



Association between Oral Health Literacy of Mothers with Child who has Epilepsy and the Children's Oral Health

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ABSTRACT

Aims Children with epilepsy are exposed to oral disease due to the lack of self-care and antiepileptic medicines' side effects. The present study aimed to assess the association between mothers' oral health literacy with a child who has epilepsy and the children's oral health status.

Materials & Methods This cross-sectional study was performed during the fall and winter of 2017 in Ahvaz, Iran. Mothers of one-hundred 3-6 years' children with epilepsy referred to Golestan hospital were selected through the available sampling method and completed a valid and reliable questionnaire on oral health literacy. The children's oral and dental health was also examined by a dentist to determine decayed, missed, and filled teeth and simplified oral hygiene index. ANOVA and Pearson correlations were used to analyze data in SPSS 15.

Findings The mean age of mothers, OHI-S index, and the average number of decayed teeth in children were 30.28 ± 4.3 , 2.75 ± 0.75 , and 2.86 ± 1.65 , respectively. Besides, the mean numbers of extracted and filled teeth of children were respectively 0.31 ± 0.48 and 0.19 ± 0.41 . A significant relationship was seen between the mother's education and the simplified oral hygiene index. Also, there was a significant relationship between mothers' oral health literacy and decayed, missed, and filled teeth ($p < 0.005$). Moreover, no statistically significant relationship was observed between mothers' oral health literacy and simplified oral hygiene index score ($p > 0.05$).

Conclusion The present study showed an association between maternal Oral Health Literacy and children's oral health with epilepsy.

Keywords Oral Health; Health Literacy; dmft; OHI-S; Epilepsy

CITATION LINKS

[1] Assessment of oral side effects of Antiepileptic drugs and ... [2] A clinical evaluation of gingival overgrowth in children ... [3] Assessment of oral health status of children with ... [4] Phenytoin-induced severe gingival overgrowth ... [5] The effects of antiepileptic drugs on oral ... [6] The effect of phenytoin medication on dentin ... [7] Epilepsy and oral health ... [8] Oral health behavior among school children aged ... [9] Effects of lecturing on selfcare oral health behaviors ... [10] Oral health and dental status in people with ... [11] Development and validation of the health literacy ... [12] Development of a greek oral health literacy ... [13] Oral health literacy: A ... [14] Oral health literacy among female caregivers ... [15] Relationship between dental status and family ... [16] Parent health literacy and adherence-related ... [17] Mothers' oral health literacy and children's oral ... [18] Is parental oral health literacy a predictor ... [19] Pediatric dentistry: Infancy through ... [20] Health Literacy for Iranian Adults (HELIA) ... [21] Measurement in nursing and health ... [22] Prevalence and factors associated ... [23] The influence of mothers' lifestyle and health ... [24] Comparison of oral health status between ... [25] Oral health literacy and oral health ... [26] Relationship between oral health literacy ... [27] The prevalence of dental caries among Egyptian ... [28] Relationship of oral health literacy with dental ... [29] Oral health behavior and self-esteem in Swedish ... [30] Mothers knowledge and attitude towards factors ... [31] Childhood dental history and adult dental attitudes and ... [32] Association between knowledge of caries preventive ...

Introduction

Epilepsy is a condition in which the brain activity and behavior of the patients are disturbed, and thus they have no control over muscle tone and may temporarily lose consciousness [1]. Assessment of oral health status in children who have epilepsy is of critical importance. Some studies indicated that groups who were receiving phenytoin had a 53% rate of gingival hyperplasia. Also, hyperplasia was observed slightly in the sodium valproate group [2]. A similar work demonstrated the negative effect of antiepileptic medicines on patients' oral health [3]. For instance, the results of some studies showed the occurrence of gingival hyperplasia in phenytoin consumers [4]. Therefore, keeping good oral hygiene is recommended in patients taking antiepileptic medicines to control gingival hyperplasia's severity since these drugs accelerate plaque accumulation [5]. A study found that the phenytoin reduced the dentin sediment slightly and significantly increased dental decay [6]. Good oral health care and awareness about such conditions will help better dental and oral health in epileptic patients [7]. Previous studies have proved that oral health (OH) is an important element for children's quality of life, particularly in children with chronic diseases [8-10].

During recent years, health literacy has emerged as one of the key factors in shaping healthy behaviors [11], specifically in the oral and dental health area [12]. Oral health literacy is defined as "the degree to which individuals can obtain, process, and understand basic oral health information and services needed to make appropriate health decisions" [12, 13]. Oral health literacy is a central construct for the promotion of oral and public health [12]. Several studies have shown a significant relationship between the parents' poor health literacy and unsuitable health behaviors, which could affect their children's health [14]. In dentistry, having oral health information is vital for the children's caregivers since the higher the fathers' information and education level, the better the children's positive attitudes and health behaviors. It seems that successful oral health improvement in children strongly depends on their improvements at home [15]. The study by Paschal et al. indicated that low health literacy among parents may help as a risk factor for adherence-related consequences in children with epilepsy [16]. Similarly, a study by Dieng *et al.* reported mothers' oral health literacy was related to their children's oral care [17].

Health literacy is considered an important factor in doing health behaviors, and some studies show a link between low health literacy of parents and inappropriate health behaviors that affect the health of their children [18]. Recently, oral health literacy has received more attention for promoting oral health outcomes in dentistry. The age range of 3-6 is a critical age period for establishing dental health.

Caring for teeth is a fine motor activity that most 3- to 6-year-olds cannot be done without assistance. Also, dietary intake and patterns that may greatly influence oral and overall health are very important and influenced by parents [19].

All in all, considering the importance of oral and dental care of children who have epilepsy and the role of their mothers as their caregivers, the present study aimed to assess the association between oral health literacy of mothers with a child who has epilepsy and the children's oral health.

Materials and Methods

This is a cross-sectional study. 100 pairs of 3-6 aged children with epilepsy and their mothers referred to the pediatrics neurology department of Golestan Hospital (the referral center for children's epilepsy), Ahvaz, Iran, for treatment selected through the available sampling method. The sample size was calculated by the following formula:

$$n = \left[\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{0.5 \ln \left(\frac{1+r}{1-r} \right)} \right]^2 + 3 \cong 100$$

Sampling was performed during the autumn and winter of 2017. The inclusion criteria were as follows: having a history of using oral antiepileptic medicines (Phenytoin and Valproic acid and Carbamazepine) for at least one year, taking no antibiotics two weeks before the examination, ability to communicate in Persian (the formal Iranian language), having no other systemic diseases and consent to participate in the study.

A researcher-made questionnaire was designed and used to measure oral health literacy. The questionnaire was designed based on the framework of the Iranian health literacy questionnaire [20]. The questionnaire's content validity was accepted by 10 experts in health education, pediatric dentistry, pediatric neurology, and maternal-child health care specialists. To do qualitative content analysis, experts' comments on Persian grammar accuracy, using appropriate words and scoring, and placing items in their proper place were employed. In quantitative content analysis, experts' opinions on aspects of simplicity, clarity, relevance, and necessity of each item were evaluated to calculate the Content Validity Index (CVI) and the Content Validity Ratio (CVR), respectively, as recommended earlier [21]. Finally, the validity of the questionnaire was approved (CVR=1, CVI=1).

Additionally, the face validity was determined. To reduce and remove inappropriate items and determine each item's importance, a questionnaire was completed by 20 women (these 20 women were excluded from the study sample), and items' appearance and suitability were investigated. After evaluating the CVR and CVI standards, 3 items were removed. The internal consistency of the

questionnaire was investigated using Cronbach's alpha, and the reliability of the questionnaire was 0.85. It took 12 minutes to complete the questionnaire by participants. The score in the oral health literacy questionnaire was ranging from 5 (minimum score) to 25 (maximum score) in the acquisition section (i.e., the ability to obtain oral health information, "I can find information about oral health from different sources" was one of the items in this scale". The field of reading comprehension (i.e., the ability to understand oral health issues, "Understanding of oral health concepts is easy for me" was one of the items in the scale") from 9 (minimum) and 45 (maximum); in the evaluation section (i.e., the ability to appraise oral health issues; "since the child will lose his/her primary teeth, so there is no need to take care of them" was one of these statements) from 10 (minimum) 50 (maximum score); in the in decision-making section (i.e., using the information to make proper decisions and follow treatments; "I can go to a dentist when I have symptoms of a *tooth decay*, was one of these statements) from 8 (minimum) and 40 (maximum score); and in the performance (Doing health behaviors; The statement, "do you brush/wash your teeth after eating sugary food/drinks?" was one of these statements) from 9 (minimum) to 45 (maximum score). Moreover, the level of health literacy of the participants was divided to "adequate" and "inadequate. When categorizing into two levels, health literacy score of equal or less than or equal to 50% of score obtained by participants as 'inadequate' OHL, and above 50% score as 'adequate' OH according to what reported earlier in behavioral science [21, 22].

All participants were informed about the study and confidentiality protocols. Informed consent was obtained from participants. The ethics committee of Ahvaz Jundishapur University of Medical Sciences confirmed the morality and ethics of the study. The children's oral examination was done based on world health organization (WHO) criteria [23] in a seated position with sufficient light by observation and tactile test using explorer and mirror by a dentist and consisted of dmft OHI-S studies. The examinations related to dmft and OHIS were done by two dentists, and then the results were compared. As a result, the average results of the examination showed a 95% similarity. Based on WHO guidelines [23], no radiographic examination was carried out during the study. The sum of all decayed missed and filled primary teeth was considered as the dmft index. Evaluation of oral health index including the measurement of plaque and calculus index is measured based on OHI-S index, in which every index is determined based on a code and indicates the amount of observed calculus and debris on the dental surface. Six dental surfaces (four posteriors and two interior surfaces) were similarly selected for examination [10]. Criteria for

classifying debris were as follows: code Zero: no debris or stain present, Code 1: soft debris covering not more than one-third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered, code 2: soft debris covering more than one third but not more than two-thirds of the exposed tooth surface, Code 3: soft debris covering more than two-thirds of the exposed tooth surface. The criteria for classifying calculus: Zero code: no calculus present, Code 1: Supragingival calculus covering not more than a third of exposed tooth surface, code 2: Supragingival calculus covering more than one third but not more than two-thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth or both, code 3: Supragingival calculus covering more than two-thirds of the exposed tooth surface or a continues heavy band of subgingival calculus around the cervical portion of the tooth or both. The average debris and calculus scores are combined to obtain the Simplified Oral Hygiene Index [1]. The values of the OHI-S were divided into three groups: Good health (0-1.2), moderate health (1.3-3), and poor health (3.1-6) [24]. The participants filled in the questionnaire in a separate room at the Golestan Hospital. For illiterate participants, the questionnaire was completed by interview.

SPSS 15.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Descriptive and inferential statistics were used to analyze the data. Pearson correlations were used to assess the relationship between maternal OHL, dmft, and OHI-S. The ANOVA test was used to estimate differences between different levels of dmft and OHI-S and maternal oral health literacy scores.

Findings

The mean age of mothers was 30.28 ± 4.30 years, and their oral health literacy score was 156.76 ± 31.47 (Table 1). The mean age of the children was 4.45 ± 1.14 years. In child oral-dental health, the mean decay tooth (d) was 2.86 ± 1.65 , which was considered low decay. The average of the missed tooth (m) and filled tooth (f) were 0.31 ± 0.48 and 0.19 ± 0.41 , respectively. 49% of mothers acquired adequate OHL score, and the score of 51% of mothers found to be inadequate.

Among the study sample, 13 children had dmft values equal to 0, and in 3 of the samples, dmft values were equal to 9, suggesting the lowest oral and dental health. ANOVA test was performed to evaluate differences among mothers' oral health literacy scores in different sub-groups of children with dmft and the OHI-S index. The results showed a significant difference among subgroups of children ($p=0.005$) (Table 2); however, no significant difference was observed between oral health literacy of mothers and OHI-S score ($p=0.64$) (Table 3).

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Table 1) Mothers' demographic information, their oral health literacy dimensions score, and dmft and OHI-S values for the children

Variables	Min	Max	Mean±SD
Mothers' Age (year)	20	40	30.28±4.30
Acquisition	5	25	16.14±4.89
Comprehension	9	45	34.85±8.94
Evaluation	10	50	41.20±8.91
Decision	8	40	32.29±7.33
Performance	9	45	32.28±7.79
Total oral literacy	59	201	156.76±31.47
OHI-S	1	5	2.75±1.35
dmft	0	9	3.51±1.97
Children age (year)	3	6	4.46±1.14
d	0	9	2.86±1.65
m	0	2	0.31±0.48
f	0	2	0.19±0.41

Table 2) The differences among mothers' oral health literacy scores in different subgroups of children with dmft

dmft	N	OHL	F	Sig.
0	19	199	2.038	0.001
1-3	64	150.76		
4-9	17	65		
Total	100	-		

Table 3) The differences among mother's oral health literacy scores in different subgroups of children's OHI-S

OHI-S	N	OHL	F	Sig.
Good health (0-1.2)	17	200	0.90	0.6
Moderate Health (1.3-3)	65	150.74		
Poor health (3.1-6)	18	81		
Total	100	-		

The Pearson correlation test was used to determine the relationship between the dimensions of mothers' oral health literacy (acquisition, comprehension, evaluation, decision-making, and performance) and the dmft value of children. The findings indicated a strong statistical relationship between performance factor and dmft and a strong statistical relationship between comprehension and dmft. Also, there was a strong statistical relationship between evaluation and decision-making dimensions and dmft. On the contrary, no significant relationship was observed between the acquisition factor and the value of dmft (Table 4).

Table 4) Correlations between mothers' oral health literacy dimension scores and the children's dmft (N=100)

Variable	Correlation	Sig.
dmft & performance	-0.65	0.001
dmft & decision	-0.62	0.001
dmft & evaluation	-0.67	0.001
dmft & comprehension	-0.65	0.001
dmft & acquisition	0.13	0.192

Pearson correlation also was used to assess the relationship of the mothers' oral health literacy factors with OHI-S and dmft value of children, the parameters including decay tooth (d), pulled tooth (m), and filled tooth (f) as well as to investigate the

relationship of family income, use of feeding bottle, mothers' education, and the use of the internet with OHI-S and dmft. The results showed a statistically significant relationship between mothers' education and dmft ($p=0.001$; $r=-0.23$); no significant difference was observed for other variables ($p>0.05$).

Discussion

Assessment of oral health and its determinants like OHL of carers in children with epilepsy is important. While in this study, almost half of women had inadequate OHL, a study in Brazil showed that 71% of adults have low OHL [25]. One possible explanation for such a difference in the prevalence of low levels of inadequate OHL might be the use of different assessment tools, different cutoff points, and different populations under investigation.

The association between oral health literacy and health status has been reported earlier; A decision made by every individual is being influenced by his/her level of oral health literacy, which is influenced by some socio-demographic variables [26]. It has been well documented that children who had a mother with dental caries are at risk of getting affected by dental caries [18, 27]. The present study results indicate a relationship between the performance dimension of mother's oral health literacy and the dmft of their children. In line with our study, a previous study showed a relationship between oral health literacy of parents and children's caries [28]. Also, the findings of Kallestal *et al.* [29] showed that the economy, gender, poverty, place of residence, race, social level, and parents' job had a direct relationship with parents' performance in the field of children's oral and dental health. Although in a study, it was found that some demographic factors such as the number of family members, race, age, economic level, ethnicity, level of education, and place of residence play a key role in the oral health of children [2], in the current study, just maternal education showed a statistical relationship with children's oral health status.

The present study results showed a very strong relationship between mothers' oral health literacy and dmft index. A relationship between parent health literacy and adherence-related outcomes in children with epilepsy has been reported elsewhere [16]. Ansari-Moghaddam *et al.* stated a statistically significant relationship exists between mother's knowledge and behavior with their children's oral and dental health [30]. Another study also highlighted the importance of mothers' knowledge in oral and dental health [31].

A negative correlation was observed in the present study between mother's education and OHI-S index in children. In Nigeria, Folan *et al.* [32] investigated the relationship of knowledge with children and parents' behavior about decay prevention methods

and dental decays in 324 students with an age range of 8-12 years old, 308 fathers, and 318 mothers. They showed that the mother's oral health is a good predictor for oral health behaviors in children [14], confirming the results of a present study with regards to observing a relationship between OHI-S and mother's education. In some other studies, the relationship between health literacy and its factors with oral health was studied. For example, in Iran, Nourijelyani *et al.* [23] found mothers' higher education and knowledge, positive attitude, and dmft and lower levels of community periodontal treatment needs (CPITN) were associated with higher oral health in children. Vann *et al.* concluded that caregivers' oral health literacy had a multifaceted effect on the oral outcomes in children [14].

One of the limitations of this study was the convenience sampling of participants. As such, the results cannot be generalized to the whole target population. The limited number of samples studied is another limitation of this study. Due to the cross-sectional nature of the study, causality could not be proved. As such, longitudinal studies are needed to confirm the results.

Conclusions

The present study showed an association between maternal OHL and oral health of children with epilepsy. Considering the fact that OHL is a modifiable factor, these findings support developing oral health promotion programs among these target populations.

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Ethical Permissions: The Ethics Committee of Ahvaz Jundishapur University of Medical Sciences confirmed the study's morality and ethics (IR.AJUMS.REC.1396.731).

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