )
<b>Pharmacological techniques</b>	
Nitrous oxide	7.3 ( $\pm 3.20$ )
Using sedation	6.4 ( $\pm 3.19$ )

General anesthesia	7.0 ( $\pm$ 3.00)
Communicative techniques	
Disallowing child speaking during treatment	3.6 ( $\pm$ 2.99)
Mentioning the possibility of pain	7.6 ( $\pm$ 2.22)

SD= Standard deviations

Table 3. Ranking of dental officers' acceptability of applied behaviour management techniques according to participants' experience.

Behavior guidance techniques	Acceptability mean score (SD)	Behavior guidance techniques	Acceptability mean score (SD)
	Received PDCA		Not receive PDCA
Positive verbal reinforcement	9.5 ( $\pm$ 0.93)	Positive verbal reinforcement	9.3 ( $\pm$ 1.39)
Tell-Show-Do	9.0 ( $\pm$ 1.31)	Tell-Show-Do	9.3 ( $\pm$ 1.17)
Providing exact explanation	8.7 ( $\pm$ 2.04)	Use of euphemisms	9.3 ( $\pm$ 1.17)
Use of euphemisms	8.6 ( $\pm$ 1.77)	Providing exact explanation	9.0 ( $\pm$ 1.77)
Using the child's imagination	8.5 ( $\pm$ 1.17)	Using the child's imagination	8.9 ( $\pm$ 1.46)
Using music or video distraction	8.2 ( $\pm$ 2.27)	Using music or video distraction	8.6 ( $\pm$ 1.30)
Voice control	8.2 ( $\pm$ 2.00)	Voice control	7.9 ( $\pm$ 1.46)
Mentioning the possibility of pain	7.5 ( $\pm$ 2.23)	Mentioning the possibility of pain	7.8 ( $\pm$ 2.19)
Encourage child not to be a coward	7.5 ( $\pm$ 2.73)	Nitrous oxide	7.8 ( $\pm$ 1.58)
Nitrous oxide	7.2 ( $\pm$ 3.35)	General anesthesia	6.5 ( $\pm$ 2.27)
General anesthesia	7.1 ( $\pm$ 3.09)	Promising a toy	6.1 ( $\pm$ 3.09)
Promising a toy	6.8 ( $\pm$ 2.64)	Using sedation	6.0 ( $\pm$ 3.16)
Using sedation	6.5 ( $\pm$ 3.21)	Immobilization by staff or parent	5.1 ( $\pm$ 2.30)
Immobilization by staff or parent	6.3 ( $\pm$ 2.82)	Immobilization by Papoose board	5.0 ( $\pm$ 2.51)
Immobilization by Papoose board	4.5 ( $\pm$ 3.40)	Encourage child not to be a coward	4.6 ( $\pm$ 1.85)
Disallowing child speaking during treatment	3.7 ( $\pm$ 2.99)	Hand over mouth (HOM)	3.6 ( $\pm$ 2.50)

Hand over mouth (HOM)	3.1 ( $\pm 3.08$ )	Disallowing child speaking during treatment	2.8 ( $\pm 3.06$ )
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SD= Standard deviations; PDCA= Paediatric Dentistry Compulsory Attachment

Table 4. Ranking of dental officers' acceptability of applied behaviour management techniques according to gender.

Behavior guidance techniques	Acceptability mean score (SD)	Behavior guidance techniques	Acceptability mean score (SD)
	Male		Female
Positive verbal reinforcement	9.1 ( $\pm 1.46$ )	Positive verbal reinforcement	9.6 ( $\pm 0.83$ )
Tell-Show-Do	8.7 ( $\pm 1.33$ )	Tell-Show-Do	9.1 ( $\pm 1.28$ )
Use of euphemisms	8.5 ( $\pm 1.23$ )	Providing exact explanation	9.0 ( $\pm 1.42$ )
Providing exact explanation	7.4 ( $\pm 3.32$ )	Using the child's imagination	8.8 ( $\pm 1.48$ )
Using the child's imagination	7.3 ( $\pm 1.98$ )	Use of euphemisms	8.8 ( $\pm 1.82$ )
General anesthesia	6.9 ( $\pm 3.01$ )	Using music or video distraction	8.7 ( $\pm 1.70$ )
Voice control	6.7 ( $\pm 2.09$ )	Voice control	8.5 ( $\pm 1.77$ )
Using music or video distraction	6.6 ( $\pm 3.11$ )	Mentioning the possibility of pain	7.9 ( $\pm 2.14$ )
Mentioning the possibility of pain	6.2 ( $\pm 2.12$ )	Nitrous oxide	7.6 ( $\pm 3.03$ )
Nitrous oxide	6.1 ( $\pm 3.71$ )	Encourage child not to be a coward	7.4 ( $\pm 2.88$ )
Encourage child not to be a coward	6.0 ( $\pm 2.00$ )	General anesthesia	7.1 ( $\pm 3.03$ )
Promising a toy	5.6 ( $\pm 1.82$ )	Promising a toy	7.0 ( $\pm 2.79$ )
Using sedation	5.2 ( $\pm 3.66$ )	Using sedation	6.7 ( $\pm 3.03$ )
Immobilization by staff or parent	4.9 ( $\pm 3.26$ )	Immobilization by staff or parent	6.5 ( $\pm 2.59$ )
Immobilization by Papoose board	3.2 ( $\pm 3.04$ )	Immobilization by Papoose board	4.9 ( $\pm 3.31$ )
Disallowing child speaking during treatment	2.3 ( $\pm 1.94$ )	Disallowing child speaking during treatment	3.9 ( $\pm 3.12$ )
Hand over mouth (HOM)	2.2 ( $\pm 1.85$ )	Hand over mouth (HOM)	3.4 ( $\pm 3.20$ )

SD= Standard deviations

## Aversive techniques

The least accepted BMT among dental officers in Sabah are immobilisation with a papoose board and hand over mouth (HOM), with mean scores of 4.6 and 3.2 respectively (Table 2). The young adult also supported that the hand-over-mouth (HOM) technique is not the preferred method (Table 5). The older dental officers have chosen voice control as one of six most favoured BMT with mean score (SD) of 8.3 ( $\pm$  2.13) (Table 5).

Table 5. Ranking of dental officers' acceptability of applied behaviour management techniques according to age.

Behavior guidance techniques	Acceptability mean score (SD)		
	Young adult (24 - 30)	Middle aged adults (31-45)	
Positive verbal reinforcement	9.5 ( $\pm$ 1.01)	Positive verbal reinforcement	9.5 ( $\pm$ 0.92)
Tell-Show-Do	9.0 ( $\pm$ 1.29)	Tell-Show-Do	9.1 ( $\pm$ 1.36)
Providing exact explanation	8.8 ( $\pm$ 1.72)	Use of euphemisms	9.0 ( $\pm$ 1.41)
Use of euphemisms	8.6 ( $\pm$ 1.79)	Using the child's imagination	8.7 ( $\pm$ 1.39)
Using the child's imagination	8.5 ( $\pm$ 1.756)	Providing exact explanation	8.4 ( $\pm$ 2.90)
Using music or video distraction	8.3 ( $\pm$ 2.05)	Voice control	8.3 ( $\pm$ 2.13)
Voice control	8.1 ( $\pm$ 1.91)	Using music or video distraction	8.3 ( $\pm$ 2.72)
Mentioning the possibility of pain	7.6 ( $\pm$ 2.21)	Encourage child not to be a coward	7.9 ( $\pm$ 2.31)
Nitrous oxide	7.5 ( $\pm$ 3.13)	Promising a toy	7.7 ( $\pm$ 2.82)
General anesthesia	7.2 ( $\pm$ 2.96)	Mentioning the possibility of pain	7.5 ( $\pm$ 2.33)
Encourage child not to be a coward	7.0 ( $\pm$ 2.87)	Nitrous oxide	6.5 ( $\pm$ 3.44)
Promising a toy	6.5 ( $\pm$ 2.61)	General anesthesia	6.4 ( $\pm$ 3.20)
Using sedation	6.5 ( $\pm$ 3.16)	Immobilization by staff or parent	6.3 ( $\pm$ 3.11)
Immobilization by staff or parent	6.1 ( $\pm$ 2.71)	Using sedation	6.1 ( $\pm$ 3.38)
Immobilization by Papoose board	4.6 ( $\pm$ 3.32)	Immobilization by Papoose board	4.3 ( $\pm$ 3.35)
Disallowing child speaking during treatment	3.8 ( $\pm$ 2.99)	Hand over mouth (HOM)	2.9 ( $\pm$ 3.11)

Hand over mouth (HOM)	3.3 ( $\pm 3.01$ )	Disallowing child speaking during treatment	2.6 ( $\pm 2.85$ )
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SD= Standard deviations

### Desensitization techniques

The five most favoured desensitisation techniques are tell- show-do, providing exact explanation, use of euphemisms, using the child's imagination and using music or video distraction (Table 2). All dental officers regardless of age, experience and gender have ranked the desensitisation techniques among the top six most preferred BMT (Table 3) (Table 4) (Table 5). The female, the 'received PDCA' and young adult are a slightly more to use the 'providing the exact explanation' method with mean score of 9.1 ( $\pm 1.42$ ), 8.7 ( $\pm 2.04$ ) and 8.8 ( $\pm 1.72$ ) (Table 3)(Table 4) (Table 5). Male dental officers have preferred the use of euphemisms as one of the top three most acceptable techniques in dealing with paediatric patients than the female dental officers (Table 4).

### Pharmacological techniques

The dental officers who work in Sabah prefer pharmacological techniques moderately to other BMT. The ranking starts with nitrous oxide, general anaesthesia and sedation with a mean score (SD) of 7.3 ( $\pm 3.20$ ), 7.0 ( $\pm 3.00$ ) and 6.4 ( $\pm 3.19$ ) respectively (Table 2). The dental officers from both groups of "Received PDCA" and "Not receive PDCA" have scored average for nitrous oxide with a mean score (SD) of 7.2 ( $\pm 3.35$ ) and 7.8 ( $\pm 1.58$ ) (Table 3). Many dental officers despite their age and experience would select the nitrous oxide technique as the most acceptable BMT than general anesthesia and sedation (Table 3) (Table 5). Nevertheless, our data has highlighted that the male dental officers generally preferred general anaesthesia more than nitrous oxide and sedation (Table 4).

### Communicative technique

The 'not received PDCA' group believed that disallowing a child to speak during treatment is the undesirable technique with a mean score (SD) of 2.8 ( $\pm 3.06$ ) (Table 3). Child not allowed to speak during treatment has been stated as one of the least preferred techniques among dental officers, whether male or female. (Table 4).

## DISCUSSION

Children's behaviour management is a therapeutic art that requires both expertise and abilities that are developed with the aim of establishing effective communication, alleviating fear, and developing trust between the child, the dental officer, and the parents. This will help to improve the child's development of a favourable attitude toward oral health care. The study is carried out among dental officers in Sabah to assess their perceptions of behaviour management techniques. It is compulsory for all dental officers to complete the new dental officer programme within one (1) year of government service including one (1) month attachment in the Department of Paediatric Dentistry.

The study showed that the three most accepted BMT are positive verbal reinforcement, tell-show-do, and offering an exact explanation. On the contrary, the 4 least accepted BMT among dental officers in Sabah are Immobilization by staff or parent, immobilisation with a papoose board, preventing the child from speaking during treatment, and hand over mouth (HOM). Nevertheless, immobilization by staff or parent may have its uses in certain situation such as in an emergency situation. Papoose board are not common in Malaysia and not available widely available in the general primary dental clinics (Ali et al., 2021). The lack of defined standards and legislation in Malaysia regarding the use of physical restraint for

both public and private dental patients may result in both poor acceptance and low preference for such an intervention (Ali et al., 2021).

Positive reinforcement works best with kids between the ages of 6 and 12 because at this developmental period, kids are motivated by a sense of achievement (Rana et al., 2020). The data of our study supported the notion that the most preferred technique by the dental officer in Sabah is positive reinforcement, followed by tell-show-do and providing exact explanation.

Many studies have reported that Tell-Show-Do is the most commonly used BMT (Grewal, 2003; Sharath et al., 2009; Wali et al., 2016; Keskinrugar et al., 2018; Rana et al., 2020). The youngster starts addressing the items metaphorically when they are between the ages of 2 and 7 years old. They make comparisons between things and familiar objects like toys and games (Rana et al., 2020). Our result has shown that the desensitisation technique is favoured, after positive reinforcement, by dental officers in Sabah. The desensitisation technique comprises of tell-show-do, providing an exact explanation, use of euphemisms, using the child's imagination and using music or video distraction. The least accepted BMT are immobilisation with a papoose board and hand over mouth (HOM). As for the behaviour management techniques that required physical restraint or hand over mouth, these techniques are generally not favoured due to the fact that they are not well accepted in modern society and deemed invasive (Wali et al., 2016). Furthermore, these dental officers were probably trained during their attachment with the Paediatric Dental Specialist that physical restraint is to be a last resort as acclimatization is the way to train the child's acceptability towards dental care. The lack of defined standards and legislation in Malaysia in physical restraint may result in both poor acceptance and low preference for such an intervention (Ali et al., 2021). However, future study must be designed in order to validate this matter.

Interestingly, the acceptability of the usage of nitrous oxide inhalation sedation ( $7.3 \pm 3.20$ ) is higher than general anaesthesia ( $7.0 \pm 3.00$ ) and using other sedation ( $6.4 \pm 3.19$ ) (Table 2). It means that these dental officials may have recognised the risk linked with general anaesthetic or other forms of sedative procedures, as nitrous oxide inhalation sedation is widely regarded as extremely safe. However, this study was unable to evaluate factors linked with the preference for use of nitrous sedation over general anaesthesia.

The research among dental students has shown that the most accepted BMT between pre-clinical and clinical students is positive reinforcement technique (Ali et al., 2021). In our study, the frequently used techniques between the 'received PDCA' group and the 'not received PDCA' group are the positive reinforcement technique and tell-show-do.

Our data has shown that both age categories of subjects preferred positive reinforcement technique and Tell-Show-Do, while the least preferred techniques are HOM and disallowing the child to speak. Many published reports stated that younger clinicians are keener in treating anxious patients and are willing to use various BMT in managing their patients (Wright et al., 1991; Brahm et al., 2013; Strøm et al., 2015). On the contrary, our studies showed that younger clinicians tend to rank the perception on the usage of Nitrous Oxide and general anaesthesia higher ( $7.5 (+3.13)$  and  $7.2 (+2.96)$ ) than older clinicians ( $6.5 (+3.44)$  and  $6.4(+3.20)$ ).

Female dental officers are more diverse and efficient in using the BMTs than male dental officers (Brahm et al., 2013). Female dental officers also showed more interest to obtain new information and assistance when dealing with fearful patients (Brahm et al., 2013). Besides, female dental officers are more prepared to treat anxious patients compared to male dental officers (Strom et al., 2015). Our study has confirmed that the female dental officers are more willing to use different types of non-pharmacological techniques than the male dental officers. Female dental officers tend to use many other techniques before

resorting to general anaesthesia. The females like to seek more knowledge regarding BMT as they feel that the undergraduate training is insufficient (Brahm et al., 2013). The females have more empathy toward the children (Sotto et al., 2008). Nonetheless, a similar article has reported that male surgeons are more aware of BMT than females and they thought it could be a matter of catching up since females are better in caring toward the children (Kawia et al., 2015).

New dental officers may have the potential to influence how young dental officers' view paediatric dental behaviour management strategies later in life. A child's first dental experience influences subsequent compliance and views of dental treatment. It may lead to dental neglect, as evidenced by data on dental facility visits, which reveal that just one in every four adults visits a dental facility (OHP KKM, 2022). As a result, paediatric dental specialists should take into account the potential importance of training and education in influencing how young dental officers' view behaviour management strategies. This data could be used for further actions in creating modules for continuous professional development activities during compulsory training in Paediatric Dentistry Specialist Department, in Malaysia. By managing children's anxiety, future dental experiences can be improved for betterment of quality of life and oral health care of these children in primary dental care settings in Malaysia. This study's main disadvantage is the small number of respondents who were limited to the state of Sabah, making it unable to generalise on how dental officers are perceived throughout Malaysia. This study also omits a part of questionnaire in clinical situations (Parent present in clinic and Show the needle). As showing the needle is inappropriate techniques in managing children in dental settings. Further analysis to check for statistical differences between groups were impossible because of the small number of respondents who had not yet received PDCA. It is advised that the number of respondents participated in multi-center studies be increased in future in order to give more definitive findings.

## **CONCLUSION**

Generally, Positive verbal reinforcement and Tell-Show-Do are the most preferred BMT among all DOs in Sabah. On the other hand, disallowing the child to speak during treatment and HOM are the 2 least preferred BMT used. For the New Dental Officer Programme (NDOP) under the Ministry of Health Malaysia, training modules in continuous professional development especially on its indication of usages should be organised to improve dental officers' competence in treating children. More studies with larger samples should be designed among dental officers in Peninsular Malaysia to discover acceptance of BMT among dental officers in Malaysia.

## **CONFLICT OF INTEREST STATEMENT**

The authors declare that they have no conflicts of interest in the publication of this paper.

## **AUTHOR CONTRIBUTIONS**

Nor Asmawati Che Lah and Abdul Rauf Badrul Hisham wrote the study design and initial draft. Nor Asmawati Che Lah, Abdul Rauf Badrul Hisham, Farah Najihah Mohamad, Nur Hazwani Mohamad Jurimi, Nurul Syahirah Zakaria and Naimah Hasanah Mohd Fathil have done the data collection, data interpretation and manuscript preparation. Nor Asmawati Che Lah, Abdul Rauf Badrul Hisham, and Leong Kei Joe analysed the data. Nor Asmawati Che Lah, Abdul Rauf Badrul Hisham, and Leong Kei Joe did the final writing.

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