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ORIGINAL ARTICLE

The relationship between children's media habits and their anxiety and behaviour during dental treatment

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ABSTRACT

Objective: The existing evidence suggests that media habits may have moderating role on children's psychological adjustment in the dental setting. The aim of this study was to investigate the relationship between children's media habits and their anxiety and behaviour management problems (BMP) during dental treatment.

Materials and methods: A total of 289 children aged 3–6 years old were included. Dental anxiety (DA) and BMP were assessed using Clinical Anxiety Rating Scale and Frankl's Rating Scale during the dental treatment. The parents reported their own DA, educational level and economic status; and the children's and also their own daily hours of using media. The data were analysed with the Mann–Whitney U, Kruskal–Wallis, Chi-square or Fisher exact tests, Spearman's correlation coefficient and logistic regression.

Results: The children with DA had significantly higher amount of watching TV, playing e-games and surfing the Internet, and total amount of using electronic media than those without DA. The amount of watching TV and the total amount of using electronic media were significantly higher in the children with BMP than those without BMP. DA and BMP were significantly correlated with the children's hours of watching TV and total media time.

Conclusions: There was a significant relationship between the amount of electronic media usage and DA and BMP in 3- to 6-year-old children.

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Introduction

Nowadays children spend a significant amount of time watching TV and video, surfing the Internet, and playing computer games [1]. With the daily innovations in the electronic media devices, the interest for the use of media is ever-increasing among children, which make it difficult to control the quality of media input. Much concern has been expressed about the effects of media on young children that would impact their healthy development [2,3]. This public trend is alarming since it can affect children's social, mental and physiologic functions [4]. An emerging body of research highlights the association of the excessive amount of watching TV, computer use and game playing, with the higher rates of fear, anxiety and negative psychological emotions [4–6]. It has been noted that media evoke children's emotions and they respond directly to depicted emotionally charged contents that may cause behavioural changes and development of anxiety-related disorders [7]. Therefore, the use of media is considered to be potentially interfering with children's sociopsychological development since it affects many aspects of their contemporary life including peer and parent relationships, school performance and social, physical and mental development [8].

Current theoretical models of developmental psychology, such as the dynamic diathesis-stress model, the social learning theory and the displacement hypothesis, confirm the relationship between children's development and media usage [9–11]. However, the investigations within this area have methodological shortcomings, such as small and/or non-representative samples, and differences in measures and methodology that may account for the current discrepancy in the findings of these studies [12].

On the other hand, children's anxiety, depression and behavioural problems are predisposing factors for dental anxiety (DA) and dental behaviour management problems (BMP) [13,14]. DA is a response to stressful stimuli specific to the dental context and is associated with reactions towards a situation of an anticipated, but not realistic, threat in the dental setting. Besides, BMP denotes to the externalizing behavioural problems related to the dental situation, marked by uncooperative and disruptive behaviours, resulting in the delay of treatment or rendering it impossible [14,15]. DA and BMP influence children's dental visit and make the dental

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treatment potentially demanding for dentists, parents and children [13].

Together, it seems that the pattern of the use of media could have a moderating role on children's psychological adjustment in the dental setting. To the best of our knowledge, no previous studies have assessed whether the children's anxiety and BMP during the dental treatment is associated with their amount of media usage. Therefore, the aim of the present study was to extend the current knowledge by exploring the relationship between the children's media habits and their psychological adjustment (as indicated by DA and BMP) during the dental treatment.

Material and methods

The study design was in accordance with the Declaration of Helsinki for Human Rights and was reviewed and approved by the Committee for Ethics in Research on Humans at the university (Reference No. TBZMED.REC.1394.6). The data are reported according to guidelines for reporting observational studies (STROBE guidelines).

Participants

Based on 80% power, significance level of 5% [16], and considering 50% correlation coefficient between the variables [17]; 267 samples were needed for this study, which were increased to 302 in order to improve the validity of the study and allow for the probable losses. A convenience sample of three- to six-year-old children attending the Department of Paediatric Dentistry between May and November 2015 were assessed for inclusion according to the following criteria: the presence of carious primary mandibular first or second molars without pulpal involvement; and the parents' ability to write and read and willingness to participate in the study. Children with any of the following conditions were excluded: history of confounding mental and/or medical condition; the history of post-traumatic stress disorders, specific phobia related to dental setting and other anxiety disorders; the history of invasive procedures or traumatic experiences in dental and medical settings; and previous experience of intraoral injections and hearing or speech disorders.

Initially, the parents read a brief introduction explaining the procedures and the purpose of the study. Then, they completed an assessment package including a consent form and a set of questionnaires at the reception area. A research assistant was available to answer the parents' questions during the whole data collection session, and to check all questionnaires before leaving the assessment session.

Parental version of the SCARED questionnaire (Screen for Child Anxiety Related Disorders) was used to rule out those children with anxiety disorders [18]. The questionnaire has been designed to evaluate the signs and symptoms of separation anxiety, general anxiety, phobic disorders, obsessive disorders, fear resulting from trauma, social phobia, specific phobia and school phobia in children. A score of $\geq$25 on the questionnaire indicates anxiety disorder in the child [19]. The SCARED has been utilized in both community and clinical settings and has been shown to have high internal consistency, construct validity and reliability as a screening tool for children's anxiety disorders [18,20].

Measures

Educational level of the parents

The parents were categorized into two groups according to their academic education as with and without academic degree [21].

Economic status of the family

An index of the economic status of the family was constructed according to three categories as follows: 1. low economic status (monthly income $\leq$10,000,000 Rials or 305 US$); 2. average economic status (10,000,000 $<$ monthly income $<$20,000,000 Rials or 610 US$); and 3. high economic status (monthly income $\geq$20,000,000 Rials or 610 US$) [22]. The income levels were adopted from Poureslami et al. study (2015) [23]. The parents rated the financial wellbeing of their family according to this index. These responses provided a subjective measure of the family wealth.

Use of electronic media by the children and parents

The number of hours a child spent on 'watching TV' and 'surfing the Internet and playing e-games' per day was determined by the parents' reports. The patients were allocated to three categories: the children who only watched TV, the children who only used computer; and those who used both. This was to avoid the cumulative effect of the use of two different electronic media (computer and TV) on DA and BMP.

The amount of each parent's (father and mother) media usage per day was determined using their self-reports. The categories were the same as those used for the children.

Children's dental anxiety and behaviour management problems

Venham's Clinical Anxiety Rating Scale (CARS) was used to evaluate the children's DA. It is one of the most commonly used scales to evaluate DA in children younger than six years old and have six categories [24,25]. Table 1 shows the description of each category. The children with a score of $\geq$4 were categorized as having DA [26].

Frankl's Rating Scale (FRS) was used to evaluate the children's BMP. It categorizes the child's behaviour into four grades from definitely negative (grade 1) to definitely positive (grade 4). The description of each grade is shown in Table 2. The children with grade one and two behaviour profile were categorized as having BMP [27].

Two paediatric dentists independently observed and rated the children's behaviour and DA during the treatment using the FRS and the CARS based on the corresponding rating criteria given in Tables 1 and 2. The observers were blind to each other's scores, and to the demographic and baseline characteristics of the patients.

The observers had received adequate hours of training prior to this study in order to become familiar with the rating scales [28]. Accordingly, the observers rated DA and BMP in 25 patients under the supervision of an experienced paediatric dentist and any disagreements were resolved by discussion. These patients were not included in the study. The inter-rater reliability was assessed using the intra-class correlation coefficient (ICC). The agreement between the observers was excellent for the CARS (ICC = 0.79, $p < .001$) and FRS (ICC = 0.85, $p < .001$).

Parents' dental anxiety

The parents' DA has been shown to have a significant relationship with children's DA, particularly in young children [29]. In order to control for this confounding variable, the parents' DA was assessed using the Dental Anxiety Scale (DAS) which was previously translated by Javadinejad et al. [30]. It consists of four questions to be answered by the parents each including five responses (1–5) of increasing anxiety. The sum of responses ranges between 4 and 20 [30].

Dental procedure

This study consisted of two consecutive sessions. All treatments were performed by a postgraduate student of paediatric dentistry under the supervision of an attendant paediatric dentist who was consulted for treatment planning and treatment procedures. The supervisor was not present during the treatments. One of the parents was present during the treatment as passive observer.

In the first visit, comprehensive clinical examination and fluoride therapy were performed to induce a positive attitude towards future dental treatments in the children.

In the second visit, after a brief initial communication, a standardized 'tell-show-do' method of behaviour management was used for all patients [31]. The same operator provided the dental treatments for all included children. After the application of a topical anaesthetic agent (Benzocaine, Dentsply, York, PA), the standard inferior alveolar nerve block was administered with counter-stimulation and distraction using 27-gauge (long) needle following aspiration. Counter-stimulation included the vibration of injection site with a slight thumb pressure and the vibration of an equivalent extra-oral site using the forefinger. The children were asked to raise their right and left legs for distraction during injection [32]. Subsequently, each carious lesion was removed using a high-speed dental hand piece. A standard Class I or II cavity was prepared and an amalgam restoration was accomplished. The whole treatment procedures were completed within 30-45 minutes.

Table 1. Categories of child's anxiety according to the Venham's Clinical Anxiety Rating Scale.

0	Relaxed, smiling, willing and able to converse
1	Uneasy, concerned; during stressful procedure may protest briefly and quietly to indicate discomfort; hands remain down or partially up to signal discomfort; willing and able to interpret experience as requested; a tense facial expression is evident; may have tears in eyes.
2	Child appears scared; tone of voice, questions and answers reflect anxiety; during stressful procedure, may exhibit verbal protest, quiet crying and tense and raised (but not interfering) hands; child interprets situation with reasonable accuracy and continues to work to cope with anxiety.
3	Shows reluctance to enter situation, difficulty in correctly assessing situational threat; pronounced verbal protest, crying; protest out of proportion to threat; copes with situation with great reluctance.
4	Anxiety interferes with ability to assess situation; general crying is not related to treatment; body movement is more prominent; child can be reached through verbal communication and, eventually with reluctance and great effort, he begins the work of coping with the threat.
5	Child out of contact with the reality of the threat; child cries loudly, is unable to listen to verbal communication, makes no effort to cope with threat, and is actively involved in escape behaviour; physical restraint is required.

Statistical analysis

Proportions were used to describe categorical and numerical variables. Continuous variables were described using means and standard deviations (SD). The data were evaluated with the Kolmogorov–Smirnov test and Q–Q plot to check the normal distribution of data. Levene's test was used to assess the equality of variances [33]. The data were analysed with the Mann–Whitney U, Kruskal–Wallis, chi-square or Fisher exact tests, Spearman's correlation coefficient and Logistic Regression using the SPSS software (version 21; Chicago, IL) at $p < .05$ significance level.

Results

A total of 302 patients were identified as the eligible participants. Ten parents refused to sign written informed consent permitting their children to participate in this study. Three patients were excluded because of major incomplete or missing data in the corresponding questionnaires. A final sample of 289 children aged three to six years old (5.01 ± 0.92) along with their parents was included in this study. The baseline characteristics of participants are shown in Table 3.

Four sets of variables including (1) demographic variables, (2) use of different media and its duration, (3) children's DA and (4) BMP were analysed to understand how children's

Table 2. Categories of child's behaviour according to the Frankl's Rating Scale.

Score	Grade	Description
1	Definitely negative	Refusal of treatment, forceful crying, fearfulness, or any other overt evidence of extreme negativism.
2	Negative	Reluctance to accept treatment, uncooperative, some evidence of negative attitude but not pronounced (sullen, withdrawn).
3	Positive	Acceptance of treatment; cautious behaviour at times; willingness to comply with the dentist, at times with reservation, but patient follows the dentist's directions cooperatively.
4	Definitely positive	Good rapport with the dentist, interest in the dental procedures, laughter and enjoyment.

Table 3. Baseline characteristics of the participants.

Variables		Boy[a]	Girl[a]	Total[a]
Sex		153 (52.9%)	136 (47.1%)	289
Age of children (years)		4.99 ± 1.02	5.02 ± 0.78	5.01 ± 0.92
Media type	TV	76 (60.8%)	49 (39.2%)	125
	Computer	15 (41.7%)	21 (58.3%)	36
	TV & Computer	59 (48.8%)	62 (51.2%)	121
Mothers' educational level	Without academic degree	119 (51.7%)	111 (48.3%)	230
	With academic degree	34 (57.6%)	25 (42.4%)	59
Fathers' educational level	Without academic degree	109 (52.2%)	100 (47.8%)	209
	With academic degree	44 (55.0%)	36 (45.0%)	80
Economic level of family	Low	39 (43.8%)	50 (56.2%)	89
	Average	87 (58.0%)	63 (42.0%)	150
	High	27 (54.0%)	23 (46.0%)	50

[a]Numbers denote frequency (percentage) except the age of patients which is expressed in Mean ± SD.

media habit impact their DA and BMP during the dental treatment.

The children were categorized based on the presence of DA and BMP (Table 4). There was no significant difference in age ($p = .68$) and sex ($p = .72$) between children with and without DA (Table 4). There was also no significant difference in age ($p = .08$) and sex ($p = .47$) between children with and without BMP (Table 4).

Children's media habit and their dental anxiety

The use of different types of media was not significantly different between the children with and without DA ($p = .41$) (Table 4).

The children with DA had significantly higher amount of watching TV (3.07 ± 2.02 vs. 2.40 ± 2.11 hours, $p = .01$), playing e-games and surfing the Internet (1.53 ± 1.71 vs. 0.83 ± 1.12 hours, $p = .04$) and total amount of using electronic media (4.6 ± 2.26 vs. 3.23 ± 2.44 hours, $p < .001$) compared to those without DA. In addition, DA was significantly correlated with the children's hours of watching TV ($r = 0.20$, $p < .001$) and total media time ($r = 0.25$, $p < .001$).

Children's media habit and their behaviour management problems

The use of different types of media was not significantly different between the children with and without BMP ($p = .8$) (Table 4).

The amount of watching TV and the total amount of using electronic media were significantly higher in the children with BMP than those without BMP (2.98 ± 1.93 vs. 2.29 ± 2.16 hours, $p = .001$; and 4.13 ± 2.05 vs. 3.14 ± 2.58 hours, $p < .001$ respectively). There was no significant difference between the children with and without BMP in the amount of playing e-games and surfing the Internet (1.15 ± 1.51 vs. 0.85 ± 1.12 hours, $p = .4$). In addition, BMP was significantly correlated with the children's hours of watching TV ($r = -0.20$, $p < .001$) and total media time ($r = -0.23$, $p < .001$).

Types of electronic media used by children

In overall, 43.2% ($n = 125$) of children used TV, 12.4% ($n = 36$) used computer and 41.8% ($n = 121$) of children used both (Table 3). Seven patients did not use computer or TV. There was no significant difference between different ages ($p = .95$). The difference in the use of different types of media between boys and girls was borderline non-significant ($p = .05$). However, the use of TV tended to be more frequent among the boys (Table 3).

Amount of electronic media usage in boys and girls

The children's hours of watching TV, computer activities (playing e-games and surfing the Internet), and total media time were 2.51 ± 2.11, 0.94 ± 1.26 and 3.45 ± 2.47 respectively. The girls spent significantly more hours on playing e-games and surfing the Internet than the boys (1.02 ± 1.18 vs. 0.87 ± 1.32 hours, $p = .03$). There was no significant difference between the girls and boys in the hours of watching TV and the total amount of using electronic media (2.47 ± 2.24 vs. 2.53 ± 2.00 hours, $p = .5$; and 3.5 ± 2.52 vs. 3.41 ± 2.42 hours, $p = .85$ respectively).

Amount of electronic media usage in different ages

The children's hours of watching TV and use of computer (e-game and Internet) were not significantly different between the age groups ($p = .09$ and $p = .12$, respectively). The total hours of using electronic media were significantly different between the age groups ($p = .04$) and three-year-old children had the lowest amount of watching TV (1.96 ± 1.98 hours) and use of computer (0.70 ± 0.86 hours).

Children's media usage and economic status of family

The children's hours of watching TV ($p = .02$), using computer (e-game & Internet) ($p = .001$) and the total amount of electronic media usage were significantly lower ($p < .001$) in the families with low economic status than in those with middle and high economic status. There was also a significant correlation between the economic status of family and the children's hours of watching TV ($r = .14$, $p = .01$), using computer ($r = 0.20$, $p < .001$) and the total amount of electronic media usage ($r = 0.24$, $p < .001$).

Children's media usage and educational status of parents

The amount of watching TV (2.5 ± 1.91 vs. 2.51 ± 2.16 hours, $p = .73$) and using computer (e-game & Internet) (1.05 ± 1.13

Table 4. Comparison of demographic variables between the study groups.

Variables		Dental anxiety			Behaviour management problems		
		Yes[a]	No[a]	*p* Value	Yes[a]	No[a]	*p* Value
Number of children		47 (16.2%)	242 (83.8%)		91 (31.4%)	198 (68.6%)	
Age of children (years)		4.70 ± 1.10	4.78 ± 1.00	.68[b]	4.92 ± 0.99	4.69 ± 1.02	.08[b]
Sex	Boy	26 (17.0%)	127 (83.0%)	.72[c]	51 (33.3%)	102 (66.7%)	.47[c]
	Girl	21 (15.4%)	115 (84.6%)		40 (29.4%)	96 (70.6%)	
Media type	TV	20 (16.0%)	105 (84.0%)	.41[c]	42 (33.6%)	83 (66.4%)	.80[c]
	Computer	4 (11.1%)	32 (88.9%)		10 (27.8%)	26 (72.2%)	
	TV & Computer	23 (19.0%)	98 (81.0%)		39 (32.2%)	82 (67.8%)	
Mothers' educational level	No academic degree	29 (12.6%)	201 (87.4%)	.002[c]	69 (30.0%)	161 (70.0%)	.28[c]
	Academic degree	18 (30.5%)	41 (69.5%)		22 (37.3%)	37 (62.7%)	
Fathers' educational level	No academic degree	25 (12.0%)	184 (88.0%)	.001[c]	56 (26.8%)	153 (73.2%)	.005[c]
	Academic degree	22 (27.5%)	58 (72.5%)		35 (43.8%)	45 (56.3%)	
Economic status	Low	5 (5.6%)	84 (94.4%)	<.001[c]	21 (23.6%)	68 (76.4%)	.01[c]
	Average	25 (16.7%)	125 (83.3%)		46 (30.7%)	104 (69.3%)	
	High	17 (34.0%)	33 (66.0%)		24 (48.0%)	26 (52.0%)	

[a]Numbers denote frequency (percentage) except the age of children which is expressed in Mean ± SD.
[b]Result of Mann–Whitney U-test.
[c]Result of chi-square test.
$p < .05$ is statistically significant.

vs. 0.91 ± 1.29 hours, $p = .09$) was not significantly different in the children of mothers with and without academic degree.

In contrast, those children whose father had an academic degree spent significantly more time on computer (e-game &Internet) (1.41 ± 1.49 vs. 0.76 ± 1.11 hours, $p < .001$) and also had higher total electronic media usage (3.92 ± 2.31 vs. 3.27 ± 2.5 hours, $p = .007$). The children's hours of watching TV was not different in children of fathers with and without academic degree (3.55 ± 2.22 vs. 3.43 ± 2.53 hours, respectively, $p = .49$).

Relationship between children's and parent's media usage

The mothers' hours of watching TV, e-game and Internet usage and total media usage was 2.40 ± 1.71, 0.41 ± 0.81 and 2.81 ± 1.91 hours, respectively. The fathers' hours of watching TV, e-game and Internet usage and total media usage was 2.02 ± 1.68, 0.57 ± 0.96 and 2.60 ± 2.06 hours, respectively.

The children's TV viewing time was not correlated either with their mothers' ($r = 0.07$, $p = .1$) or fathers' time of watching TV ($r = -0.006$, $p = .45$). The children's e-game and Internet usage time was significantly correlated with that of mothers ($r = 0.22$, $p < 0.001$) and fathers ($r = 0.24$, $p < .001$). The children's total hours of using electronic media was significantly correlated with that of mothers ($r = 0.11$, $p = .02$) and fathers ($r = 0.09$, $p = .04$).

Relationship between children's and parents' dental anxiety

A significant correlation was detected between the children's and mothers' DA ($r = 0.135$, $p = .02$). However, the mothers' level of DA was not significantly different between the children with and without DA (DFS = 12.93 ± 2.52 vs. 12.04 ± 3.29, respectively, $p = .11$). There was also no significant difference in the fathers' level of DA between the children with and without DA (DFS = 10.19 ± 4.67 vs. 9.32 ± 4.08, $p = .31$). No significant correlation was detected between the children's and fathers' DA ($r = 0.018$, $p = .75$).

Advanced statistics

A logistic regression was performed to ascertain the effects of children's and parents' media time, economic status of family and parents' educational level on the likelihood that the children have DA and BMP. The logistic regression model for DA was statistically significant ($\chi^2(4) = 31.969$, $p < .001$). The economic status of family significantly contributed to the children's DA ($p = .001$). Increasing the children's (OR = 1.185, 95%CI = 1.040–1.349, $p = .01$) and mother's (OR = 1.254, 95%CI = 1.061–1.481, $p = .008$) total media time was associated with an increased likelihood of exhibiting DA. For BMP, the logistic regression model was statistically significant ($\chi^2(3) = 21.227$, $p < .001$). The likelihood of exhibiting BMP increased with the increase in the amount of the children's total media time (OR = 1.131, 95%CI = 1.018–1.256, $p = .02$), as well as the mothers' (OR = 1.429, 95%CI = 1.028–1.987, $p = .03$) and fathers' (OR = 1.341, 95%CI = 1.023–1.756, $p = .03$) amount of computer activities.

Discussion

Children's DA has been shown to be related with several factors like age, sex and psychosocial factors [14,34,35]. In addition, the current evidence has indicated that media usage might be a risk factor for anxiety disorders [1,5,11,17]. This paper presents the results of a first effort to understand whether preschool children's anxiety and BMP during the dental treatment are related with their amount of media usage.

Different techniques including proxy report, self-report and diary report have been used to determine the extent of the use of electronic media. The results of a literature review by Moore et al. [36] showed that these methods have comparable validity. In the present study, children's media time was determined by the parents' reports. The most striking

result of the present study is that the children who spent more hours watching TV and using electronic media were more likely to have DA and BMP. The opinions regarding the effect of media on aggressiveness and behavioural problems in children are not consistent. However, numerous effects have been documented related to the amount of consumed media [7,37]. The increased amount of media usage has been shown to positively correlate with increased anxiety, aggression, behavioural problems and depression; as well as difficult psychological adjustment, poorer social relationships, attention-deficit hyperactivity disorder, autism spectrum disorders, social anxiety disorder and psychological trauma in young children [6,12,38]. Surprisingly, children as young as 14 months of age have been shown to copy the behaviours shown on TV [12]. In addition, it has been documented that the content of media has more profound effects on social adjustment in children. Therefore, it would be of particular importance to investigate the potential effect of the content of different media on children's anxiety and BMP in dental environment in future studies.

The negative effect of the inappropriate use of media on children's anxiety and behaviour can be explained with the current theoretical models of human development [12]. One theory is based on the dynamic diathesis-stress model which declares that psychological adjustment and development is the result of interaction between characteristics of the child and environment [11]. Another theory named displacement hypothesis states that sedentary habits like playing video games may substitute more productive and/or active activities (e.g. homework, sports, family interactions) [11]. Moreover, conceptualization of the relationship between the use of media and children's behaviour is based on the social learning theory in which each behavioural response is triggered by a function of particular reinforcement in a given situation. Based on this theory, the use of media can negatively affect children because they may model the negative behaviours to which they are exposed [11].

In the present study, the children's anxiety and behaviour were evaluated during routine dental treatment which lasted 30–45 min. This time is the usual duration for Class I or II cavity preparation and an amalgam restoration. It has been noted that treatment duration between 30 and 45 min is the most appropriate for paediatric dental patients beyond which children's behaviour and anxiety tend to deteriorate [35,39–41]. However, evaluation of children's anxiety and behaviour during complicated treatments and/or longer time periods is suggested to better understand the children's psychological adjustments with these treatments. In addition, the treatments were performed in the presence of one of the parents as passive observer, and under the supervision of an experienced paediatric dentist who was consulted for treatment planning and treatment procedures. Although previous studies have mentioned that parental presence does not affect children's behaviour and anxiety during the treatment [42–44], the possible effects of presence of parents or supervisor, and parent active involvement during the dental treatment should be examined in future studies.

Our results showed that the children spent approximately two and a half hours per day watching TV, and almost one hour on computer activities which is consistent with the literature [45]. A previous review article revealed that children $\leq$6 years of age spend more time watching TV than playing e-games or using computer [45]. Therefore, the longer time of using TV in the present study was expected considering the age of children which was less than 6 years old. The children's media time is the result of an interaction between several socio-economic factors [38]. In our study, the children's total media time was correlated with their mothers' and fathers' total amount of media usage that affirms the importance of parental media habit [37]. In addition, the children in families with low economic level had lower media use than those in the families with higher economic status. Furthermore, the fathers' educational level was significantly related to the total amount of media use by the children. Economic status may have influenced our results for the association between the media usage of children and parents and also the children's psychological adjustment in the dental setting. The children's media time also depends on the parents' belief in relation to the usefulness or detrimental effects of TV on children [12]. Other factors including children's social orientation (their exposure to gender-specific roles, expectations and attitudes), media and educational materials, ethnicity, identity, and pedagogy may affect young children's use of media [46–49].

DA has a multifactorial aetiology and all of these factors cannot be covered in one study because of the large number of variables involved. In the present study, the children's age and their parents' level of DA, as two important confounding factors, were matched between the study groups. However, the cross-sectional design of this study does not permit exact causal inferences from the observed differences and extrapolation of the results. Therefore, future representative longitudinal data collections with the use of larger sample sizes and more homogeneous distribution of participants from families with similar socio-economic and educational level will yield more accurate results and determine such cause-and-effect relationships. Investigating the relationship between media habits and DA and BMP in older children is also recommended.

Conclusions

Based on the findings from the present study, there is a significant correlation between 3-6-year-old children's DA and BMP, and the amount of daily use of media. Specifically, children with DA and BMP spent more hours watching TV, playing e-games and surfing the Internet.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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