Reflection of Parental Oral Health Literacy on Children's Oral Health Status Using Regression Analysis

ABSTRACT

Background and Objective: The need to measure oral health literacy has led to the development of measurement instruments. The aim of this study was to evaluate the association between parental oral health literacy and children's oral health status in Chengalpattu district and assess the degree to which parental factors explain this association.

Materials and Methods: This cross-sectional epidemiological study took place among 350 children aged from 3 to 9 years and their parents to estimate the children's dental health status by DMFT index, at the child's home. Examiners interviewing the parents administered the Health Literacy in Dentistry scale (HeLD) - a Pre- validated questionnaire to determine their Oral health literacy and questioned them further about their social characteristics and their children's dental health behaviour. Statistical analysis was done using Pearson's Correlation coefficient and Linear regression analysis.

Results: The age of the parents and children were 29.25 ± 4.63 and 7.23 ± 2.83 respectively. Results from Pearson's correlation coefficient shows that the factors that are significantly correlated with oral health status of the children were parent's working status, number of children, type of family and oral health literacy of the parents. Forward Linear regression analysis also demonstrates the same factors that were associated.

Conclusion: The Oral health literacy level of parents was significantly associated with their children's oral health status. Improving parent's Oral health literacy might help strengthen their capacities to promote oral health, thus helping to improve their children's dental health.

Paper Type: Research Article

Keywords: Children's oral health status, Health Literacy in Dentistry scale, Parental Oral health literacy.

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M.Sathiya Gomathi
* Postgraduate Student- Department of Public Health Dentistry-Karpaga Vinayaga Institute of Dental Sciences-Madhurandhagam-Chengalpattu District-TamilNadu-India.(corresponding author):
id- sgomathi91@gmail.com

S. Vishnu Prasad
Professor and Head-Master of Dental surgery-Department of Public Health Dentistry-Karpaga Vinayaga Institute of Dental Sciences-Madhurandhagam-Chengalpattu District-TamilNadu-India

K.Indra Priyadharshini
Senior Lecturer -Master of Dental surgery-Department of Public Health Dentistry-Karpaga Vinayaga Institute of Dental Sciences-Madhurandhagam-Chengalpattu District-TamilNadu-India

J.Mahesh-Reader
Reader-Department of Public Health Dentistry-Karpaga Vinayaga Institute of Dental Sciences-Madhurandhagam-Chengalpattu District- TamilNadu- India

R. Karthikayan
Senior Lecturer- Department of Public Health Dentistry-Karpaga Vinayaga Institute of Dental Sciences-Madhurandhagam-Chengalpattu District-TamilNadu-India

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Introduction

Health literacy describes an individual's capacity to obtain, process, and understand written or verbal health information to make informed health decisions (1). Health literacy is "linked to literacy and entails people's knowledge, motivation and competencies to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course" (2). Health literacy, including oral health literacy, has been described as a community asset needing to be improved through community interventions and as a risk factor needing to be considered by health service providers (3). Oral health literacy (OHL), is a determinant that is associated with problems of access to prevention and oral healthcare (4). Thus OHL although sometimes defined mainly as literacy, is a social and individual resource that expresses the individual's ability to obtain and process the basic oral health information required to take relevant oral health decisions (5).

The process of acquiring oral health information, appraising its concepts and applying oral health prevention and treatment plans appropriately requires new skill development called oral health literacy (OHL) (6). World Health Organization's (WHO's) 7th Global Conference on Health Promotion list's health literacy as one of the five key tracks for promoting health (7). Parents have the greatest effect on all aspects of health including physical and psycho social health of their children and this effect starts at birth (8). Studies have reported that parent's oral health habits are associated with their children's oral health (9). Many previous research proved that children's oral-health status is often related to social dimensions, such as parental income and education (10). Inadequate Oral Health Literacy of parents is associated with children having high rates of dental caries and few dental fillings (11). A systematic review of the literature showed that parents with low health literacy had less health knowledge and presented behaviour less advantageous to their child's health, indicating a trend for an association between low parental nonspecific health literacy and worse child health outcomes (12).

Oral health literacy was assessed by various instruments among which, the Oral Health Literacy Instrument (OHLI), the Comprehensive Measure of Oral Health Knowledge (CMOHK), The Rapid Estimate of Adult Literacy in Dentistry (REALD) are very commonly used (13-15). The Health Literacy in Dentistry (HeLD) is an instrument which takes a broad approach to oral health literacy, measuring an individual's ability to seek, understand and utilize oral health information to make appropriate oral health-related decisions (16). There is lack of literature on association of parental oral health literacy using Health literacy in dentistry(HeLD) scale and oral health status of their children. Henceforth, this study was aimed to evaluate the association between parent's oral health literacy (OHL) and children's oral health status in Chengalpattu district by using Health literacy in Dentistry (HeLD) scale.

Materials and Methods

Study setting, Location and Population:

A cross-sectional study was conducted over a period of 4 months (April and July 2022) to assess the association of parental oral health literacy and its impact on their children's oral health status in Chengalpattu district, TamilNadu- India. The study population comprised of parents and children from 3 to 9 years old. The planning of this study was based on the guidelines of the Strengthening the Reporting of Observational

Studies in Epidemiology (STROBE initiative). Ethical clearance was obtained from the institutional ethical committee, Karpaga Vinayaga institute of dental sciences, Chengalpattu. (KIDS/IEC/2022/II/005). The purpose of the study was explained to the participants and informed consent was obtained from the participants.

Sample size estimation:

A pilot study was conducted among 20 participants to validate the questionnaire and to get the required sample size. The estimated sample size was 350 with following inputs of 80% power and margin of error at 5% with 95% confidence level.

Sampling procedure:

A two-stage sampling method was used in selecting the parents and children to participate in the study. First, three sub-municipals were randomly selected from the Chengalpattu District, since it has more sub- municipals. Second, we used consecutive sampling to select 120 eligible parents from each of the three randomly selected sub-municipals. This method allowed us to conveniently select eligible participants consecutively into the study until a desired sample size was attained.

Eligibility Criteria:

The eligibility criteria were set as; selected children had lived with his or her parents from birth. A written informed consent was obtained from the parents for their participation in the study and that of their child. Children and parents with a disability or disease liable to prevent data collection were excluded from the study. Participants who were not willing to participate in the study were kept out from the involvement.

Methodology

The source of data was primary in nature for which a close ended questionnaire survey was conducted. The study population comprised of 350 parents and their children who met the inclusion criteria and agreed to participate in the study. Before the administration of the questionnaire the aim and the potential benefits of the study were clearly explained to all the participants.

Validation and Reliability of the Questionnaire:

Health literacy in dentistry scale (HeLD) with 14 questions was assessed for content validity in the research population. The questionnaire was tested for content validity by four Panellist - social and preventive medicine, public health dentist, two parents (One father and one mother). Questionnaire was assessed for Content Validity Index (CVI) relevance with simplicity, clarity, ambiguity and objectivity were checked and the CVI score is 0.8. We translated the questionnaire into vernacular language. (Tamil).

The questionnaire was pretested among 20 parents in Chengalpattu district by test retest method. It was given to same persons twice with two days apart. Reliability was assessed for the parental oral health literacy and attitude towards oral health. The Cronbach's alpha statistic was 0.87 which indicated significant correlation. These 20 participants were not included in the main study.

Parent's demographic and social characteristics:

The demographic data collected included name, gender, age, place of birth, number of children, level of education, work status (working, not working), occupation, number of children, type of family and social support, estimated by the frequency of contacts with family, friends and neighbour (less than once a month, at least once a month, and at least once a week).

Parent's Oral health literacy:

Oral health literacy was estimated by the Health Literacy in Dentistry Scale (HeLD), which comprises of 14 questions that consists of 7 domains which includes, knowing the communication of dental

services, access, receptivity, understanding, utilization of dental services, support for dental treatments and various economic barriers in achieving dental needs (16). Each question had responses as yes, maybe and no. The score has a possible range of 0 (lowest literacy) to 28 (highest literacy).

Parent's attitudes toward oral health and hygiene:

The attitude to oral health was evaluated by a mini questionnaire according to the importance given to 5 items:(17).

limitation of sweet food consumption, use of fluoridated toothpaste, use of toothbrushes, regular visits to a dentist, keeping one's mouth and teeth clean. Grouping the 4 possible responses to each item (not at all important, not important, important, and very important) into pairs allowed us to classify the variable into 2 categories (negative attitude, positive attitude).

Assessment of Parent's oral health condition:

All the parents underwent dental clinical examination for the assessment of dental caries. Indicators for dental caries were calculated based on the number of decayed, missing, and filled teeth using Decayed Missing and Filled (DMFT) index.

Outcome variable: Children's dental health status

The outcome variable is evaluated by presence or absence of dental caries. Dental caries was measured by the prevalence in the sample; the number of children with at least one tooth decay were compared to the total number of children without tooth decay.

Data collection:

A single investigator who got trained with World Health Organization (WHO) standards, collected the data pertaining to both survey and oral health status (18). The examination, which used a disposable examination kit and a headlamp, took place at the child's home, in the parent's presence. The demographic and OHL data were collected during a face-to-face interview conducted by the same trained examiner, using a questionnaire.

Data analysis:

The data were initially complied in Microsoft Excel spreadsheet, the data analysis was done with the Statistical Package for the Social Sciences (SPSS) for Windows version 20.0 software (IBM, Chicago Inc., IL, USA). Descriptive statistics were performed for characteristics of the study participants. Pearson's correlation coefficient and Linear regression analyses were carried out. We used Pearson's correlation coefficient analysis to select the variables for linear regression analysis. In the correlation coefficient the factors associated with the oral health status of the children was analyzed to derive the relationship between dependent and independent variables. In the forward linear regression models we tested association between factors associated with oral health status of the children and other independent variables like Type of Family, Number of Children, working status of Parent and Oral Health Literacy-HELD Scale. For all analysis, $P < 0.05$ was considered to be statistically significant.

Results

Table.1 demonstrates the characteristics of the study participants based on demographic pattern and social characteristics. In the present study, 350 children and 350 parents were examined. Around 15 parents refused to participate in the study, as they have lack of time. Among the parents, there were 74(21.1%) fathers and 276(78.8%) were mothers. The mean age of the parents and children were 29.25 ± 4.63 years and 7.23 ± 2.83 years respectively. The mean decayed teeth score of parents were 1.95 ± 1.45 and children were 1.14 ± 0.76. Around 41 % of the parents were

graduates and professionals. More than half of the parents were working (61.7%) and in that around 56.3% were intermediate workers. Most of the parents had a relatively active social life as they have frequency of contact with family, neighbour, and friends daily. Most of the study participants belongs to upper lower (35%) and Upper class (31.4%) of socioeconomic classes.

Table 1. Characteristics of the study participants

Variables		Mean ± SD	Variables		Mean ± SD
Age of the Parent		29.25 ± 4.63	Age of the Children		7.23 ± 2.83
Oral health status of parents	Decayed teeth	1.95 ± 1.45	Oral health status of children	Decayed teeth	1.14 ± 0.76
	Missing teeth	0.88 ± 0.9		Missing teeth	0.36 ± 0.48
	Filled teeth	1.31 ± 1.15		Filled teeth	0.26 ± 0.43
Variables		N (%)	Variables		N (%)
Parents	Father	74(21.1)	Work status	Working	216(61.7)
	Mother	276(78.8)		Not working	134(38.3)
Education	Diploma/Post high school	61(17.4)	Occupation	Worker	141(40.3)
	Graduate/ Postgraduate	95(27.1)		Intermediate	197(56.3)
	Professional/Honour	50(14.28)		Manager	12(3.4)
Type of family	Joint	133(38)	Socioeconomic status	Lower	21(6)
	Nuclear	217(62)		Upper lower	49(14)
				Lower middle	49(14)
				Upper middle	121(34.6)
				Upper	110(31.4)
Social Contact					
Parent's frequency of contact with family members	Daily	225(64.3)	Parent's frequency of contact with neighbour	Daily	217(62)
	Weekly	49(14)		Weekly	66(18.9)
	Monthly	42(12)		Monthly	36(10.3)
	Rarely	34(9)		Rarely	31(8.9)
Parent's frequency of contact with friends	Daily	210(57.4)			
	Weekly	70(20)			
	Monthly	41(11.7)			
	Rarely	38(10.9)			

Table.2. shows the distribution of study participants(Parents) based on Oral health literacy scale (HELD) and Oral health behaviour. The oral health literacy of the parents was found to be good for all the domains in HELD scale of oral health literacy. Similarly, oral health behaviour of the parents was also found to be good as majority of the parents follows good oral hygiene practices (67%).

Table.2. Distribution of study participants (Parents) based on HELD scale and Oral health behaviour

Oral Health Literacy of parents based on HELD Scale			Oral health behaviour		
Criteria	Good	Poor	Criteria	Good	Poor
Communication	227(64.9)	123(35.1)	Avoiding a lot of sweet foods	243(69.4)	107(30.1)
Access to dental service	228(65.1)	122(35.1)	Using fluoride toothpaste	245(70)	105(30)
Receptivity	228(65.1)	122(35.1)	Visiting the dentist regularly	234(66.9)	116(33.1)
Understanding	227(64.9)	123(35.1)	Keeping the teeth and gums very clean	232(66.3)	118(33.7)
Utilization	228(65.1)	122(35.1)	Drinking fluoridated water	234(66.9)	116(33.1)
Support	227(64.9)	123(35.1)			
Economic barriers	228(65.1)	122(35.1)			

Furthermore, Pearson's correlation coefficient showed that there was significant correlation for Parent's work status (0.028), Number of children (0.024), Type of family (0.008) and Oral health literacy of parents (0.010) with oral health status of children. (Table.3) For one-unit increase in parent's work status, the expected log odds of children's oral health status increases by 0.028-fold. For one-unit increase in number of children, the expected log odds of children's oral health status increases by 0.024-fold. For one-unit increase in type of family, the expected log odds of children's oral health status increases by 0.088-fold. For one-unit increase in oral health literacy of parents, the expected log odds of children's oral health status increases by 0.010-fold. All these factors were considered for forward Linear regression analysis. Figure.1 is Directed Acyclic Graph showing the relationship of independent variables and oral health status of the children.

Table.3 Factors associated with Oral health status of children

Variables	R value	P value
Parent's Age	0.055	0.309
Parent's Education	-0.013	0.807
Parent's Work status	-0.214	0.028*
Parent's Occupation	-0.004	0.942
Number of Children	-0.121	0.024*
Type of Family	0.324	0.008*
Socioeconomic Status	-0.030	0.573
Social contact with family	0.002	0.977
Social contact with neighbors	0.019	0.723
Social contact with friends	-0.011	0.840
Oral health literacy of parents -HELD scale	-0.137	0.010*
Oral health behaviour	0.010	0.846
Oral health status of Parent	0.003	0.951

*Pearson's Correlation Coefficient

The linear regression model shows the parent's work status (95% CI: 1.12-1.31), number of children (95% CI: -0.38-0.05), type of family (95% CI: 1.24-1.74), oral health literacy of parents (95% CI: -0.25—0.02) were significantly associated with oral health status of the children. (Table.4)

Table.4. Factors associated with Oral health status of children: Linear Regression analysis

Criteria	β Coefficient	Standard Error	95 % Confidence Interval		P Value
			Lower bound	Upper Bound	
Type of Family	-0.006	0.050	1.12 - 1.31		0.001**
Number of Children	-0.141	0.060	-0.38 - -0.05		0.045*
Working status of Parent	-0.022	0.126	1.24 - 1.74		0.041*
Oral health Literacy -HELD Scale	-0.220	0.085	-0.25 - -0.02		0.001**

*Forward Linear Regression analysis
P<0.05 -Statistically Significant

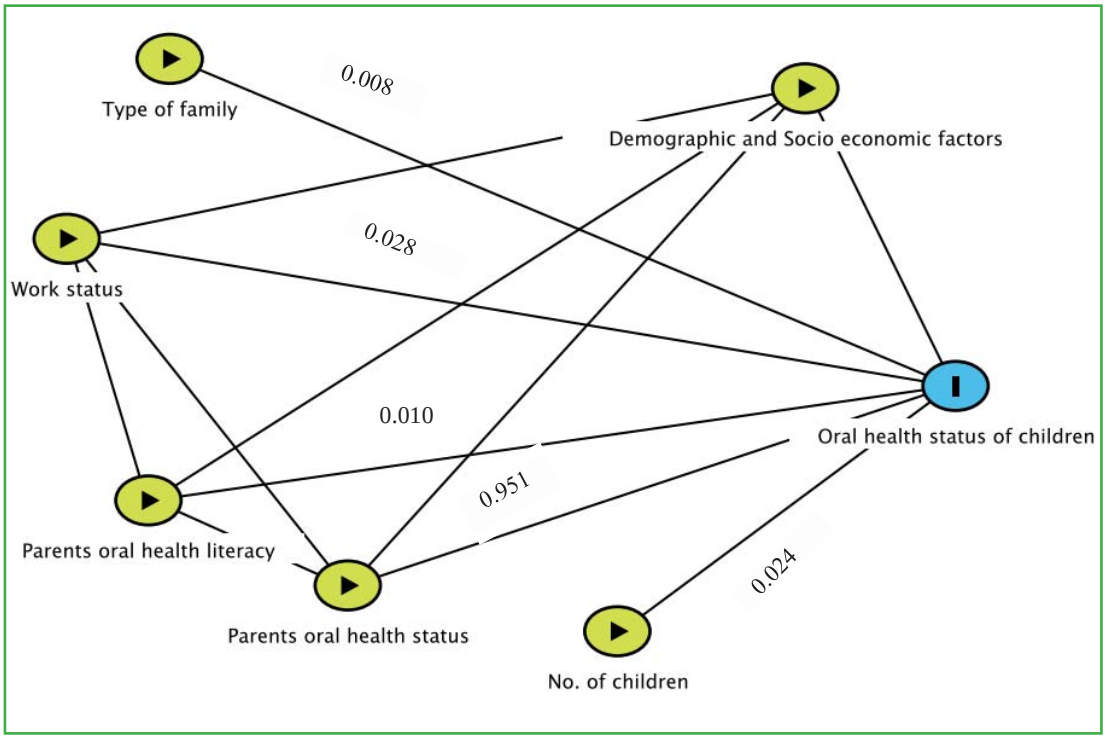

Figure .1 Directed Acyclic Graph showing the relationship of independent variables and oral health status of the children.

Discussion

This study aimed to find the relationship between the Oral Health Literacy(OHL) of parents using HELD scale and oral health status of their children. Oral Health Literacy, as one of the important determinants of oral health, has been evaluated simultaneously with oral health behaviour of parents and their children's oral health status. Younger children are more dependent on their parents on matters concerning their health, which include not only seeking health care, but also the maintenance of positive health attitudes (19). A possible explanation for this trend is that parents with lower OHL may have a decreased knowledge of how to prevent dental caries in their children, or have more difficulty in understanding oral health instructions. Nevertheless, these results must be viewed with caution as they concern primary teeth and cannot be generalized to permanent

dentition. The findings of the present study showed that disparities in dental caries exist as a function of both the parent's socioeconomic characteristics (level of education, occupation and social support) and their OHL. These results agree with the study conducted by Ellankany et al. who found that a higher mother's OHL was protective against children's dental caries (20).

In the present study, good OHL of parents is beneficial for the oral health of children, as it indicates that they have learned about oral diseases and the means of preventing them and are able to both implement prevention and interact pertinently with the healthcare system (21). In the present study, oral health of children was significantly associated with those parents who were employed with some government/ private organization. This is similar to previous studies, where Children of employed mothers had a higher dental caries experience when compared to those of unemployed mothers which was statistically significant. It is reported that mother's employment status negatively affects children's health (22). Mothers play a pivotal role in developing good oral care practices in children. There will be limited attention on good dietary habits and oral health care of the children as working mother get less quality time for their children.

Our study findings showed no evidence of association of socioeconomic status of parents and oral health of the children, which is in contrast to the study conducted by Baiju et al where low socioeconomic status had a statistically significant relationship with greater caries experience compared to high socioeconomic status(23). The reason may be because of the fact in our study many of the participants belong to similar social classes hence the significance is not evident. These findings suggest that all people's oral health beliefs are not necessarily fixed.

The findings presented here in the study, provide indications of how parent's oral health literacy can influence the oral health outcome of their children. Oral health literacy was assessed by means of HELD scale,HeLD-14 has good statistical properties and validity, with the obvious benefit being that the data could be collected with less fieldwork effort and respondent burden. The instrument may be especially useful in settings the oral health literacy of vulnerable populations, in which where sensitivities need to be acknowledged, is sought (24). Beyond the REALM, CMOHK and TOFHLA, the present investigation also showed that the was significantly associated with HELD- health literacy indicator. Completing forms in a healthcare setting is challenging on a number of levels, including being able to recognize words and read sentences but also recalling details from the past and writing one's answers/ thoughts in a coherent way. This study is the first to consider the stability of oral health literacy of parents using (HELD) scale with that of children's oral health. A substantial proportion of the population are likely to change their beliefs about oral health practices because of various factors. This instability varies according to the particular belief in question, but may be up to 50%. Thus, measuring beliefs at one point in time (as in a cross-sectional survey) is likely to result in considerable miscalculation in any investigation of the relation between beliefs and oral health. This suggests that longitudinal studies are of greater utility, because they allow for examination of the 'stability' of health beliefs via their repeated measurement over time. Future studies considering the role of cultural, familial and contextual aspects in visiting the dentist are necessary.

Strengths and Limitations: This study contains limitations, much like all other studies. Since

this study is cross-sectional, cause-and-effect correlations between the variables cannot be determined. Although this constraint existed, methodological steps and statistical analysis were taken to address the likelihood of bias. The execution of a pilot study to test the suggested methods and ensure the validity of the findings, the training and calibration of the examiners, the use of instruments validated for the study population, and the selection of adjustment factors using a direct acyclic graph were some of the measures that were taken as the strengths.

Conclusion

The current study came to the conclusion that better parental oral health literacy plays a significant influence in improving the oral health status of children. Working status of the parents, type of family and number of children are the important determinants and showed significant effect on children's oral health status. Hence, it is essential to include OHL when creating and implementing a programme targeted at enhancing the oral health of both parents and children.

Availability of data and materials: Datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest: No potential conflict of interest was reported by the author

Ethical consideration: Ethical clearance was obtained from the institutional ethical committee, Karpaga Vinayaga institute of dental sciences, Chengalpattu. (KIDS/IEC/2022/II/005).

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