

Comparison of the opinions and attitudes of medical doctors, dentists and mothers toward teething symptoms

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Abstract

Background. The signs and symptoms associated with teething can be local or systemic. It remains unclear whether the disturbances are caused by the eruption of primary teeth or whether they simply coincide with tooth eruption. Parents and healthcare professionals can have different perceptions about teething symptoms, especially in different cultural or socio-economic contexts.

Objectives. The study aimed to compare the opinions and attitudes of medical doctors, dentists and mothers toward the symptoms of teething.

Material and methods. Data about the signs and symptoms was collected using a researcher-made questionnaire. The questionnaire was mailed in December 2019 to 800 randomly selected medical doctors and dentists working in the Central Aegean Region of Turkey. Mothers of children aged 0–3 years who were referred to the pediatric department were selected for the study. Data from 199 medical doctors (109 family physicians, 90 pediatricians), 293 dentists (169 general dentists, 124 pediatric dentists) and 352 mothers who completed the questionnaire was included in the study. The data was analyzed using the IBM SPSS Statistics for Windows program.

Results. Each participant identified at least one symptom related to teething. Statistically significant differences were found between the 3 groups in terms of symptoms except for stomach ache ($p < 0.05$). Gingival irritation was the most common symptom among dentists (95.6%) and mothers (70.7%), while irritability was the most common symptom among medical doctors (90.5%). Mothers believed to a greater extent than the other groups that fever, vomiting and cough were associated with teething ($p < 0.05$), whereas medical doctors tended to point to drooling, irritability, biting/chewing, diarrhea, and ear rubbing more often than the other groups ($p < 0.05$). In addition, sleep disturbance and loss of appetite were associated with teething less frequently by mothers as compared to the other groups ($p < 0.05$).

Conclusions. In the present study, medical doctors, dentists and mothers reported unproven and controversial associations between teething and certain local or systemic symptoms. Mothers especially were more likely to believe that systemic symptoms that can be confused with other serious diseases were associated with teething.

Keywords: signs and symptoms, teething, tooth eruption, primary tooth

Introduction

The eruption of primary teeth is a crucial moment in the life of infants, and it has remained a subject of great concern among those who directly deal with the health of these children, such as parents, dentists, pediatricians, and other healthcare professionals. Parents and healthcare professionals can have different perceptions about teething symptoms, especially in different cultural or socio-economic contexts.^{1–3}

The relationship between the eruption of primary teeth and the general health of infants has been documented for over 5,000 years.⁴ The signs and symptoms associated with teething may be local or systemic. Local symptoms include gingival irritation (red and sensitive gums, gingival edema, and rubbing), drooling, a drool-induced rash on the chin or face, a diaper rash, flushed cheeks, ear rubbing on the side of the erupting tooth, mouth ulcers, eruption cysts, biting objects, and finger sucking. Systemic symptoms include irritability, fever, restless sleep, the loss of appetite, crying, diarrhea, constipation, colic, vomiting, coughing due to hypersalivation, nasal discharge, strong urine odor, and stomach ache.^{1,2,4–6} However, these symptoms vary from baby to baby. It remains unclear whether the eruption of primary teeth causes the disturbances or whether the symptoms coincide with tooth eruption. This is partly due to confusion between signs and symptoms. Symptoms are what the patient experiences, but children indicate that they are getting their first few teeth through signs and signals that only their caregivers can interpret.⁷ According to healthcare professionals, local manifestations are more related to the process than systemic manifestations.^{8,9} However, based on wrong information or beliefs, parents and healthcare professionals can mistakenly attribute the symptoms of minor or potentially fatal illnesses to teething.^{10,11} These false/mistaken beliefs can contribute to the standard developmental needs of an infant going unaddressed. Also, they can lead to delays in the diagnosis of severe diseases.^{1,12}

In previous studies, healthcare professionals investigated the symptoms by providing common descriptive results.^{2,5,6,12–17} Only limited studies have evaluated opinions comparatively.^{1,12,18,19} The present study aimed to compare the opinions and attitudes of medical doctors, dentists and mothers toward the symptoms of teething.

Methods

This study was approved by the local Ethics Committee at Afyonkarahisar Health Sciences University, Turkey (No. 2011-KAEK-2/2019-206). The data regarding signs and symptoms was collected using a researcher-made questionnaire. The survey contained demographic factors and the signs/symptoms of teething (gingival irritation, drooling, irritability, sleep disturbance, biting/chewing, rash, loss of appetite, diarrhea, fever, ear rubbing,

vomiting, cough, and stomach ache) that were frequently reported in previous studies.^{1,2,4–6} The participating healthcare providers were asked: “What is the average percentage of patients who consult you for teething complaints monthly?” In December 2019, the questionnaire was mailed to 800 randomly selected medical doctors and dentists working in the Central Aegean Region of Turkey.

As mothers are generally thought to be more involved in childcare than fathers, they have been more frequently used as proxies. Our study included 400 mothers of children aged 0–3 years who were referred to the pediatric department of the university hospital in Afyonkarahisar, Turkey, for any reason from December 2019 to September 2020. The parents provided written informed consent for the various research procedures. The questionnaire included demographic factors, the educational level, and the signs/symptoms of teething (gingival irritation, drooling, irritability, sleep disturbance, biting/chewing, rash, loss of appetite, diarrhea, fever, ear rubbing, vomiting, cough, and stomach ache) that were frequently reported in previous studies.^{1,2,4–6} Mothers were also asked: “Did you consult a healthcare center for your children’s teething symptoms?”

The participants were divided into 3 groups for statistical analysis: medical doctors (family physicians and pediatricians); dentists (general and pediatric); and mothers. Data from the completed surveys of 199 medical doctors (109 family physicians, 90 pediatricians), 293 dentists (169 general dentists, 124 pediatric dentists) and 352 mothers were included in the study.

Statistical analysis

The data was analyzed using the IBM SPSS Statistics for Windows program, v. 23.0 (IBM Corp., Armonk, USA). A descriptive analysis of the data is presented in the cross tables. Numbers and percentages of the demographic data were tabulated. Comparisons between the groups were performed using the χ^2 and Z-ratio tests for categorical variables. Statistical significance was set at a *p*-value <0.05.

Results

Out of the 844 participants, 41.7% (*n* = 352), 34.7% (*n* = 293) and 23.6% (*n* = 199) were mothers, dentists and medical doctors, respectively. In the medical doctor group, 54.8% (*n* = 109) were family physicians and 45.2% (*n* = 90) were pediatricians. In the dentist group, 57.7% (*n* = 169) were general dentists and 42.3% (*n* = 124) were pediatric dentists. Figure 1 shows the group structure of the participants. The distribution of the participants by gender was as follows: 30% (*n* = 253) were males and 70% (*n* = 591) were females. While 42.3% (*n* = 124) of dentists were males and 57.7% (*n* = 169) were females, 64.8% (*n* = 129) of medical doctors were males and 35.2% (*n* = 70) were females. Table 1 shows the age distribution for all participants.

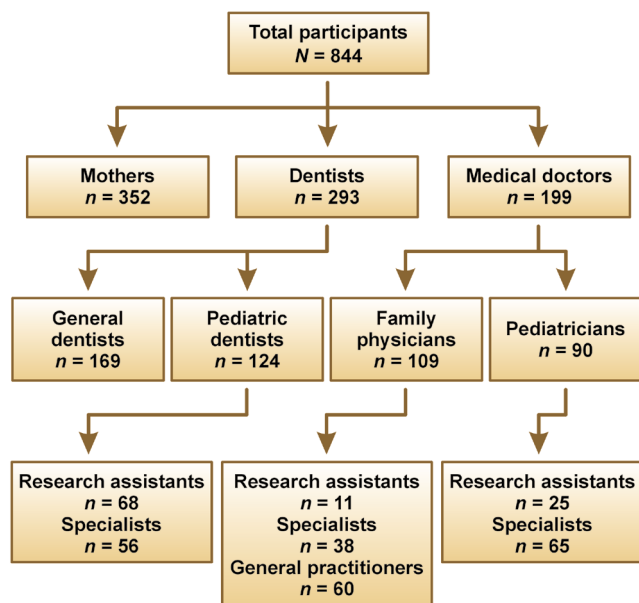


Fig. 1. Group structure of the participants

When the educational level of mothers was examined, 36.9% were found to be primary school graduates, 36.1% were high school graduates, 21.3% were university graduates, and 5.7% were Ph.D. holders. Our study found that 26.4% of the participating mothers worked outside home, while 73.6% were housewives.

Each participant in the study identified at least one symptom related to teething. Of the total number, 31.2% reported 1–4 symptoms, 40.5% reported 5–8 symptoms, and 28.3% reported 9 or more symptoms.

Statistically significant differences were found between the 3 groups in terms of symptoms except for stomach ache ($p < 0.05$). Gingival irritation (83.6%), irritability (75.0%) and drooling (70.4%) were the most common symptoms related to teething, while vomiting (8.8%), cough (6.5%), rash (6.0%), and stomach ache (2.5%) were the rarest symptoms attributable to teething.

There were significant differences in the percentage agreement between medical doctors and dentists regarding to gingival irritation ($p < 0.001$), irritability ($p < 0.05$), drooling ($p < 0.001$), biting/chewing ($p < 0.001$), diarrhea ($p < 0.001$), fever ($p = 0.028$), ear rubbing ($p < 0.001$), and rash ($p < 0.001$).

There were significant differences in the percentage agreement between medical doctors and mothers

Table 1. Age distribution of medical doctors, dentists and mothers

Age [years]	Medical doctors n = 199	Dentists n = 293	Mothers n = 352	Total N = 844
<20	0 (0)	0 (0)	6 (1.7)	6 (0.7)
21–30	59 (29.6)	170 (58.0)	182 (51.7)	411 (48.7)
31–40	112 (56.3)	107 (36.5)	140 (39.8)	359 (42.5)
>40	28 (14.1)	16 (5.5)	24 (6.8)	68 (8.1)

Data presented as number (percentage) (n (%)).

regarding gingival irritation ($p < 0.001$), irritability ($p < 0.001$), drooling ($p < 0.001$), sleep disturbance ($p < 0.001$), biting/chewing ($p < 0.001$), loss of appetite ($p < 0.001$), diarrhea ($p < 0.001$), fever ($p < 0.001$), ear rubbing ($p < 0.001$), vomiting ($p < 0.001$), cough ($p = 0.003$), and rash ($p < 0.05$).

There were significant differences in the percentage agreement between dentists and mothers regarding gingival irritation ($p < 0.001$), irritability ($p < 0.001$), drooling ($p < 0.001$), sleep disturbance ($p < 0.05$), biting/chewing ($p < 0.001$), loss of appetite ($p < 0.001$), diarrhea ($p < 0.05$), fever ($p < 0.001$), and vomiting ($p < 0.05$).

According to groups, gingival irritation was the most common symptom listed by dentists (95.6%) and mothers (70.7%), while irritability was the most common symptom noted by medical doctors (90.5%). Mothers believed to a greater extent than the other groups that fever, vomiting and cough were associated with teething ($p < 0.05$), whereas medical doctors tended to point to drooling, irritability, biting/chewing, diarrhea, and ear rubbing more often than the other groups ($p < 0.05$). In addition, sleep disturbance and loss of appetite were associated with teething less frequently by mothers as compared to the other groups ($p < 0.05$). The distribution of symptoms according to groups is shown in Table 2.

Approximately 51.4% of mothers responded affirmatively to the question: “Did you consult a healthcare center for your children’s teething symptoms?”. Among these mothers, 87.3% stated that they took their child to medical doctors, while 12.7% of them visited dentists.

When medical doctors and dentists were asked: “What is the average percentage of patients who consult you for teething complaints monthly?”, approx. 83.4% of medical doctors and 82.3% of dentists stated that “they are less than 10% of the patients I examine monthly”. Only 16.6% of medical doctors and 17.7% of dentists stated that “they are more than 10% of the patients I examine monthly”. The variation between medical doctors and dentists was not statistically significant ($p = 0.737$).

Discussion

Teething has been a subject of studies and interest of healthcare professionals who deal with children. Previously, only a limited number of studies evaluated opinions comparatively.^{1,12,18,19} However, the present study comparatively evaluates the opinions of the medical doctors (family physicians and pediatricians), dentists (general and pediatric) and mothers closely dealing with teething.

Gingival irritation (83.6%) was the symptom most associated with teething among all respondents, which is in accordance with previous clinical and survey studies.^{5,7,14–17,20,21} Among the current study groups, gingival irritation was most commonly noted by dentists (95.6%), which is a finding similar to that reported by Aliabad et al.¹⁹

Table 2. Distribution of the answers of the participants about the signs/symptoms of teething

Signs/symptoms of teething	Answers	Medical doctors <i>n</i> = 199	Dentists <i>n</i> = 293	Mothers <i>n</i> = 352	Total <i>N</i> = 844	<i>p</i> -value
Gingival irritation	related	177 (88.9) ^a	280 (95.6) ^b	249 (70.7) ^c	706 (83.6)	<0.001*
	non-related	22 (11.1) ^a	13 (4.4) ^b	103 (29.3) ^c	138 (16.4)	
Irritability	related	180 (90.5) ^a	238 (81.2) ^b	215 (61.1) ^c	633 (75.0)	<0.001*
	non-related	19 (9.5) ^a	55 (18.8) ^b	137 (38.9) ^c	211 (25.0)	
Drooling	related	179 (89.9) ^a	221 (75.4) ^b	194 (55.1) ^c	594 (70.4)	<0.001*
	non-related	20 (10.1) ^a	72 (24.6) ^b	158 (44.9) ^c	250 (29.6)	
Sleep disturbance	related	130 (65.3) ^a	171 (58.4) ^a	160 (45.5) ^b	461 (54.6)	<0.001*
	non-related	69 (34.7) ^a	122 (41.6) ^a	192 (54.5) ^b	383 (45.4)	
Biting/chewing	related	161 (80.9) ^a	178 (60.8) ^b	118 (33.5) ^c	457 (54.1)	<0.001*
	non-related	38 (19.1) ^a	115 (39.2) ^b	234 (66.5) ^c	387 (45.9)	
Loss of appetite	related	136 (68.3) ^a	190 (64.8) ^a	106 (30.1) ^b	432 (51.2)	<0.001*
	non-related	63 (31.7) ^a	103 (35.2) ^a	246 (69.9) ^b	412 (48.8)	
Diarrhea	related	104 (52.3) ^a	60 (20.5) ^b	115 (32.7) ^c	279 (33.1)	<0.001*
	non-related	95 (47.7) ^a	233 (79.5) ^b	237 (67.3) ^c	565 (66.9)	
Fever	related	13 (6.5) ^a	37 (12.6) ^b	217 (61.6) ^c	267 (31.6)	<0.001*
	non-related	186 (93.5) ^a	256 (87.4) ^b	135 (38.4) ^c	577 (68.4)	
Ear rubbing	related	63 (31.7) ^a	39 (13.3) ^b	33 (9.4) ^b	135 (16.0)	<0.001*
	non-related	136 (68.3) ^a	254 (86.7) ^b	319 (90.6) ^b	709 (84.0)	
Vomiting	related	7 (3.5) ^a	21 (7.2) ^a	46 (13.1) ^b	74 (8.8)	<0.001*
	non-related	192 (96.5) ^a	272 (92.8) ^a	306 (86.9) ^b	770 (91.2)	
Cough	related	5 (2.5) ^a	18 (6.1) ^{ab}	32 (9.1) ^b	55 (6.5)	0.010*
	non-related	194 (97.5) ^a	275 (93.9) ^{ab}	320 (90.9) ^b	789 (93.5)	
Rash	related	3 (1.5) ^a	26 (8.9) ^b	22 (6.3) ^b	51 (6.0)	0.003*
	non-related	196 (98.5) ^a	267 (91.1) ^b	330 (93.8) ^b	793 (94.0)	
Stomach ache	related	4 (2.0) ^a	10 (3.4) ^a	7 (2.0) ^a	21 (2.5)	0.453
	non-related	195 (98.0) ^a	283 (96.6) ^a	345 (98.0) ^a	823 (97.5)	

Data presented as *n* (%). Different letters in superscript show statistically significant differences between the groups at the level of $p < 0.05$; * statistically significant.

In most studies, irritability is listed as the most frequent symptom of teething.^{1,6,15–17,20–22} In the current study, irritability (75.0%) was similarly associated with teething among most of the respondents. The rates were 90.5% for medical doctors, 81.2% for dentists and 61.1% for mothers. The current results are similar to those from a study showing that general practitioners reported irritability as a sign of teething more often than nurses and dentists.¹⁹ This may be related to the fact that families more often visit medical doctors for teething complaints.

There is an increase in saliva production during the first 3–4 months of life as the salivary glands develop and during the teething period. Drooling (70.4%) was among the most often noted symptoms during the teething period among medical doctors (89.9%), dentists (75.4%) and mothers (55.1%), which is a finding similar to those of previous studies.^{2,5,6,13–17,20,22}

Previous subjective parental information and most of prospective clinical studies pointed to sleep disturbance during the teething period.^{3–6,13–17,23,24} In the present study, more than half of the participants (54.6%) attributed sleep disturbance to teething. In a study performed in

Iowa, USA, a greater percentage of pediatric dentists and parents reported sleep disturbance than pediatricians.¹⁸ However, the present study showed the following ranking for the observation of sleep disturbance: medical doctors (65.3%); dentists (58.4%); and mothers (45.4%). The differences between the studies may be due to the fact that our study groups were composed of pediatricians or pediatric dentists and non-specialists, like family physicians and general dentists. Also, sociocultural or educational differences as well as variations in the sample size between the study groups may have led to such discrepancies.

In the present study, 54.1% of the participants reported biting, chewing or sucking during the teething period, which is similar to previous clinical studies.^{4,5,15,16} In a study conducted among pediatricians, general practitioners, dentists, and nurses, dentists had the highest level of agreement for biting (96%), followed by nurses (91%).¹⁹ Biting or chewing were commonly stated symptoms during teething in parent surveys,^{3,12,17,21,25} but in this study, medical doctors (80.9%) and dentists (60.8%) reported these symptoms more often than mothers (33.5%). It can be assumed that socioeconomic and cultural differences among mothers may have

contributed to the disparities in the findings of the above-mentioned studies. Also, differences in the sample size of the study groups may have contributed to varied results.

In the present study, 51.2% of the respondents stated that the loss of appetite was associated with teething. Most parents and healthcare professionals in Turkey and other countries similarly attribute a decrease in appetite to teething. Additionally, the levels of interleukin-1 beta (IL-1 β) have also been correlated with the loss of appetite.^{3–6,13–16,21,25–27} According to the group data from the present study, medical doctors (68.3%) and dentists (64.8%) reported the loss of appetite more often than mothers (30.1%). This result may be related to the appetite level being a subjective finding among mothers.

In the current study, diarrhea was attributed to teething by 33.1% of all participants. In previous studies, mothers of varying cultures believed that their child's diarrhea at this age was due to teething.^{1,5,7,17,21,23,25} Some researchers who followed children during the eruption period attributed diarrhea to teething, and the levels of IL-1 β and interleukin-8 (IL-8), as well as to placing contaminated objects in the mouth, extra saliva and infectious agents.^{1,2,6,20,23,27} In a study conducted among Florida pediatricians (USA), 34.9% of participants associated teething with diarrhea.¹⁴ In a study on parents, pediatric dentists and pediatricians from Iowa, USA, the reported rates of diarrhea during teething were 56.7%, 52% and 9.1%, respectively.¹⁸ In the present study, the rates were as follows: 52.3% for medical doctors; 20.5% for dentists; and 32.7% for mothers. The differences between the studies can be attributed to the sample size, differences in the definition of diarrhea, variations within the sample groups (including pediatricians, or pediatricians and general physicians), and cultural differences. Additionally, the lower rate noted among dentists can be attributed to the fact that diarrhea is not a typical subject evaluated in dental training or practice.

Fever is among the symptoms most frequently reported by mothers from different countries.^{1–3,16,17,21,23,25} However, the results are controversial among healthcare professionals. Some authors reported fever during teething, and correlated it with early vital factors, or high levels of IL-1 β and tumor necrosis factor (TNF) in the gingival crevicular fluid.^{20,27,28} Alternately, some prospective studies reported a slight increase in body temperature only on the day of eruption ($36.70 \pm 0.39^\circ\text{C}$); at other times, the temperature remained within normal limits and could not be defined as fever.^{5,6,13} In the present study, 31.6% of the responders reported $>38.5^\circ\text{C}$ fever. Mothers (61.6%) reported fever more often than dentists (12.6%) and medical doctors (6.5%), which is similar to other studies.^{1,18} The false beliefs associated with teething were found to be significantly associated with the educational level. Commonly, healthcare professionals and parents with a high level of education were found to have a better knowledge about teething.²⁹ Based on these results, it is not surprising that mothers having at least a university degree constituted only 27% of the group, which resulted in the group of mothers having more misconceptions.

In previous studies, mothers associated ear rubbing with teething.^{17,29} However, a study by Tasanen showed no relationship between teething and ear rubbing.¹⁶ In the present study, 16% of the respondents attributed ear rubbing to teething. Medical doctors (31.7%) noted ear rubbing more often than dentists (13.3%) and mothers (9.4%). These results may be related to the fact that patients generally consult a medical doctor for ear rubbing/earache, and when there are no symptoms of infection or other diseases, ear rubbing is attributed to teething.

Vomiting was associated with teething by only 8.8% of the respondents; mothers (13.1%) attributed it to teething more often than dentists (7.2%) and medical doctors (3.5%). Although vomiting was associated with teething in other studies conducted with the participation of parents,^{2,23,26,29} in the majority of prospective studies, it was not associated with teething.^{4,5,25,29}

In a study conducted in Egypt, Allam reported that 48% of mothers believed that cough could be due to teething.²³ On the other hand, in prospective studies, healthcare professionals did not attribute cough or bronchitis to teething.^{5,16} In the present study, mothers (9.1%) associated cough with teething statistically more often than medical doctors (2.5%). Additionally, only 6.5% of the participants in total claimed cough to be a teething symptom. Although the rate was low, it should not be forgotten that attributing these symptoms to teething can lead to other severe illnesses, like bronchopneumonia, being overlooked. Therefore, mothers especially should be informed of this misconception.

Rash (6.0%) was one of the least often declared teething symptoms among the respondents, especially among medical doctors (1.5%). In parent surveys, cheek rashes or diaper rashes were attributed to teething.^{6,17,23} Although some studies including physicians listed facial rashes,¹⁵ most prospective studies reported that rash was not associated with teething.^{4,5,25,29} It can be surmised that the circumoral area can be irritated by drooling. Otherwise, facial rashes along with other accompanying systemic manifestations should be associated with human herpesvirus 6 (HHV-6) or other infections common among children of that age.⁴

Limitations

The limitation of this study is that the study group did not represent all demographics. A study with a larger population size that would include multiple geographical areas and different specialists is required for identifying relationships between the eruption of primary teeth and local or systemic manifestations.

Conclusions

In the present study, medical doctors, dentists and mothers reported unproven and controversial associations between teething and local or systemic symptoms.

Mothers were more likely to confuse systemic symptoms that should be attributed to serious diseases with those of teething. Many of these signs can be part of the normal developmental process and can be attributed to teething, or may be due to a childhood disease. Neglecting important disease symptoms based on the belief that the symptoms are caused by teething as well as paying unnecessary attention to the complaints actually related to teething negatively affect a child's physical health and quality of life. Medical doctors and dentists should dispel longstanding cultural myths and false beliefs about teething, and share evidence that teething is not strongly associated with severe symptoms. Providing education about the teething period in infants during prenatal classes for mothers, in professional health programs and during the continuing vocational education for healthcare professionals should be considered.

Ethics approval and consent to participate

This study was approved by the local Ethics Committee at Afyonkarahisar Health Sciences University, Turkey (No. 2011-KAEK-2/2019-206). Informed written consent was obtained from the participants.

Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.


Consent for publication

Not applicable.

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