CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3540898

Available online at: http://www.iajps.com ***Research Article***

KNOWLEDGE, PRACTICE AND DETERMINANTS ASSOCIATED WITH TEETHING SYMPTOMS IN INFANTS AMONG MOTHERS ATTENDING VACCINATION CLINIC IN AL-NAWARIYAH PRIMARY HEALTH CARE CENTER IN MAKKAH AL-MUKARRAMAH IN 2018

CROSS SECTIONAL STUDY

[1]Dr.Orjuwan Khaled Bosaeed

[1]R3 Family Medicine,

Abstract:

Background: *Teething is a natural physiological phenomenon, which usually occurs without complications. However, there are several symptoms and beliefs that has been linked to teething and these had led to many unnecessary interventions which may be harmful to the infant in many of cases.*

Aim of the Study: *To estimate the level of knowledge and asses the current practice of mother towards teething signs and symptoms in infants among mothers as well as the factors affecting it.*

Methodology: *A cross-sectional study involving 152 mothers attending vaccination clinic for their children in Al-Nawariyah PHC in Makkah al Mukarramah. A self-administered questionnaire was used for data collection. Variables such as demographic and knowledge, attitude towards symptoms and practice used to manage the symptoms of teething*

Results: *A total of 152 respondents participated in the study. Majority of the respondents belonged to 26 – 35 years of age, college level of education, have 2000 – 15000 SR family monthly income, 2-4 number of children, and majority are housewife. There are 65.1% - 78.3% of the respondents have high level of knowledge on teething. Majority [75%] of the respondents have misconception that diarrhea is a sign of teething symptoms and 42.8% don't believed on the necessity of medical attention during teething episodes. Symptoms such as desire to bite [69.1%], increase salivation [59.2%], gum irritation [58.6%] and loss of appetite [50.7%] were also identified. Statistical analysis revealed that among the different demographics, only the number of children is a significant factor that affects the level of knowledge [p-value = 0.042] and practice towards teething [p-value = <0.001] of mothers attending vaccination clinic.*

Conclusions: *There is an average level of knowledge and practice on teething of the 152 mothers attending vaccination clinic in Al-Nawariyah primary healthcare center in Saudi, Arabia. The level of knowledge on teething of mothers as well as the practices in managing teething problems was significantly associated with the number of children. Education efforts of adults with regards to teething of infants in Saudi Arabia is still encouraged.*

Corresponding author:

Orjuwan Khaled Bosaeed,

R3 Family Medicine, Date of submission: 15\9\2019

QR code

Please cite this article in press Orjuwan Khaled Bosaeed et al., ***KNOWLEDGE, PRACTICE AND DETERMINANTS ASSOCIATED WITH TEETHING SYMPTOMS IN INFANTS AMONG MOTHERS ATTENDING VACCINATION CLINIC IN AL-NAWARIYAH PRIMARY HEALTH CARE CENTER IN MAKKAH AL-MUKARRAMAH IN 2018.,*** *Indo Am. J. P. Sci, 2019; 06[11].*

INTRODUCTION:

Teething is a naturally occurring physiological phenomenon, which frequently happens without complications. It is described as movement of the tooth from its development position within the alveolar bone to flare-up in the oral cavity [1]. This process happens to all infants, and every mother has to deal with her baby during this period. However, there are several symptoms and beliefs have been linked to teething among different generations and only few evidence exists to support them. These ideas had led to many unnecessary interventions which may be harmful to the infant in many of cases.

Teething on infants are commonly manifested by desire to biting, gum irritation, irritability, drooling, fever, vomiting, sleep disturbance, diarrhea, and loss of appetite that sometimes resulted to decrease in weight [2-7]. In terms of managing these symptoms of teething, different non-pharmacological and pharmacological interventions are available without the advice of a healthcare professional [8]. Non-pharmacological interventions commonly reported are allowing their children to bite on chilled objects or teething gels containing benzocaine [3, 6, 9-11]. Pharmacological interventions on the other hand includes the use of acetaminophen and ibuprofen, systemic analgesics and applied topical analgesics, antipyretics and antibiotics [3, 4, 6, 9].

The use of over-the-counter or prescription-strength topical analgesics for teething pain is not recommended and it was known to cause harm to child's life, viscous lidocaine has been linked to serious adverse reactions [including death] in young children being treated for teething pain [12]. Additionally, methemoglobinemia has been reported in association with the use of oral benzocaine sprays, benzocaine-containing teething gels in infants or children younger than two years of age [11].

In Saudi Arabia, antibiotics can be accessed without restrictions in community pharmacies [13]. However, misuse of over-the-counter antibiotics was also reported to be associated to emergence of bacterial resistance [3]. Thus, there is a great need for the society to differentiate between facts and false myths related with the teething process.

Rationale:

As family medicine physicians, it is our duty to worry about general health of the population. The children is important corner to the community, therefore it is important to correct any misconception about their health, using incorrect medication, especially that antibiotics spread bacterial resistance and affect the whole world not just the local community. The researcher as a female and a mother herself understands how children are precious to their mothers. Seeing them sick is the hardest to a mother's heart, moreover imagining that some of interventions can severely harm the children because of the influence of the wrong beliefs of the society encourage the researcher to conduct this study.

AIM OF THE STUDY:

Determining the prevalence of the wrong beliefs and myths on teething symptoms. Furthermore, develop educational design to upgrade mother's knowledge and improve their current practices on infant teething process.

Objectives:

1. To estimate the level of knowledge towards teething symptoms in infants among mothers attending vaccination clinic in Al Nawariyah primary health care centers in Makkah Al-Mukarramah in 2018 and the factors affecting it .
2. To assess the current practice of mothers attending vaccination clinic in Al-Nawariyah primary health care in Makkah Al- Mukarramah in 2018 towards teething symptoms in infants and the factors affecting it.

Literature review:

Tooth Eruption and Teething in Infants:

In order for the tooth to appear, an eruption pathway is first created through bone resorption and formation process. It started with the formation of tooth germ within the dental follicle which is covered by the reduced enamel epithelium and fused to the oral epithelium over the cusp of the developing tooth [14-16]. As soon as the tooth crown emerge in the gingiva, this overlying epithelium started to degenerates [1, 15-18]. Eruption of the tooth is also influenced by the force created of the periodontal ligament and the tooth pulp and roots that are undergoing development [14, 17, 19]. According to Hulland and colleagues**,** the mean duration of primary tooth eruption from upcoming to complete eruption was 0.7 mm per month [15]. Physiologically, tooth eruption are governed by an array of regulatory factors such as the *c-fo*s genes, hormones [pituitary growth, thyroid and parathyroid], growth factors such as EGF, CSF-1 and TGF-β1, cytokines and other protein peptides [PTHr, MCP-1 and IgA] [1, 14-20].

Tooth eruption in infants usually occur at around 4-8 months of age. However, according to some articles, timing of tooth eruption varies by as much as six months [9, 16]. This begins with the eruption of the lower incisors and usually completed at around 30-36 months of age and is manifested by the appearance of the second primary molars [9].

Primary tooth eruption or teething in infants are perceived to have teething pain or capable to cause significant discomfort both to the parent and the infant [9, 14, 16, 21]. Although there are reported prevalence of around 85% teething pains in infants, evidence are considered weak primarily because the respondents are the mothers and this are just assumptions of the adults based on distressed appearance of the infant [4, 14, 22].

Symptoms Associated with Teething:

In terms of individual symptoms, a wide array of symptoms associated with teething in infants were reported. Additionally, according to the American Academy of Pediatric Dentistry, teething in children can lead to intermittent localized discomfort in the area of erupting primary teeth, irritability, and excessive salivation [23]. Furthermore, Galili and colleagues found that in simultaneous multiple eruptions were associated with diseases [24].

In 2016, Massignan and colleagues conducted a meta-analysis study on the signs and symptoms of primary tooth eruption involving 1179 articles. In this particular study, the researchers have found a 70.5% [total sample = 3506] overall prevalence of signs and symptoms occurring during primary tooth eruption in children between 0 and 36 months. The most frequent symptoms associated to teething in most children found in this study were gingival irritation [86.81%], irritability [68.19%], and drooling [55.72%] [7].

In much earlier studies, Kiran and colleagues and Noor-Mohammed and Basha observed that teething was associated with systemic symptoms [21, 25]. A clinical study in 2011 conducted by Kiran and colleagues found that symptoms such as fever, drooling, diarrhea, irritability, loss of appetite, sleeping problems and rhinorrhea were associated with eruption of the incisors [21]. However, in 2012, Noor-Mohammed and Basha found that teething was associated with fever and drooling only [26]. Similarly, in 2011, Ramos-Jorge and colleagues found that there was a slight increase in body temperature during tooth eruption in children [27].

Interventions on Teething

There are many teething remedies being implemented by parents and health professionals to manage teething pains of infants despite lack of evidence supporting efficacy. According to Tsang, most of these interventions are being implemented without advice of a dental professional and these are based on common knowledge from the community [8]. Both pharmacological and non-pharmacological interventions are usually applied practices to relieved teething pains in infants.

Non-pharmacological approaches commonly applied aims to either cool or rub the teething site [10, 22]. According to Williams, cooling effect reduces inflammation due to constriction of the blood vessels and creates numbing of the gingivae while rubbing massages the gingival and overwhelms the sensory receptors providing temporary relief of teething pain [22]. On the other hand, pharmacological interventions aims to attain analgesia, anaesthesia and sedation [10, 22]. Tsang summarize examples of over the counter drugs commonly administered to relieve teething pains are paracetamol also known as acetaminophen, the non-steroidal anti-inflammatory drug [NSAID] like ibuprofen and salicylates, and lignocaine and benzocaine [8].

Studies on Teething:

International Studies:

Several studies has been conducted on teething around the world to evaluate the knowledge of mothers, actual symptoms of teething, and management practices [2, 4, 7, 10]. In terms on knowledge of mothers on teething, a study in India conducted by Kakatkar and collegues reported that professional parents with high income were found to have a better level of teething knowledge [5]. Similarly, El-Gilany and colleagues in a study conducted in Egypt, found that good knowledge on teething are significantly associated to higher education, urban residence, and first-born child [4]. In contrast to this, a study in Brazil conducted by Azevedo and colleagues in 2015, published no significant association of socio-economic and demographic variables on mother's knowledge towards teething symptoms [27].

In 2016, Masignnan and colleagues have conducted a systematic review and meta-analysis on the symptoms of teething and found out that there are different symptoms associated with teething. In this particular study, the most common symptoms found were gingival irritation [87%], followed by irritability [68%], and drooling [56%]. The researchers also

found that teething was associated with some increase in temperature, but it was not more than 38°C [100.4°F] [7]. In India, a cross-sectional study in 2017 by Kakatkar and colleagues was conducted using a self-administered questionnaire. In this particular study, the researchers have found out that most of the population have experienced diarrhea [87.5%], fever [70%], and sleep disturbances [48.2%] during teething episodes [5]. In earlier years, a study conducted by Adimorah and colleagues in Nigeria found almost the same symptoms of teething. In this study, the researchers found that the commonest medical symptoms were fever [71.7%], loose stools [58.3%] and vomiting [35%] [2]. In more recent year, another study conducted in Egypt reported symptoms of teething as biting fingers/objects [70.5%], drooling [60.0%], gum rubbing [42.0%], gum swelling [47.0%], diarrhea by [51.0%], fever [83.2%] and weight loss [46.0%] [4].

Different non-pharmacological and pharmacological interventions are used to manage teething without the advice of a healthcare professional[8]. In a study conducted in Jordan by Owais and colleagues in 2010, found that more than half of the participants allowed their children to bite on chilled objects, and a [76.1%] of participants used systemic analgesics and [65.6%] of participants rubbed their children gums with topical analgesics [10]. In India, Kakatkar and colleagues reported that 33.2% of the population allowed their children to bite on chilled objects in relieving teething pain of infants [5]. In Nigeria, Adimorah and colleagues reported that 46.9% of the respondents used "teething powder" [powdered aspirin and carbonate] to relieve the symptoms and [18.4%] used paracetamol[2]. In Egypts, the most frequently given treatments were antipyretics [71.3%] and antibiotics [24.3%] [4].

In 2015, Elbur and colleagues have conducted a cross-sectional study on parental knowledge and practices on infant teething in Taif, Saudi Arabia. This particular study was participated with 493 respondents. The researchers have found that teething is attributed with multiple symptoms such as desire to bite [93.1 %], fever [87 %], gum irritation [84.2 %], increased salivation [84 %] and diarrhea [83 %]. The researchers also found that fever as a teething symptom was more common among female gender [*p-value* = 0.001] than male. Furthermore, diarrhea as teething symptoms were found to be significantly associated with female gender [*p-value* = < *0.001*], residence [*p-value* = *0.039*] and educational level [*p-value* = 0.006]. In terms of managing teething pains on infants, 88 % of parents allowed the child to bite on a chilled object, while 70.2 % preferred the use of systemic analgesics and 45 % believed that giving antibiotics will relieve teething pains [3].

Another cross-study conducted in Saudi was in 2017 conducted by Kumar and colleagues. In this study, a total of 159 mothers in Jazan were assessed in terms of their teething knowledge and estimated the prevalence of teething myths. Based on this study, the researchers found that majority of the study population knew the basic information of teething such as, that the first primary teeth erupt at the age of 6 to 7 months and that lower central incisors are the first to erupt. Furthermore, in this study the researchers have found a spectrum of signs and symptoms associated with teething. These include desire to bite [97.5%], fever [93%], diarrhea [91.1%], drooling [79.9%], appetite loss [77.4%], gum irritation [71.7%], vomiting [49.4%], sleep disturbances [51.1%], respiratory problems [18.2%], prone to diseases [23.4%], ear problems [34.6%] and runny nose [37.1%]. In terms of practices to manage teething pain, the researchers have found that the mothers' usually provide their child chilled objects to bite [55.7%], use bottle-feeding at night [42.1%]. In addition, some mothers gave systemic analgesics [38.6%] and applied topical analgesics [50.3%] [6].

METHODOLOGY:

Study Design:

Cross-sectional study.

Study Area:

Makkah is the holiest city in Islam and it is the home of the Kaaba the direction of Muslim prayers. The Muslims pray at least 5 times a day directing themselves to the Kaaba asking Allah for forgiveness and mercy. It is also the place where pilgrims come every year from all over the world to perform Hajj as one of the Islam's corners. In addition, the city have multiple nationalities and different socioeconomic status. There are six sectors in Makkah region namely, Al Zaher, Al Kaakyah, Al Adel, Al Sarayea, Khelais, and Al Kamel. The first three sectors mentioned are found inside the Makkah city where the study was conducted specifically in Al Nawariyah PHC.

Study Population

Mothers attending vaccination clinic for their children in Al-Nawariyah PHC in Makkah al Mukarramah.

Inclusion criteria:
- All mothers who have children older than six months attending vaccination clinic in Al-Nawariyah primary healthcare center.
- All nationalities
- All educational level

Exclusion criteria:
- Non-Arabic speakers.

Sample size
The calculation of the sample size was done using Raosoft sample size calculator with 95% confidence level, 5% sampling error, and 50% probability of prevalence. A total of 152 was the minimum recommended size for the survey.

Sampling technique
Al- Nawarriyah PHC was randomly selected from the list of mostly visited PHC centers for the vaccination clinics was done using an online random number generator. Then the researcher selected every third mother from the attending mothers who fits the criteria by using systemic random sampling.

Data collection tool
Data was collected through a self-administered questionnaire used previously in Jazan and proved to be valid and reliable [6]. Approval from the corresponding author to use the tool was achieved through personal e-mail communication. The researcher translated the questionnaire to Arabic and re-translated it to English to ensure cultural validity and reviewed by certified consultants.

The questionnaire consists of two parts. The first part was intended to collect demographic data such as mother's age, child's age, number of children, family income, occupation, and education level of the mother. On the other hand, the second part consists intends to gather information on:
- The knowledge about teething such as age tooth eruption starts, which group of teeth comes out first during teething, and age tooth eruption is completed.
- Current practices both non-pharmacological and pharmacological interventions adopted by mothers to relieve teething pains in their children.

Data Collection technique
The entire data collection was collected within three weeks for four days per week. The researcher visited the selected PHC and attend the vaccination clinic. Respondents was chosen based list of mothers that entered the clinic and choose every third mother from this list. The interview was conducted in the waiting area before the start of clinic vaccination. Brief research introduction and consent was provided. Suitable respondents selected was given the questionnaire and collected as soon as finished. After data collection, data was entered manually and appropriate statistical analysis was used.

Study Variables
Dependent variable
- Knowledge about teething symptoms in infants.
- Attitude towards the symptoms.
- Practice used to manage the symptoms.

Independent variables
- Age of mother.
- Education level.
- Monthly family income.
- Number of children in the family.
- Employment status.

Data Entry and Analysis
The data was entered and statistically analyzed using MS Excel and SPSS software version 23. A simple descriptive statistics was used to define the characteristics of the study variables through a form of counts and percentages for the categorical and nominal variables. Continuous variables are presented by mean and standard deviations. During the analysis, question answers are converted to 1 for the correct answer and 0 for the wrong answer. Using A simple additive method two domains are identified namely:

Level of knowledge towards teething symptoms in infants
- Baby teeth starts to erupt around 4 to 8 months of age
- The first teeth to appear are the lower central incisors
- Eruption of teeth is complete at ~3 years of age

Practice of mothers attending vaccination clinic
- Allow the child to bite on a chilled object
- Use systemic analgesics
- Use topical analgesia
- Use Antibiotic

Whereas 0 is lowest and 3 is the highest for the "Level of knowledge towards teething symptoms in infants" and 0 is the poor and 4 is the excellent for the "Practice of mothers attending vaccination clinic". To compare more than two groups, a One-way ANOVA, with Least Significant Difference [LSD] as a post hoc test, was used. These tests were done with the assumption

of normal distribution. Otherwise, Games Howell test was used as an alternative for the LSD test. Lastly, a conventional p-value <0.05 was the criteria to reject the null hypothesis.

Pilot Study:
A pilot study was conducted in Al Eskan PHC center utilizing 10% of the sample size before the actual research. The participating subjects and data in this pilot study was not included in the main study. The pilot study was conducted to test the questionnaire applicability, understanding, validity and reliability.

Ethical Considerations:
- Before the study was conducted, approval from the research committee was obtained.
- Written permission from the joint program of family medicine was obtained.
- Permission of al Nawariyah PHC center director was obtained.
- Verbal consent was obtained from each participant.
- All information was kept confidential and completely disclose except for the study purpose.

Relevance & Expectations
The researcher expected to find poor knowledge and misconceptions regarding the signs and symptoms of teething and practices used to manage infant teething problems.

Limitation:
Time limitation was expected.

Budget:
This study was self-funded.

RESULTS:
Out of the 152 prospective respondents, all of them responded in the survey, giving a 100% response rate.

Characteristics of the Respondents
Demographic characteristics of the sample population [N=152] are shown in Table 1. The age of the participants varies extensively from the lowest age range [18 and below] up to the highest age range [above 40]. However, the highest number of participants [33.6%] belonged at 30-35 age range followed by 26-29 age range [27.6%] while the lowest number of respondents belonged to 18 and below age range [0.7%]. Majority of the respondents went to college [80%] and very few were illiterate [2%]. Despite high educational level attainment, more than half [62.3%] of the respondents were housewife and only 37.8% were considered employed in different sectors. Noteworthy also is that, 6% of the respondents are employed in the health sector. Other employment status [11%] of the respondents identified were military, tour guide, worked in private company and some were already retired working and some were still students.

Almost half [44.1%] of the respondents were having more than 5000 to 10000 SR monthly income and very few [3.3%] fall below the lowest income range [less than 2000 SR]. In addition, more than a quarter [28.3%] of the respondents fall under the higher income range of more than 10000 to 15000 SR [23%] and more than 15000 [5.3%]. More than half [59.9%] of the respondents have 2 to 4 number of children and a few [2.6%] have more than 7 children.

Table 1. Characteristics of the study population [N=152].

Demographics		Count	%
Age	18 and below	1	.7
	19 to 25	24	15.8
	26 to 29	42	27.6
	30 to 35	51	33.6
	36 to 40	21	13.8
	above 40	13	8.6
Education Level	College	80	53.0
	High school	43	28.5
	Middle school	19	12.6
	Elementary	6	4.0
	Illiterate	3	2.0
	Missing	1	
Family monthly income	Less than 2000 SR	5	3.3
	More than 2000 to 5000 SR	37	24.3

	More than 5000 to 10000 SR	67	44.1
	More than 10000 to 15000	35	23.0
	More than 15000	8	5.3
Number of children in the family	One child	37	24.3
	2 to 4 children	91	59.9
	5 to 7 children	20	13.2
	More than 7	4	2.6
Employment Status	Housewife	94	62.3
	Education sector Employed	37	24.5
	Health sector	9	6.0
	Others	11	7.3
	Missing	1	
	Total	11	100.0
Others, specified	Military	1	9.1
	Private company	1	9.1
	Retired	2	18.2
	Student	6	54.5
	Tourist guide	1	9.1

Knowledge of Teething in Infants

The basic knowledge of the respondents on infants teething are shown in Table 2. Out of the 152 respondents, 78.3% agree that primary teeth eruption starts at around 4 to 8 months of infant age. On the other hand, more than a quarter [33%] of the respondents disagree [16.4%] and doesn't have any idea [5.3%].

In terms of which teeth appear first, almost the same number from above agree [76.3%] that the lower central incisors appear first while a slight decrease in number of the respondents disagree [14.5%]. Consequently, there was an increase to 9.2% from 5.3% who doesn't have any idea which tooth usually comes out first.

For the third variable measured, only 65.1% of the respondents agree that eruption of teeth is completed at 3 years of age. A fewer number [9.2%] of the respondents disagree with the statement this time. Accordingly, the number of the respondents that don't know increased to a quarter [25.7%].

However, analysis using the simple additive method revealed that the mean 1.64 as shown in table 2. Level of knowledge of respondents towards teething symptoms of infants indicates not so high and yet not so low.

Table 2. Level of knowledge of respondents towards teething symptoms

Domains	N	Min	Max	Mean	SD
Level of knowledge towards teething symptoms in infants	152	0	3	1.64	0.7
Practice of mothers attending vaccination clinic	152	0	4	2.55	0.9

Table 3. Knowledge of the respondents on infant teething [N=152].

Variables		Count	%
Baby teeth starts to erupt around 4 to 8 months of age	Agree	119	78.3
	Disagree	25	16.4
	Don't know	8	5.3
The first teeth to appear in the mouth are the lower central incisors:	Agree	116	76.3
	Disagree	22	14.5
	Don't know	14	9.2
The eruption of teeth is complete at approximately 3 years of age:	Agree	99	65.1
	Disagree	14	9.2
	Don't know	39	25.7

Perceived Teething Symptoms in Infants

In terms of teething symptoms, the most commonly identified by more than half of the respondents were diarrhea [75%], desire to bite [69.1%], increase salivation [59.2%], gum irritation [58.6%] and loss of appetite [50.7%]. The least [5.9%] commonly identified symptoms on the other side were skin rash, convulsion and some answered no symptoms. Other symptoms identified by the respondents are shown in Figure 1 below.

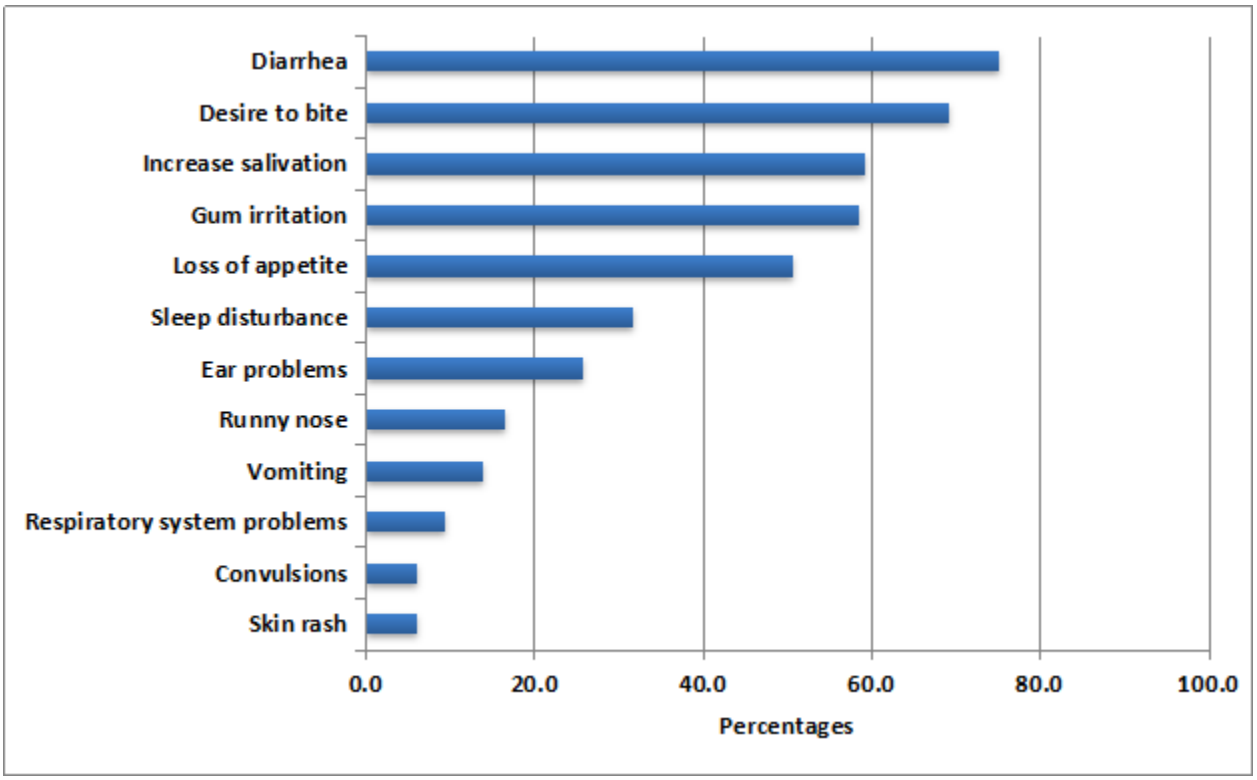


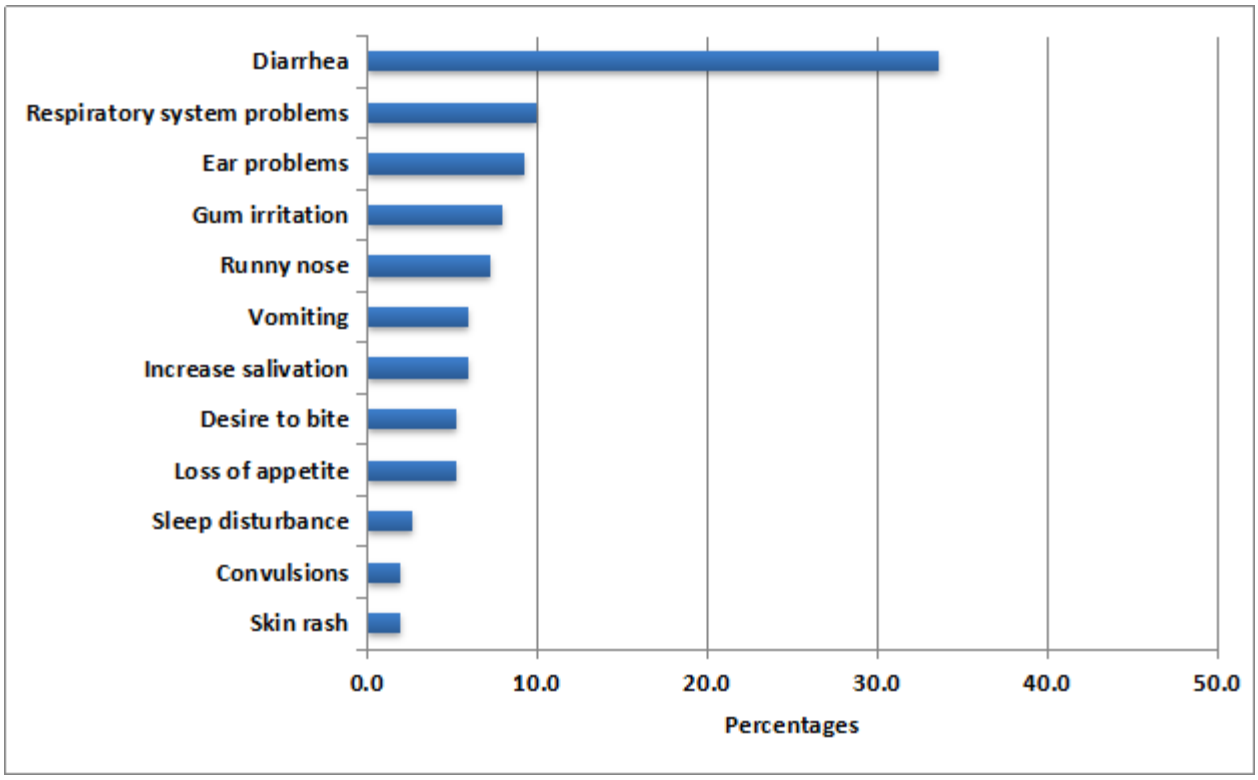
Figure 1. Perceived teething symptoms in infants by the respondents [N=152].

Attitude towards Symptoms:

As to which among the symptoms the respondents need to seek medical professional advice are shown in Figure 2. Almost half of the respondents [42.8%] believed that none of the symptoms identified needs professional attention. Only 33% believed that in the presence of diarrhea medical attention is needed. The symptoms less likely needed medical attention identified by the respondents [2.0%] were skin rash, convulsion and sleep disturbance [2.6%].

Figure 2. Symptoms identified by the respondent [N=152] that needed health care professionals.

Awareness to Teething Intervention/Practice:



Opinion of the respondents on both non-pharmacological and pharmacological interventions related to infant teething are shown in Table 4. Generally, the respondents agreed that both non-pharmacological and pharmacological interventions are applicable during teething period of infants.

For the non-pharmacological practice such as allowing the child to bite chilled objects, more than half [66.4%] of the respondents agreed to this particular practice while 30.3% of the respondents disagree to this. However, a few respondents [3.3%] didn't know this practice to relieve teething pains in children.

Pharmacological interventions such as the use of both systemic and topical analgesics, and the use of antibiotics were also common to the respondents. More than half [68.4%] of the respondents agreed on the use of systemic analgesics. A much lower percentage of the respondents agreed on the use topical analgesics. Among the three pharmacological intervention, the use of antibiotics received the least number of respondent that have agreed [26.3%]. In terms on the number of respondents that don't know about these pharmacological interventions, more respondents have no idea on the use of topical analgesics [5.3%] as compared to the use of systemic analgesic and antibiotics [2.6%].

However, the mean 2.55 over-all rating of the respondents attending vaccination clinic towards the management intervention of teething is considered as not so poor but not so excellent.

Table 4. Awareness of the respondents [N=152] on non-pharmacological and pharmacological interventions to teething.

Variables		Count	%
Allow the child to bite on a chilled object	Agree	101	66.4
	Disagree	46	30.3
	Don't know	5	3.3
Use systemic analgesics	Agree	104	68.4
	Disagree	44	28.9
	Don't know	4	2.6
Use topical analgesia	Agree	70	46.1
	Disagree	74	48.7
	Don't know	8	5.3
Use Antibiotic	Agree	40	26.3
	Disagree	108	71.1
	Don't know	4	2.6

Association of Characteristics:

Characteristics to Knowledge towards Teething

Association of demographic characteristics towards level of knowledge of participants to teething symptoms are shown in Figure 3. Among the five [5] variables measured, only the number of children in the family variable were found significantly associated [*p-value = 0.042*] at 0.05 level of confidence as shown in tabe 5. Furthermore, statistical analysis revealed that the level of knowledge of the respondents towards teething having one child significantly differs with those more than 4 children [*p-value = 0.013*] at 0.05 level of confidence as shown in Table 6.

Table 5. Association of demographic characteristics towards level of knowledge and practice of participants to teething symptoms

Variables		Total	Level of knowledge towards teething symptoms in infants	Practice of mothers attending vaccination clinic
Age	18 to 25	25	1.52 ± 0.7	2.40 ± 1.0
	26 to 29	42	1.67 ± 0.7	2.60 ± 1.0
	30 to 35	51	1.63 ± 0.7	2.39 ± 1.0
	36 to 40	21	1.81 ± 0.6	2.76 ± 0.8
	above 40	13	1.54 ± 0.8	2.92 ± 0.8
p-value			*0.666*	*0.269*
Education Level	College	80	1.68 ± 0.6	2.59 ± 0.9
	High school	43	1.60 ± 0.8	2.49 ± 1.0
	Middle school and below	28	1.57 ± 0.7	2.46 ± 1.1
p-value			*0.746*	*0.777*
Family monthly income	Less than 5000 SR	42	1.64 ± 0.6	2.71 ± 0.9
	More than 5000 to 10000 SR	67	1.60 ± 0.7	2.48 ± 1.0
	More than 10000	43	1.70 ± 0.7	2.49 ± 0.9
p-value			*0.756*	*0.403*
Number of children in the family	One child	37	1.43 ± 0.7	2.03 ± 1.0
	2 to 4 children	91	1.66 ± 0.7	2.73 ± 0.9
	More than 4	24	1.88 ± 0.4	2.67 ± 0.9
p-value			*0.042a*	*<0.001a*
Employment Status	Housewife	94	1.61 ± 0.8	2.48 ± 1.0
	Employed	46	1.67 ± 0.6	2.59 ± 0.8
	Others	11	1.73 ± 0.6	2.82 ± 0.6
p-value			*0.778*	*0.484*

a-significant using One-Way ANOVA @<0.05 level.

Table 6. Multiple comparison between numbers of children of the respondent against level of knowledge towards teething symptoms.

Variable	I	J	Mean Difference [I-J]	95% C.I		p-value
				Lower Bound	Upper Bound	
Level of knowledge towards teething symptoms in infants	One child	2 to 4 children	-.227	-.56	.11	0.247
		More than 4	-.443*	-.80	-.08	0.013
	2 to 4 children	One child	.227	-.11	.56	0.247
		More than 4	-.216	-.50	.07	0.167
	More than 4	One child	.443*	.08	.80	0.013
		2 to 4 children	.216	-.07	.50	0.167

*. The mean difference is significant at the 0.05 level using Games-Howell test.

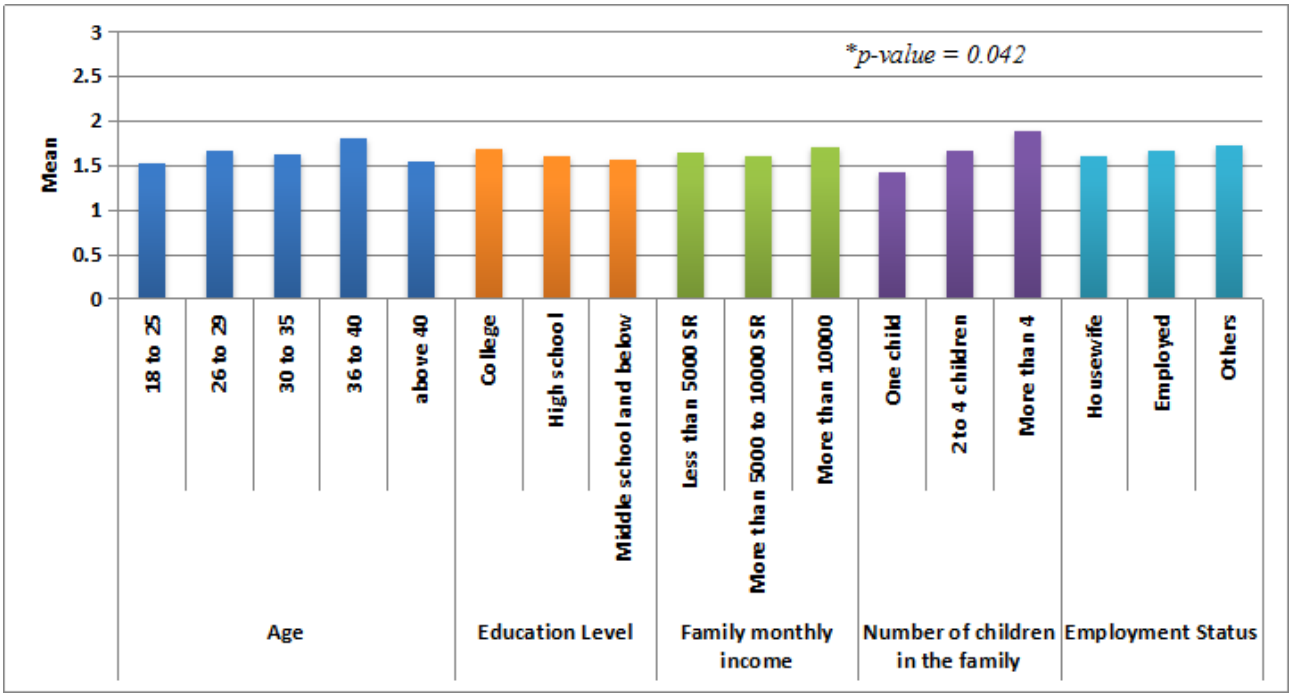


Figure 3. Level of knowledge towards teething symptoms in infants against demographics of the respondents.

Characteristics to Teething Practice of Mothers:

In terms of characteristics that determines practice of mother towards teething, again only the number of children variable were found significantly associated [*p-value = <0.001*] at 0.05 level of confidence as shown in Figure 4 and table 2. However, based on multiple comparison between the numbers of children as shown in Table 7, statistical analysis revealed that the practice of mothers significantly differs between one child and 2-4 children [*p-value = <0.001*], as well as between one child and more than 4 children [*p-value = 0.008*].

Table 7. Multiple comparison between numbers of children of the respondent against practice of mothers attending vaccination clinic.

Dependent Variable	I	J	Mean Difference [I-J]	95% C.I		p-value
				Lower Bound	Upper Bound	
Practice of mothers attending vaccination clinic	One child	2 to 4 children	-.698*	-1.05	-.35	<0.001
		More than 4	-.640*	-1.11	-.17	0.008
	2 to 4 children	One child	.698*	.35	1.05	<0.001
		More than 4	.059	-.35	.47	0.779
	More than 4	One child	.640*	.17	1.11	0.008
		2 to 4 children	-.059	-.47	.35	0.779

*. The mean difference is significant at the 0.05 level using LSD.

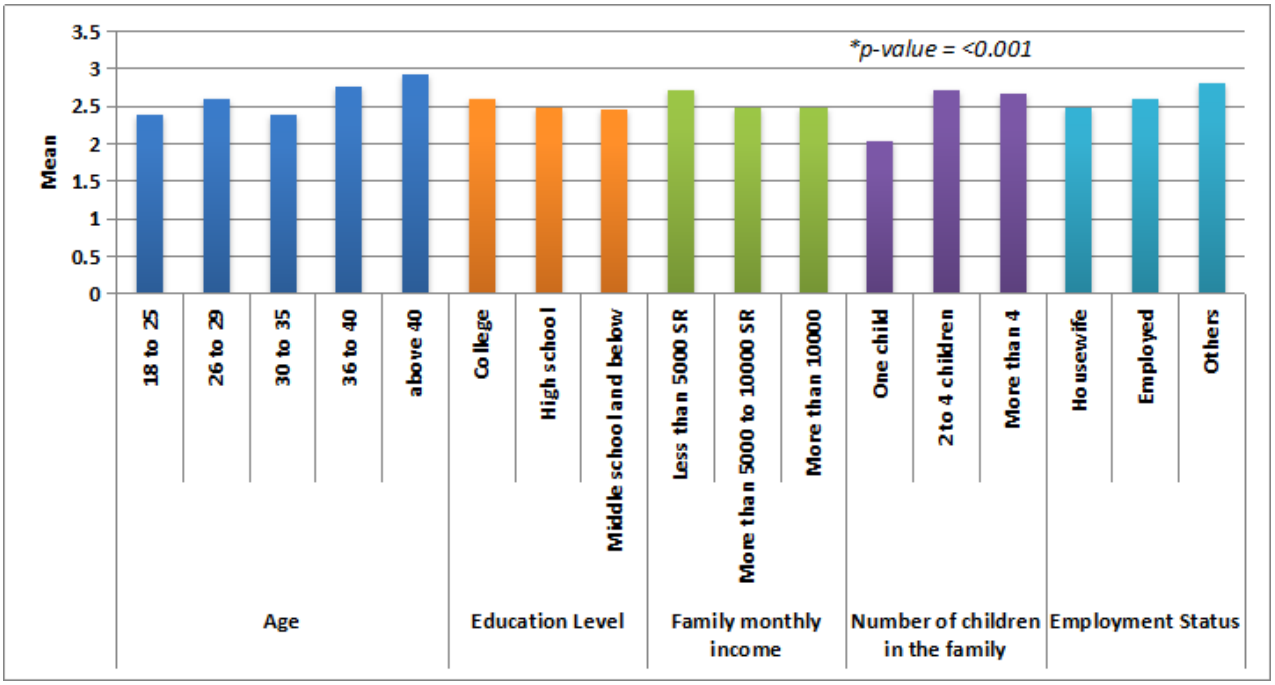


Figure 4. Practice of mothers attending vaccination clinic against demographics of the respondents.

DISCUSSION:

Teething in infants are naturally occurring event to all normal human beings. This teething events in infant are associated with wide array of signs and symptoms perceived by parents and healthcare providers. As an infant can't verbally communicate yet with their feeling and problems these perceptions are merely based on observations on behavior of the child by an adult individual. However, biased perception and poor knowledge most often than not leads to poor interventions that may harm the child.

In this particular study, the researchers aimed to estimate the knowledge, assess attitudes towards symptoms and the practices of mothers on infant teething as well as the factors affecting it. This study

involved 152 mothers attending vaccination clinic in Al-Nawariyah primary healthcare center.

In terms on the level of knowledge on teething, the respondents in this study were found at average level [1.64 were 0 is low and 3 is high]. The percentages 78.3%, 76.3% and 65.1% of respondents with basic knowledge on teething was quite high. However, there are still more than a quarter that either doesn't believe or don't know the basic knowledge of teething such as, eruption of baby teeth starts around 4-8 months of age, that the lower central incisors appear first and that complete primary teeth eruption usually happens at 3 years of age. The level of knowledge found in this study was in contrast with previous study involving Saudi nationals in Jazan region, wherein a poor level of knowledge was reported [6]. The difference in results may be attributed primarily to the different location where the study was conducted and that on most of the variables, different categorical range were used between the two studies. However, majority of the respondents in the previous study had lower level of education attainment as compared to the present study wherein majority were college level. In a study conducted by El-Gilany and colleagues in Egypt, the researchers reported that good knowledge on teething are significantly associated to higher education[4], This variation can be attributed to differences in culture and contents of educational curricula..

With respect to symptoms, although more than half of the respondents reported desire to bite [69.1%], increase salivation [59.2%] and gum irritation [58.6%] as teething symptoms, majority [75%] of the respondents believed that diarrhea is a teething symptom. In contrast with other studies, this 75% is much lower than that of Kumar and colleagues [91.1%] and Elbus and colleagues [83%] but the same with that of Owais and colleagues [3, 6, 10]. Diarrhea, which has been recently reported as symptom to teething was actually found as a result of poor personal and environmental hygiene practices [3]. A great portion of the respondents [5.9% - 31.9%] also have false beliefs on local symptoms such as sleep disturbance, runny nose, respiratory problems, skin rash, vomiting, ear problems and convulsions. Some of this false symptoms were also reported in the study conducted by Kakatkar and colleagues in India such as runny nose [32.7%], vomiting [37.1%] and ear problems [23.3%] [5].

Strikingly, this study found that the level of knowledge of mothers on teething is significantly associated with the number of children. This could be due to the fact that the higher number of children the mothers will have better learnings through experience of teething with children than those with just one child. Findings in this study however, are somehow opposing with other studies previously reported such as those of Kakatkar and colleague as well as Azevedo and colleagues, wherein no significant association on number of children was found to mother's level of knowledge and practices [5, 27]. In researchers own account, no other reports found associating number of children as significant factor in the level of teething knowledge and practices of mothers. The nearest so far was that of El-Gilanny and colleagues, wherein the authors have reported that first-born child as one of the independent predictors on good teething knowledge. However, the researchers have further associate this that mother's with good educational background, were residing in urban areas and only have 1 child probably due to lifestyle preference [4].

In terms on the management practice of mothers, results in this study in general are considered average [not so poor but not so excellent]. Although, more than half [66.4%] applied non-pharmacological technique in dealing with teething, a great portion [26.3% - 68.4%] also believed on the use of pharmacological approaches. According to Tsang, most parents apply a combination of non-pharmacological and pharmacological approaches to manage teething problems in children despite uncertainty of its effectiveness [8].

In comparison with previous studies conducted, the 66.4% mothers that allow their child to bite on chilled objects was much lower to that of Elbur and colleagues [88%] but much higher than that of Kumar and colleagues [55.7] [3, 6]. In addition, the 68.4% that use systemic analgesic and 46.1% that use topical analgesic was almost similar and much lower to that Elbur and colleagues, respectively [3]. This result was also lower than that of El-Gilany and colleagues wherein 71.3% of the respondents used pharmacological medication in treating teething pains [4]. The results in this study remains critical and suggestive for education on the proper use on both forms of analgesics since it has been reported to harm a child's life [8].

Despite that majority [70%] of the respondents disagree with the use of antibiotics, more than a quarter [26.3%] reported using this approach in managing teething problems. This was much lower than that of Elbur and colleagues wherein 45% reported antibiotics as part of their remedy in teething

pains. However, the researchers further reiterated the possible harm of antibiotics since misuse of this is associated with bacterial resistance especially that in Saudi Arabia antibiotics are for sale even without prescription [3].

Results of the statistical analysis in this study also revealed that among the demographics of the respondents, only the number of children is significantly associated to the practice of mothers attending vaccination clinics in managing teething problems.

In general, the respondents in this particular study showed misconception on infant teething. According to Elbur and colleagues, misconception and poor knowledge on infant teething are attributed to the effect of local cultural beliefs and false information provided to the parents by some healthcare professionals [3]. This could also mean, that a great portion of the population needs basic education to increase awareness on teething. This extra effort will insure safety and reduce risk to children during teething.

CONCLUSION:

Based on the results of this study, there is an average level of knowledge on teething of the 152 mothers attending vaccination clinic in Al-Nawariyah primary healthcare center in Saudi, Arabia. On the other hand, there is also a not so poor yet not so excellent practice of mothers in managing teething. The level of knowledge on teething of mothers as well as the practices in managing teething problems was significantly associated with the number of children. Mothers having more children most likely to have better level of knowledge on teething and correct teething practice and this could be attributed to their learning experienced.

Recommendations:

1. Further studies to estimate the knowledge of teething symptoms among health care professionals are recommended.
2. Educational interventions are needed to the population to help them recognize the signs and symptoms associated to teething and when and where to seek medical help.
3. Health care provider should provide consultation for the proper use of medications to relieve pain or to treat problems associated with teething to limit the use of serious interventions especially antibiotics.

REFERENCES:

1. Marks SC, Jr. The basic and applied biology of tooth eruption. Connect Tissue Res. 1995;32[1-4]:149-57.
2. Adimorah GN, Ubesie AC, Chinawa JM. Mothers' beliefs about infant teething in Enugu, South-east Nigeria: a cross sectional study. BMC Res Notes. 2011 Jul 1;4:228.
3. Elbur AI, Yousif MA, Albarraq AA, Abdallah MA. Parental knowledge and practices on infant teething, Taif, Saudi Arabia. BMC Res Notes. 2015 Nov 23;8:699.
4. El-Gilany AH, Abusaad FES. Mothers' teething beliefs and treatment practices in Mansoura, Egypt. Saudi Dent J. 2017 Oct;29[4]:144-8.
5. Kakatkar G, Nagarajappa R, Bhat N, Prasad V, Sharda A, Asawa K. Parental beliefs about children's teething in Udaipur, India: a preliminary study. Braz Oral Res. 2012 Mar-Apr;26[2]:151-7.
6. Kumar S, Tadakamadla J, Idris A, Busaily IA, AlIbrahim AY. Knowledge of Teething and Prevalence of Teething Myths in Mothers of Saudi Arabia. J Clin Pediatr Dent. 2016 Winter;40[1]:44-8.
7. Massignan C, Cardoso M, Porporatti AL, Aydinoz S, Canto Gde L, Mezzomo LA, et al. Signs and Symptoms of Primary Tooth Eruption: A Meta-analysis. Pediatrics. 2016 Mar;137[3]:e20153501.
8. Tsang AKL. Teething, teething pain and teething remedies. Int Dent S Afr. 2010;12:48-61.
9. Markman L. Teething: facts and fiction. Pediatr Rev. 2009 Aug;30[8]:e59-64.
10. Owais AI, Zawaideh F, Al-Batayneh OB. Challenging parents' myths regarding their children's teething. Int J Dent Hyg. 2010 Feb;8[1]:28-34.
11. US Food & Drug Administration. FDA Drug Safety Communication: Reports of a rare, but serious and potentially fatal adverse effect with the use of over-the-counter [OTC] benzocaine gels and liquids applied to the gums or mouth. 2011. Accessed: January 1, 2018]; Available from: https://www.fda.gov/drugs/drug-safety-and-availability/fda-drug-safety-communication-reports-rare-serious-and-potentially-fatal-adverse-effect-use-over.
12. US Food & Drug Administration. FDA Drug Safety Communication: FDA recommends not using lidocaine to treat teething pain and requires new Boxed Warning. 2014. Accessed: January 1, 2018; Available from: https://www.fda.gov/drugs/drug-safety-and-

availability/fda-drug-safety-communication-fda-recommends-not-using-lidocaine-treat-teething-pain-and-requires.
13. Bin Nafisah S, Bin Nafesa S, Alamery AH, Alhumaid MA, AlMuhaidib HM, Al-Eidan FA. Over-the-counter antibiotics in Saudi Arabia, an urgent call for policy makers. J Infect Public Health. 2017 Sep - Oct;10[5]:522-6.
14. Ashley MP. It's only teething...a report of the myths and modern approaches to teething. Br Dent J. 2001 Jul 14;191[1]:4-8.
15. Hulland SA, Lucas JO, Wake MA, Hesketh KD. Eruption of the primary dentition in human infants: a prospective descriptive study. Pediatr Dent. 2000 Sep-Oct;22[5]:415-21.
16. McDonald RE, Avery DR, Dean JA. Eruption of the teeth: Local, systemic and congenital factors that influence the process. In: Dean JA, McDonal RE, Avery DR, editors. Dentistry for the child and adolescent. 9th ed. St louis: Mosby; 2010. p. 155-76.
17. Cahill DR, Marks SC, Wise GE, Gorski JP. A review and comparison of tooth eruption systems used in experimentation: a new proposal on tooth eruption. In: Davidovitch Z, editor. The biologic mechanisms of tooth eruption and root resorption. Birmingham: EBSCO Media; 1998. p. 1-7.
18. Wise GE, Frazier-Bowers S, D'Souza RN. Cellular, molecular, and genetic determinants of tooth eruption. Crit Rev Oral Biol Med. 2002;13[4]:323-34.
19. Craddock HL, Youngson CC. Eruptive tooth movement--the current state of knowledge. Br Dent J. 2004 Oct 9;197[7]:385-91.
20. Wan AK, Seow WK, Purdie DM, Bird PS, Walsh LJ, Tudehope DI. Immunoglobulins in saliva of preterm and full-term infants. Oral Microbiol Immunol. 2003 Apr;18[2]:72-8.
21. Kiran K, Swati T, Kamala BK, Jaiswal D. Prevalence of systemic and local disturbances in infants during primary teeth eruption: A clinical study. Eur J Paediatr Dent. 2011;12[4]:249-52.
22. Williams TJ. The role of prostaglandins in inflammation. Ann R Coll Surg Engl. 1978 May;60[3]:198-201.
23. American Academy of Pediatric Dentistry, Clinical Affairs Committee -- Infant Oral Health Subcommittee. Guideline on infant oral health care. Pediatr Dent. 2012 Sep-Oct;34[5]:e148-52.
24. Galili G, Rosenzweig KA, Klein H. Eruption of primary teeth and general pathologic conditions. ASDC J Dent Child. 1969 Jan;36[1]:51-4.
25. Noor-Mohammed R, Basha S. Teething disturbances; prevalence of objective manifestations in children under age 4 months to 36 months. Med Oral Patol Oral Cir Bucal. 2012 May 1;17[3]:e491-4.
26. Ramos-Jorge J, Pordeus IA, Ramos-Jorge ML, Paiva SM. Prospective longitudinal study of signs and symptoms associated with primary tooth eruption. Pediatrics. 2011 Sep;128[3]:471-6.
27. Azevedo MS, Portela AR, Romano AR, Cenci. M.S. Prevalence of teething symptoms in primary teeth and associated factors: cross-sectional study in children aged 12-23 months in Pelotas, Brazil. Braz Res Pediatr Dent Integrat Clin. 2015;15[1].