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Research Article

The Relationship Between Parental Concern Level and Oral Hygiene Status Among Deaf and Hard-of-Hearing Children

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KEYWORDS

Parental concern level, oral hygiene, oral health, OHI-S, deaf and hard-of-hearing children

ABSTRACT

Background: Children with special needs, including deaf and hard-of-hearing children, are at a higher risk of developing oral health problems than typically developing children. Hearing and communication limitations may restrict their oral health knowledge, affecting their attitudes and behaviors toward maintaining oral hygiene. Parents play a crucial role in establishing healthy oral hygiene habits. This study aimed to determine and analyze the relationship between parental concern level and the oral hygiene status of deaf and hard-of-hearing children.

Materials and Methods: This quantitative study employed an analytical survey with a cross-sectional design involving 34 parents and 34 deaf and hard-of-hearing children. Total sampling was used to include the entire population. The independent variable was parental concern level, while the dependent variable was the oral hygiene status of the deaf and hard-of-hearing children. Parental concern level was assessed using a Likert-scale questionnaire. Oral hygiene status was evaluated through direct clinical examination by applying food coloring to the index teeth (16, 11, 26, 36, 31, and 46) and assessing the debris index and calculus index. Data were analyzed using the Spearman rank correlation test.

Results and Discussion: The mean OHI-S score was 2.64, indicating a moderate level of oral hygiene. A significant and strong correlation was found between parental concern level and the oral hygiene status of deaf and hard-of-hearing children ($p < 0.001$; $r = 0.591$).

Conclusion: A higher parental concern level was associated with better oral hygiene status among deaf and hard-of-hearing children.

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INTRODUCTION

Children who experience learning difficulties, intellectual disabilities, physical impairments, or specific emotional disorders are classified as children with special needs. One of the major challenges faced by children with special needs is limited access to appropriate healthcare services, particularly dental care. These challenges are associated with impairments in motor function, cognitive abilities, and behavioral regulation, which may directly affect their ability to perform daily self-care activities.[1]

Deaf and hard-of-hearing children face unique challenges in oral health education due to hearing and communication limitations, which may restrict their ability to receive spoken information and interact effectively with educators and healthcare providers. The lack of appropriate educational approaches, particularly those based on visual communication, may further increase their vulnerability to oral health problems. As a result, they may have a limited understanding of the importance of maintaining oral hygiene, which can affect their ability to practice regular and independent toothbrushing.[2] Improving the oral health of children with special needs therefore requires active collaboration among families, healthcare providers, and educators.[3]

Limited parental understanding of the importance of dental and oral care can negatively affect children's long-term oral health and hinder the development of healthy habits from an early age. Children who do not receive adequate oral health education and supervision from their parents are more likely to have poor oral hygiene, increasing their risk of oral diseases. [4] This highlights the crucial role of parents in providing education and supervision to promote proper oral hygiene behaviors. Limited parental understanding may contribute to poor oral hygiene, which can increase the risk of various oral diseases, including periodontal disease, dental caries, and other infections affecting both the soft and hard tissues of the oral cavity.[1]

Previous studies have reported an association between parental knowledge, attitudes, and practices and the oral health status of deaf and hard-of-hearing children. As primary caregivers, parents play a crucial role in establishing good oral hygiene habits by providing oral health education, fostering positive attitudes, and assisting with daily oral care.[2] Parents are also responsible for implementing preventive oral health measures from an early age, including encouraging regular toothbrushing, limiting the consumption of sugary foods, and ensuring routine dental check-ups. This role is particularly important for deaf and hard-of-hearing children, who may require greater support to maintain optimal oral health.[1,5]

A preliminary survey conducted among 11 students from five Special Needs Schools (SLB) in Surabaya found that five students had poor oral hygiene status, with Simplified Oral Hygiene Index (OHI-S) scores ranging from 3.1 to 3.6, while six students had fair oral hygiene status, with OHI-S scores ranging from 1.6 to 2.8. A previous study conducted in Bintoro Patrang village reported that deaf children had poorer OHI-S scores than children without disabilities.[6] These findings suggest that the oral hygiene status of deaf children remains a public health concern requiring greater attention. In addition to communication barriers associated with hearing impairment, parental concern in providing oral health education, guidance, and supervision may also influence children's oral hygiene status.[4]

Although previous studies have examined the relationships between parents' knowledge, attitudes, and behaviors and children's oral health, studies specifically investigating the relationship between parental concern level and oral hygiene

status among deaf children remain limited. Most studies have focused on parents' knowledge or behaviors, whereas parental concern, which encompasses attention, assistance, supervision, and involvement in maintaining children's oral health, has received limited evaluation. Previous studies on parental concern regarding children's dental and oral health have tended to be descriptive, primarily describing the level of parental concern without examining its association with children's clinical oral health conditions. In addition, studies investigating the relationship between parental concern level and oral hygiene status among deaf children in Surabaya, particularly at SLB BC Optimal and SLB Bakti Asih Surabaya, remain limited. Therefore, further research is needed to analyze the relationship between parental concern level and oral hygiene status among deaf children.

Based on the rationale presented above, this study aims to analyze the relationship between the level of parental concern and the oral hygiene status of deaf and hard-of-hearing children at SLB BC Optimal and SLB Bakti Asih Surabaya.

MATERIALS AND METHODS

This study employed an analytical observational design with a cross-sectional approach. The research was conducted at SLB BC Optimal and SLB Bakti Asih Surabaya in January 2025. Sampling was performed using a total sampling technique, yielding a total sample size of 68 respondents, comprising 34 parents of deaf and hard-of-hearing children and the 34 children themselves.

The variables examined in this study included parental concern level as the independent variable and the oral hygiene status of deaf and hard-of-hearing children as the dependent variable. Two research instruments were utilized: a questionnaire to measure parental concern level and an Oral Hygiene Index-Simplified (OHI-S) examination sheet to evaluate the children's oral hygiene status. Data regarding parental concern level were collected using a single questionnaire consisting of 25 items structured according to Swanson's Theory of Caring, encompassing five domains: *maintaining belief*, *knowing*, *being with*, *doing for*, and *enabling*. The questionnaire underwent validity and reliability testing and was deemed suitable for research use. Parental concern levels were categorized based on total scores according to Sugiyono's (2024) criteria into three categories: high (35.3–50), moderate (17.6–35.2), and low (0–17.5). Parents completed the questionnaire, while the children underwent a clinical examination recorded on the OHI-S sheet. Oral hygiene status was evaluated through clinical examination of designated index teeth to obtain the Debris Index (DI) and Calculus Index (CI).

The primary step involved determining the OHI-S score by examining specific index teeth (16, 11, 26, 36, 31, and 46). To evaluate an individual's oral cleanliness objectively and measurably, Green and Vermillion developed the Oral Hygiene Index-Simplified (OHI-S), which integrates the Debris Index (DI) and Calculus Index (CI). These two component scores are summed to yield an overall score reflecting oral cleanliness. The OHI-S scores are categorized into three levels: good (0 to 1.2), moderate (1.3 to 3.0), and poor (3.1 to 6.0). If any designated index tooth was absent, an adjacent tooth was examined as a substitute. However, if the substitute tooth was unerupted or presented with severe carious destruction precluding its suitability as an index tooth, it was excluded from scoring.

The relationship between parental concern level and the oral hygiene status of deaf and hard-of-hearing children was analyzed using bivariate analysis. Given that the collected data were on an ordinal scale, Spearman's rank correlation test was

conducted to determine the strength and direction of the association between the two variables. Ethical approval was granted by the Health Research Ethics Committee of Health Polytechnic of Surabaya (Poltekkes Kemenkes Surabaya) under Reference No. EA/3111/KEPK-Poltekkes_Sby/V/2024.

RESULTS AND DISCUSSION

Table 1. Demographic characteristics of parents and deaf and hard-of-hearing children

Characteristics	Frequency	Total	Percentage (%)	Total
Parents				
Gender				
Male	0	34	0	100
Female	34		100	
Age				
30-35 Years	5	34	14.7	100
36-40 Years	11		32.4	
41-45 Years	13		38.2	
46-50 Years	4		11.8	
51-55 Years	1		2.9	
Highest Education Level				
Elementary School	3	34	8.8	100
Junior High School	9		26.5	
Senior High School	17		50	
Bachelor's Degree	5		14.7	
Occupation				
Homemaker	19	34	55.9	100
Self-Employed	4		11.8	
Private-Sector Employee	11		32.4	
Deaf And Hard-Of-Hearing Children				
Gender				
Male	23	34	67.6	100
Female	11		32.4	
Age				
10-15 Years	20	34	58.8	100
16-20 Years	14		41.2	

Based on Table 1, all participating parents were female (100%). The largest proportion of parents was aged 41–45 years, comprising 13 respondents (38.2%). Most parents had completed high school education (17 respondents, 50.0%), and the majority were homemakers (19 respondents, 55.9%). Among the deaf and hard-of-hearing children, most were male (23 respondents, 67.6%) and aged 10–15 years (20 respondents, 58.8%).

Table 2 presents the distribution of parental concern levels among parents of deaf and hard-of-hearing children. This distribution provides an overview of respondents according to the categories of parental concern observed in the study. The information presented in this table describes the variation in parental concern levels before examining their relationship with the oral hygiene status of the children. These findings serve as a descriptive basis for the subsequent bivariate analysis of the association between parental concern and oral hygiene status.

Table 2. Distribution of parental concern levels among parents of deaf and hard-of-hearing children

No.	Concern Category	Frequency (N)	Percentage (%)
1.	High	11	32.4
2.	Moderate	12	35.2
3.	Low	11	32.4
Total		34	100

Criteria: Low (0–17.5); Moderate (17.6–35.2); High (35.3–50)

Based on Table 2, the distribution of parental concern levels among parents of deaf and hard-of-hearing children showed that the moderate category had the highest frequency, comprising 12 respondents (35.2%). Concern is defined as a proactive attitude reflected in an individual's willingness and concrete actions to help others in need. This attitude demonstrates empathy and a strong sense of social responsibility and serves as an essential foundation for building supportive and meaningful relationships.[7] In the context of this study, parental concern is reflected in parents' commitment, attentiveness, and responsiveness to the needs of their deaf and hard-of-hearing children. These elements form the basis for providing support and promoting the children's oral health and overall well-being.[1,8]

The findings of this study showed that parental concern levels among parents of deaf and hard-of-hearing children were relatively balanced across the high, moderate, and low categories, with the moderate category accounting for a slightly higher proportion of respondents. An individual's efforts to enhance concern for maintaining health, particularly oral hygiene, may be influenced by appropriate knowledge.[1] These findings indicate that some parents still had parental concern levels within the low and moderate categories, suggesting that greater attention should be given to improving parental concern regarding the maintenance of their children's oral health.

An individual's ability to recognize, understand, and interpret an object or phenomenon through sensory experience is acquired through direct interaction with the surrounding environment. This cognitive process is influenced by the way information is perceived through the senses. Because each individual has a different perceptual capacity, the level and type of knowledge acquired also vary depending on how information is interpreted and responded to.[9,10] Among parents of deaf and hard-of-hearing children, a good understanding of oral health can promote greater parental concern in assisting their children to maintain proper oral hygiene.

A mother's level of knowledge plays a crucial role in determining how she guides and shapes her child's habits, particularly those related to oral health care. This knowledge serves as the foundation for providing guidance and supervision that support healthy behaviours. Such understanding is generally acquired through both formal and informal educational methods, which help mothers recognize the importance of oral care and its influence on their children's overall health. Adequate knowledge encourages more proactive actions in consistently maintaining children's oral health.[1,11]

Based on the findings of this study, most parents of deaf and hard-of-hearing students had completed high school as their highest level of education, which is still considered relatively low and may influence their capacity to understand information, including knowledge related to oral health.[11,12] Educational attainment is closely associated with attitudes and behaviors related to maintaining children's oral hygiene. Parents with higher educational backgrounds are generally more concerned and have a better understanding of the importance of maintaining their children's oral health than those with lower educational attainment. This finding is consistent with previous studies reporting that limited knowledge of oral health may result in lower parental concern regarding the maintenance of children's oral hygiene.[13]

Oral health problems commonly experienced by deaf and hard-of-hearing children are often associated with parents' limited understanding and

inadequate actions regarding the importance of oral care from an early age.[3] The lack of information and oral health education received by parents may prevent them from fully recognizing the impact of oral hygiene on their children's quality of life. Maintaining optimal oral health in daily life requires parents to possess adequate knowledge of appropriate oral care practices.[4,14] Based on the respondents' responses, most parents demonstrated a fairly good understanding of their children's oral health needs, including monitoring their children's oral condition and encouraging them to brush their teeth regularly.

The findings of this study showed that the moderate parental concern category had the highest proportion of respondents. This finding is consistent with a previous study reporting that most parents actively assisted their children during toothbrushing and reminded them to brush their teeth twice a day, namely after breakfast and before going to bed.[13] However, the same study also found that some parents still lacked knowledge of the correct toothbrushing technique and had not established the habit of taking their children for routine dental check-ups every six months.[13] Therefore, education on proper toothbrushing techniques is essential to foster children's independence in maintaining good oral hygiene. Parents' role as positive role models in practicing proper toothbrushing techniques may also influence their children's oral health behaviors.[15] These findings suggest that although many parents demonstrated a moderate level of parental concern, improving parental knowledge and guidance regarding the maintenance of their children's oral health remains necessary.

The findings of this study showed that some parents had not established the habit of taking their children for routine dental check-ups every six months. This finding is consistent with a previous study reporting that most parents had not scheduled regular dental examinations for their children within a six-month interval, indicating that awareness of the importance of routine dental check-ups remains limited among some parents.[4] According to the guidelines of the American Academy of Pediatric Dentistry (AAPD) and the American Dental Association (ADA), children are recommended to undergo routine dental examinations every six months, beginning with the eruption of the first primary tooth or no later than 12 months of age. Regular dental examinations are intended to monitor oral health, facilitate the early detection of oral diseases such as dental caries, and prevent the progression of more severe pathological conditions.[4,5] Therefore, strengthening parental concern in establishing the habit of routine dental check-ups every six months should continue to be encouraged as part of efforts to maintain children's oral health.

Based on the findings of this study, the parental concern level was predominantly classified as moderate. Across several dimensions of parental concern, the respondents demonstrated relatively good practices. These included providing oral hygiene supplies, such as toothbrushes, toothpaste, and dental floss; purchasing toothbrushes that were appropriate for the children's age and had soft bristles; providing fluoride-containing toothpaste; and ensuring that their children consumed fruits and vegetables as part of a healthy diet. However, responses to several statements representing other dimensions of parental concern indicated that further attention is still needed, as they revealed substantial gaps in parents' understanding.

Table 3. Distribution of oral hygiene status among deaf and hard-of-hearing children

No.	Oral Hygiene Status (OHI-S)	n	%
1.	Good	6	17.6%
2.	Moderate	8	23.5%
3.	Poor	20	58.9%
Total		34	100%

Criteria: Good 0-1.2; Moderate 1.3-3.0; and Poor 3.1-6.0

Based on Table 3, the majority of deaf and hard-of-hearing children were classified as having poor oral hygiene status, accounting for 58.9% of the respondents. Optimal oral hygiene is a fundamental aspect of maintaining oral health and preventing diseases of the teeth and supporting tissues. Good oral hygiene is characterized by the absence of food debris, dental plaque, and calculus on the tooth surfaces and oral soft tissues. A clean oral cavity creates an environment that is less favourable for the growth of pathogenic bacteria, thereby reducing the risk of oral diseases such as dental caries, gingivitis, and periodontal infections.[9] Maintaining good oral hygiene is an essential preventive measure for preserving overall oral health. This includes routine practices such as proper toothbrushing, the use of dental floss, and regular dental check-ups. These practices play an important role in minimizing the risk of oral diseases and improving an individual's quality of life by maintaining optimal oral function.[5,9]

Oral health is a crucial component of children's growth and development. However, parental awareness of oral health in Indonesia remains relatively low, particularly among parents of children with disabilities.[6] The findings of this study showed that higher levels of parental concern, reflected through active attention, supervision, and the provision of oral health education, were associated with lower OHI-S scores among deaf and hard-of-hearing children, indicating better oral hygiene status. These findings suggest that parental concern plays an important role in maintaining children's oral hygiene status. Therefore, parental involvement in guiding and assisting children in maintaining their oral health should be regarded as an essential aspect of promoting optimal oral health.

Deaf and hard-of-hearing children, as part of the population of children with special needs, face barriers to language development due to impaired hearing, which limits their ability to receive auditory information.[16] Limitations in hearing and verbal communication also affect their understanding of and behaviours related to oral hygiene.[2] These conditions require more specific and intensive oral healthcare services than those provided for children in general.

More than 50% of the deaf and hard-of-hearing children in this study were found to have poor oral hygiene status. The main challenge appeared to stem from communication barriers, which made it difficult for the children to understand instructions related to self-care, including maintaining oral hygiene. Limited parental participation in providing oral health education further contributed to this condition, resulting in poor oral hygiene among deaf and hard-of-hearing children.[2]

Parents have a significant influence on shaping their children's habits, which may have either positive or negative effects on the way children maintain their oral health. The close relationship between parents and their children makes parental behavior the primary reference for developing children's oral hygiene habits. Environmental factors, particularly the family and school, play an important role in supporting the development of a healthy lifestyle, including good oral hygiene practices. Previous studies have also reported that special schools have not yet received oral healthcare services from local community health centres

(Puskesmas), making the role of the family even more important in maintaining children's oral health.[1,15]

School-based health promotion plays an important role in improving the health of the entire school community, including students, teachers, staff, parents, and the surrounding community. Integrated health promotion programs implemented in schools can create a sustainable culture of healthy living. Schools that promote clean and healthy habits provide a strong foundation for raising individuals' awareness of the importance of health while motivating them to actively participate in maintaining both personal and community health. Communities that adopt healthy lifestyles have greater opportunities to access quality, equitable, and accessible healthcare services.[17] The role of healthcare professionals, particularly dental health professionals, is therefore essential. Dental health professionals are responsible for providing education on the importance of maintaining oral hygiene through informative and communicative approaches. These efforts not only increase public knowledge but also motivate individuals to adopt healthier and more sustainable habits.

Data were collected using OHI-S assessments and questionnaire responses. Subsequently, the data were analyzed using Spearman's rank correlation test to determine the relationship between parental concern level and the oral hygiene status of deaf and hard-of-hearing children.

Table 4. Analysis of the relationship between parental concern level and oral hygiene status among deaf and hard-of-hearing children.

		Parental Concern Level			n	*P value*
		High	Moderate	Low		
Oral Hygiene Status (OHI-S)	Good	6	0	0	6	*P*≤0.001
	Moderate	1	7	0	8	Correlation coefficient = 0.591
	Poor	4	5	11	20	
	n	11	12	11	34	

The findings of this study demonstrated a relationship between parental concern level and the oral hygiene status of deaf and hard-of-hearing children. This relationship may be explained by the fact that parents with a high level of parental concern tend to be more actively involved in supervising their children's oral hygiene, reminding them to brush their teeth, assisting them during toothbrushing, and encouraging regular dental check-ups. These conditions enable deaf and hard-of-hearing children to receive better guidance in maintaining their oral hygiene, thereby contributing to better oral hygiene status.

The findings of this study are consistent with those of previous studies, which reported that parental involvement and attention play an important role in children's growth and development. As the primary educators within the family, parents contribute to shaping their children's behaviour, character, and habits through attention, supervision, and positive role modelling. Parental involvement in children's daily lives also contributes to the development of healthy behaviors, including maintaining their oral health.[18,19]

Furthermore, knowledge of oral health is one of the factors that influences an individual's behavior, although good knowledge does not always guarantee the development of positive attitudes and healthy lifestyle habits.[10] Among deaf and hard-of-hearing children, limitations in hearing

and communication make it more difficult for them to understand information related to oral health, resulting in a continued need for parental guidance in maintaining oral health. Therefore, parents' knowledge of oral health is an important factor in fostering parental concern and guiding their children in maintaining oral hygiene.[14,15]

These findings are consistent with Lawrence Green's theory, which states that health behavior is influenced by predisposing, enabling, and reinforcing factors.[20] Knowledge is one of the predisposing factors that plays an important role in shaping an individual's behavior.[21] In the present study, Lawrence Green's theory suggests that parental concern, as a form of health behavior, is influenced by the predisposing factor of knowledge and supported by environmental and social factors. This is consistent with the findings of the present study, which demonstrated a relationship between parental concern level and the oral hygiene status of deaf and hard-of-hearing children.

CONCLUSION

A significant relationship was found between parental concern level and oral hygiene status among deaf and hard-of-hearing children at SLB BC Optimal and SLB Bakti Asih Surabaya. Higher levels of parental concern were associated with better oral hygiene status, as indicated by lower OHI-S scores. Therefore, parental concern is an important aspect in supporting the maintenance of oral health among deaf and hard-of-hearing children.

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