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Exploring Factors Impacting Oral Health Behavior in Children with Special Needs

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ABSTRACT

Background: Oral health is a reflection of general health. Children with disabilities are more prone to problems such as dental caries and periodontal disease compared to children in general due to various factors. Indonesia has 3.3% of children with disabilities aged 5 to 17 years old. Families, especially mothers, play a crucial role in maintaining the dental health of children with disabilities because they are responsible for meeting basic needs and oral hygiene. The Health Belief Model theory can be used to understand parental behavior related to the health of children's oral cavity. This study aims to examine the influence of factors in HBM theory on the oral health of children with special needs.
Subjects and Method: This study uses a cross-sectional method conducted at Sukoharjo and B-C YPPALB Langenharjo schools for special needs children, Central Java, Indonesia. A total of 200 parents or guardians of children with disabilities were obtained by random sampling. The bound variable was in the form of oral health behavior while the independent variable was in the form of vulnerability perception, severity perception, benefit perception, obstacle perception, stimulus to act, and self-efficacy. The results of the study were analyzed using multiple linear regression.
Results: Oral Health Behavior increases with increased perception of vulnerability (b= 0.11; 95% CI= 0.11 to 0.21; p= 0.030), perception of severity (b= 0.16; 95% CI= 0.17 to 0.30; p= 0.028), perception of benefit (b= 0.12; 95% CI= 0.16 to 0.22; p= 0.024), stimulus to act (b= 0.18; 95% CI= 0.11 to 0.35; p= 0.037), and self-efficacy (b= 0.18; 95% CI= 0.11 to 0.26; p=0.000) and decreases with increasing perception of barriers (b= -0.15; 95% CI= -0.20 to - 0.11; p=<0.000).
Conclusion: Perception of vulnerability, perception of severity, perception of benefit, stimulus to act and self-efficacy increase oral health behavior and perception of obstacles decreases oral health behavior.

Keywords: health belief model, oral health behavior, disability

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BACKGROUND

Oral health is an important aspect that is closely related to the overall health of the body. Poor oral cavity condition negatively affects a person's general health and quality of life. Children with special needs are more susceptible to periodontal disease and dental caries than children in general, due to a lack of inadequate care (Anders and Davis, 2010). Some risk factors for oral cavity disease in children with special needs include tooth enamel deficiency, difficulty brushing teeth, decreased saliva rate, effects of long-term treatment, and limited nutrition (Cui et al, 2022).

The 2018 Riskesdas report noted that 3.3% of children in Indonesia aged 5-17 years have a disability, with the highest proportion at the age of 15-17 years (4.2%), followed by 10-14 years (3.5%), and 5-9 years (2.5%). In terms of gender, disability for boys reached 3.4% and for women 3.1% with the majority living in urban areas (3.6%) compared to rural areas (2.9%). Central Java Province has the highest number of students with special needs, namely 14,507, including 606 students in Sukoharjo Regency and spread across 7 Special Schools. Various disability conditions in children in Indonesia include blindness, deafness, impairment, disability, impairment, autism, hyperactivity, and learning and multiple developmental disorders (Kosasih, 2012).

A systematic review conducted by Anwar et al (2022) showed that there was a significant relationship between family and dental caries status in children with special needs. The role of the family, especially mothers, is very important in maintaining children's oral health (Soltani et al, 2017). Oral hygiene in children with special needs is the responsibility of everyone who takes care of them. Therefore, parents need to have adequate knowledge about how to maintain oral hygiene so that children's oral health can be maintained properly (Alamri, 2022).

Various theories of health behavior have been applied to design health interventions including the Health Belief Model, Theory of Planned Behavior, and Transtheoretical Model. Among all these theories, the Health Belief Model is the most commonly used. This theory states that preventive measures against diseases or healthy living behaviors are influenced by perceptions of vulnerability, severity, benefit, barrier, cues to act, and self-efficacy (Sulaeman, 2016). The Health Belief Theory model is useful for predicting the behavior of mothers in maintaining the health of their children's oral cavity. According to this theory, a mother should feel threatened if there are dental and oral health problems and be aware that her child is at risk of oral cavity disease if her oral hygiene is not maintained (Moghadam, 2105). Based on the above presentation, the researcher is interested in seeing the influence of factors in the Health Belief Model theory on parents/guardians on the Oral Health Behavior of children with special needs.

SUBJECTS AND METHOD

1. Study Design

The design of this study uses observational analysis with a cross-sectional approach. This research was carried out at Sukoharjo and B-C YPPALB Langenharjo school for special needs children, Sukoharjo, Central Java, Indonesia, from August to September 2024.

2. Population and Sample

The population of this study is parents / guardians of students who have children with special needs in Sukoharjo Regency and the sample of this study is 200 parents /

guardians whose children have special needs attending SLB Negeri Sukoharjo and SLB B-C YPPALB Langenharjo Sukoharjo.

3. Research Variables

The independent variables in this study are perception of vulnerability, perception of severity, perception of benefit, perception of barriers, stimulus to act, and self-efficacy while the variables bound in this study are oral health behavior.

4. Operational Definition of Variables

Perception of Vulnerability is a parent's perception of the possibility that children will be easily infected with dental and oral diseases if they do not maintain dental and oral health.

Perception of Severity is a parent's perception of how severe dental and oral diseases are likely to be if they do not maintain dental and oral health behaviors.

Perception of Benefits is the perception of the benefits that will be obtained when performing behaviors to maintain dental and oral health and hygiene. The perceived benefits can lower the risk and consequences of dental and oral diseases.

Perception of Obstacles is the perception of possible obstacles that are perceived to carry out behaviors to maintain the health and hygiene of teeth and mouth.

Stimulus to Action is a stimulus or stimulus that can trigger actions to maintain dental and oral health. This stimulus can be in the form of an internal stimulus (from within the parent) and an external stimulus (a stimulus that comes from outside).

Self-efficacy is a belief in the ability of parents to maintain the health of children's teeth and mouth.

Oral Health Behavior is the behavior of maintaining the health and hygiene of children's teeth and teeth that parents strive for.

5. Study Instrument

This research was conducted using a questionnaire instrument made by the author. The research instrument has been tested for validity and reliability before being used.

6. Data analysis

Univariate, bivariate, and multivariate analyses were performed using linear regression analysis. The research data was analyzed using the STATA 17.0 application.

7. Research Ethics

Research ethics include subject approval, confidentiality of subject identity, confidentiality of subject information is handled carefully during the research process. This research has received a research ethics feasibility certificate number 075/EC-04/FK-06/UNIZAR/VIII/2024 from the Faculty of Medicine, Al-Azhar Islamic University on August 12, 2024.

RESULTS

1. Sample Characteristics

Table 1 shows the characteristics of the 200 study subjects. Table 1 shows the characteristics of the subjects from 200 research samples. Based on table 1 the age characteristics of the subjects, 58 subjects (29%) were < 30 years old and 142 subjects (71%) were > 30 years old. Based on the characteristics of the last education, the proportion of subjects who had the last education of elementary school was 1 person (0.5%), junior high school as many as 57 people (28.5%), high school as many as 94 people (47%), and diploma / bachelor as many as 48 people (24%).

Table 1. Characteristics of Categorical Data Research Subjects (N=200)

Variable	Frequency	Percentage (%)
Age of the Subject		
< 30 years	58	29
≥ 30 years	142	71
Last Education		
No formal education	0	0
Primary School	1	0.5
Junior High School	57	28.5
Senior High School	94	47
Diploma / Bachelor	48	24
Master's Program	0	0
Children Age		
7 – 13 years (Primary School)	84	42
13 – 15 years (Junior High School)	62	31
15 – 18 years (Senior High School)	54	27
Disability Category		
Deaf	44	22
Retardation	151	75.5
Physically disabled	5	2.5

Based table 1 on the age characteristics of children with special needs, the age of 7-13 years with the elementary school level was 84 children (42%), the age of 13-15 years (junior high school level) was 62 children (31%), and the age of 15-18 years (high school level) was 54 children (27%). Based on the characteristics of children's disabilities, 44 children (22%) are deaf, 151 children (75.5%) are visually impaired, and 5 children (2.5%) are deaf.

2. Bivariate Analysis

Table 2 shows the results of bivariate analysis of health belief model constructs on oral health behavior of children with special needs.

Table 2. Results of bivariate analysis of Health Belief Model construct on oral health behavior of children with special needs

Independent Variables	Coefficient (b)	95% CI		p
		Lower Limit	Upper Limit	
Perception of vulnerability	0.48	0.38	0.59	< 0.001
Perception of Severity	0.50	0.37	0.64	< 0.001
Perception of Benefits	0.46	0.34	0.57	< 0.001
Perception of Obstacles	- 0.39	-0.45	-0.32	< 0.001
Stimulus to act	0.58	0.45	0.70	< 0.001
Self-Efficacy	0.59	0.51	0.67	< 0.001

The results of bivariate analysis between the perception of the rift and the oral health behavior showed that the perception of vulnerability increased the Oral Health Behavior by 0.48 (CI 95%= 0.38-0.59; p= 0.001) higher than that of those who did not have the perception of vulnerability, the relationship was statistically significant. Likewise with the other 4 constructs, the perception of severity increased Oral Health Behavior by 0.50 (CI 95%= 0.37-0.64; p=0.001) higher with those who did not have a perception of severity, the perception of benefits increased Oral Health Behavior by 0.46 (CI 95%= 0.34-0.57; p= 0.001) higher than that of those who did not

have a perception of benefit, the stimulus to act increased Oral Health Behavior by 0.58 (CI 95%= 0.45 -0.70; p=0.001) higher with those who did not have a stimulus to act, and that self-efficacy increased Oral Health Behavior by 0.59 (CI 95%= 0.51-0.67; p=0.001) higher with those without self-efficacy. While the perception of obstacles showed a negative relationship that the perception of obstacles decreased Oral Health Behavior by 0.39 (CI 95%= 0.45 - -0.32; p=0.001) higher with those who did not have perception of obstacles, the relationship was statistically significant.

3. Multivariate Analysis

Table 3 shows the results of the double linear regression analysis of the relationship between the construct of the Health Belief Model theory and Oral Health Behavior.

Table 3. Multivariate Analysis of Health Belief Model Constructs on Oral Health Behavior of Children with Special Needs

Independent Variables	Coefficient (b)	95% CI		p
		Lower limit	Upper Limit	
Perception of vulnerability	0.11	0.11	0.21	0.030
Perception of Severity	0.16	0.17	0.30	0.028
Perception of Benefits	0.12	0.16	0.22	0.024
Perception of Obstacles	- 0.15	- 0.20	-0.11	< 0.001
Stimulus to act	0.18	0.11	0.35	0.037
Self-Efficacy	0.18	0.11	0.26	< 0.001
n observation = 200 Adjusted R- squared= 0.7893 p = 0.002				

There is a positive relationship between the perception of vulnerability to experience dental and oral diseases and the behavior of maintaining dental and oral health. Every 1 increase in vulnerability perception score will be followed by an oral health behavior score, and the relationship is statistically significant (b=0.11; CI 95%= 0.11 to 0.21; p= 0.030). Likewise with the other 4 constructs, there was a positive relationship between the perception of the severity of dental and oral disease and the behavior of maintaining dental and oral health (b=0.16; CI 95%=0.17 to 0.30; p=0.028), there was a positive relationship between the perception of benefits for maintaining dental and oral health and the behavior of maintaining dental and oral health (b=0.12; CI 95%=0.16 to 0.22; p=0.024), there was a positive relationship between stimulus to act to maintain dental and oral health and behavior to maintain dental and oral health (b=0.18; CI 95%= 0.11 to 0.35; p=0.037), there was a positive relationship between self-efficacy to maintain dental and oral health and behavior to maintain dental and oral health (b=0.18; CI 95%=0.11 to 0.26; p=0.001).

In contrast to the other 5 constructs, the perception of obstacles has a negative relationship with the behavior of maintaining dental and oral health. Every decrease of 1 barrier perception score will be followed by a decrease in oral health behavior scores, and the relationship is statistically significant (b= -0.15; CI 95%= -0.20 to -0.11; p= 0.001). Table 3 also shows an Adj R-squared value of 78.93% which can be interpreted that 6 independent variables can explain the variation of behavioral efforts to maintain dental and oral health by 78.93%.

DISCUSSION

a. Effect of Vulnerability Perception on Oral Health Behavior

This study shows that there is a positive relationship regarding the perception of the severity of dental and oral diseases from parents to efforts to maintain dental and oral health of their children with special needs. Parents who have a high perception of the severity of dental and oral diseases will increase efforts to maintain the dental and oral health of their children with special needs.

Previous research showed that the perception of vulnerability underwent a major change after 3 months of intervention ($F= 262.3$; $p < 0.001$) (Sanaeinasab et al., 2022). By raising awareness of children and parents about their susceptibility to dental caries and establishing habits of maintaining dental and oral health can support a healthy lifestyle through interventions based on health education theories/ models (Quach, 2020). Children with special needs have the same oral health problems as normal children, such as dental caries, poor oral hygiene, periodontal pain, and malocclusion. The main factors that contribute to poor oral health in children with special needs are mental challenges, behavioral challenges, physical challenges, congenital abnormalities in the development of the mouth and face, and side effects of treatment. Some health conditions that make them more susceptible to oral health problems than normal children, namely open bites, dysphagia, plaque buildup and tartar formation due to poor dental hygiene, *bruxism*, and acid regurgitation that causes tooth avulsion (Ningrum et al, 2021).

b. Effect of Severity Perception on Oral Health Behavior

This study shows that there is a positive relationship regarding the perception of the severity of dental and oral diseases from parents to efforts to maintain dental and oral health of their children with special needs. Parents who have a high perception of the severity of dental and oral diseases will increase efforts to maintain the dental and oral health of their children with special needs.

This is in line with previous research that low maternal perception of the impact of oral cavity conditions on the quality of life of children and families reflects poor oral health conditions in children with visual impairment in the form of high biofilm on teeth and the experience of cavities (Nunes et al, 2020).

c. The Effect of Benefit Perception on Oral Health Behavior

This study shows that there is a positive relationship regarding the perception of benefits to efforts to maintain dental and oral health from parents for their children with special needs. Parents who have a high perception of benefits will increase efforts to maintain the health of the teeth and mouth of their children with special needs.

This is in line with research conducted by Goodarzi et al. (2019) that the perception of benefits has a significant influence on visits to the dentist every 6 months (OR= 1.78; CI 95% = 1.14 to 2.77; p= 0.011). An increase of 1 benefit perception score increases the likelihood of a visit to the dentist every 6 months by 1.78.

d. Effect of Perception of Barriers on Oral Health Behavior

This study shows that there is a negative relationship regarding the perception of obstacles to dental and oral diseases from parents to efforts to maintain the dental and oral health of their children with special needs. Parents who have a high perception of barriers regarding dental and oral diseases will reduce efforts to maintain the dental and oral health of their children with special needs.

Previous systematic reviews have shown that the main barriers to dental services for people with disabilities include the reluctance of professionals to provide treatment, fear of dentists, high treatment costs, lack of access to dental clinics, and inadequate health services or dental facilities (Krishnan et al, 2020).

e. The Effect of Stimulus to Act on Oral Health Behavior

This study shows that there is a positive relationship regarding stimuli to act to maintain dental and oral health from parents to efforts to maintain dental and oral health of their children with special needs. Parents who have a high stimulus to act will increase efforts to maintain the health of the teeth and mouth of their children with special needs.

This is in line with research conducted by Ashoori et al. (2020) that stimulus to act shows a significant relationship with behavior to maintain dental health (r=0.26; p=0.010). Some steps that can encourage stimulus to act on how to brush and floss correctly include choosing the right toothbrush, floss, and toothpaste, increasing the variety of toothpaste flavors, and supporting children in preparing the right dental hygiene tools. In addition, providing healthy food and frequently reminding children to brush their teeth and floss by parents is also important, rather than emphasizing on the threat that may be felt.

Based on research conducted by Alalshaikh et al. (2022), the results were obtained that there was no difference in the behavior of caregivers of children with special needs in maintaining the health of their children's oral cavity between caregivers who had education below high school (29.6%), high school (36.0%), and college (34.4%). This shows that their knowledge and attitudes are not influenced by formal education, but by practices or other exposure to information sources, such as health awareness campaigns, lectures, the internet, or other sources.

f. The Effect of Self-Efficacy on Oral Health Behavior

This study shows that there is a positive relationship regarding self-efficacy to efforts to maintain dental and oral health from parents to their children with special needs. Parents who have high self-efficacy will increase efforts to maintain the health of their children's teeth and mouths with special needs.

The results of this study are in line with those conducted by Phanthavong, et al (2019) that the self-efficacy of parents or guardians in making children do toothbrushing activities twice a day is significantly related to their children's brushing behavior (OR: 2.14, 95% CI: 1.91 to 2.41; p=0.001). Mothers who have more knowledge about their children's oral hygiene, have self-efficacy, and brush their teeth have children who brush their teeth more often. Young children depend on their mothers to keep their teeth and mouth healthy. Limitations in maintaining dental and oral health are also often experienced by children with special needs so they also need special attention in maintaining oral hygiene and parental support (Adhi & Octavia, 2013). It is possible that interventions aimed at increasing self-efficacy of parents/guardians will be effective in increasing the frequency of brushing their children's teeth.

Perception of vulnerability, perception of severity, perception of benefits, stimulus to act and self-efficacy of parents improve oral health behavior of children with special needs. On the contrary, the perception of parental obstacles decreases the oral health behavior of children with special needs. Parents'

perception is an important determinant of the health of the oral cavity of children with special needs. Based on previous research, it has been shown that the oral health status of children with special needs is worse than that of normal children, and this needs to be taken seriously to fight for the right to health and welfare of children with special needs. Children with special needs need more help in doing day-to-day activities from their parents.

AUTHOR CONTRIBUTIONS

All authors contributed to data analysis and the preparation of the final manuscript.

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CONFLICTS OF INTEREST

There is no conflict of interest in this study.

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