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Parental Insight and Action: Exploring the Link Between Knowledge and Early Childhood Dental Caries Prevention

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ABSTRACT

Background: Dental caries is the most common dental and oral disease in early childhood, but it is preventable. Prevention can be achieved by modifying parents' beliefs, lifestyle, and daily habits. One effective approach to changing behaviors related to dental caries prevention is the Health Belief Model (HBM). This study aims to identify factors influencing dental caries prevention behaviors in early childhood, including perceptions of susceptability, seriousness, benefit, and barrier, as well as cues to action, and self-efficacy.

Subjects and Method: A cross-sectional study was conducted in Weru, Sukoharjo, Central Java, Indonesia. A sample of 111 parents who had children aged 6 to 8 years was selected using multistage cluster random sampling. The dependent variable was dental caries preventive behavior. The independent variables were perceived susceptability, seriousness, benefit, and barrier, cues to action, and self-efficacy. The data were collected using questionnaire and anayzed using a multiple linear regression..

Results: Perceived susceptibility (b= 0.16; 95%CI= 0.01 to 0.17; p=0.024), perceived seriousness (b= 0.16; 95% CI= 0.01 to 0.19; p=0.050), perceived benefit (b=0.173; CI 95%= 0.005 to 0.21; p= 0.040), cues to action (b=0.21; CI 95%= 0.01 to 0.27; p=0.036), and self-efficacy (b=0.19; CI 95%= 0.01 to 0.21; p=0.037) were positively associated with dental caries preventive behavior. However, perceived barrier was negatively associated with dental caries preventive behavior (b=0.15; CI 95%= 0.01 to 0.13; p=0.047).

Conclusion: Perceived susceptibility, seriousness, benefit, cues to action, and self-efficacy are positively associated with dental caries preventive behavior. Perceived barrier is negatively associated with dental caries preventive behavior.

Keywords: Health Belief Model, dental caries, parental knowledge, caries prevention behavior.

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BACKGROUND

Dental and oral health is important for general health and quality of life. Dental and oral health problems are one of the problems that are often suffered by the Indonesian people (Tarigan. 2014). The perception and behavior of the Indonesian people towards dental and oral health is still poor (Afiati et

al., 2017). Dental caries is one of the most common dental and oral diseases suffered by the community. According to the results of Basic Health Research (Riskesdas) in 2018, the problem of dental caries has more than doubled from 2013, namely 25.9% to 57.6%, with as many as 20 provinces in Indonesia having a prevalence of dental caries above the national figure (Ministry of Health of the Republic of Indonesia, 2018).

Dental and oral health is one of the important parts in determining the health status of children, especially in early childhood. The World Health Organization (WHO) states that the incidence of dental caries in children is 60%-90% (Ashoori et al., 2020). One of the factors that determines children's behavior in maintaining healthy teeth and mouth is the influence of their parents at home. The role and knowledge of parents in the prevention of children's dental caries is indispensable in guiding, understanding, reminding and providing facilities to children so that they can maintain dental and oral health (Mukhbitin, 2018). Parents' knowledge is influenced by several factors, including education level, socioeconomic factors, and environmental factors. The high level of parental knowledge can be interpreted as parents understand and understand the prevention of dental caries in children so that it has a positive impact on parents' actions in preventing dental caries in children (Nasaar et al., 2022).

Dental caries can be prevented, and one of the important things in preventing it is by modifying thoughts, lifestyles, and daily habits in such a way that it can improve the quality of life of individuals (Kidd and Bechal, 2016). In line with these goals, the factors that affect changes in caries prevention behavior need to be identified first, so that it can make change easier. Therefore, to find out the factors that influence dental caries prevention behavior in children, it is important to use a model that identifies the factors that influence behavior. One of the models that can be used to change dental caries prevention behavior is by using the Health Belief Model (HBM) (Jeihooni et al., 2015).

This study uses the application of the Health Belief Model (HBM) theory. The Health Belief Model (HBM) is a form of theoretical model that is used to encourage the public to take positive health actions, one of which is preventive measures for dental caries (Subaris, 2016). This theory states that individuals in taking preventive measures for disease or to behave healthily are influenced by the perception of vulnerability, the perception of seriousness, the perception of benefit, the perception of obstacles, the gestures of action and self-efficacy which can influence a person to be able to behave healthily. The Health Belief Model theory can be used to determine changes in children's dental and oral health behavior (Glanz et al., 2015).

The purpose of this study is to identify factors of vulnerability perception, seriousness perception, benefit perception, obstacle perception, action cues and parental self-efficacy towards dental caries prevention behavior in early childhood in Sukoharjo Regency.

SUBJECTS AND METHOD

1. Study Design

This was a cross-sectional study carried out at the Weru Health Center, Weru District, Sukoharjo, Central Java, Indonesia, from July 2023 to September 2023.

2. Population and Sample

The target population in this study is parents of elementary school children aged 6-8 years. The sample taken was parents of elementary school children aged 6-8 years in

Weru District, Sukoharjo Regency. Taken in Weru District because the highest number of dental cases in Sukoharjo Regency is in Weru District.The sampling technique was taken by the Multistage Cluster Random Sampling technique.

3. Study Variables

The dependent variable was dental caries preventive behavior. The independent variables were perceived vulnerability, seriousness, benefits, barrier, cues to action, and self-efficacy

4. Operational Definition of Variables

Behavior of dental caries prevention in children:A parental behavior to implement preventive actions to avoid dental caries in children, such as encouraging regular tooth brushing, limiting sugar intake, and attending routine dental check-ups. Data was collected using questionnaires with continuous scales.

Perceived vulnerability: A parent's perception of how susceptible their child is to developing dental caries. Data was collected using questionnaires with continuous scales.

Perceived seriousness: A parent's belief about the severity of dental caries and its potential consequences for their child's oral and general health. Data was collected using questionnaires with continuous scales.

Perceived benefits: A parent's belief in the advantages of taking preventive measures against dental caries in children. Data was collected using questionnaires with continuous scales.

Perceived barriers: A parent's perception of obstacles or hindrances that may prevent them from carrying out dental caries prevention practices for their child. Data was collected using questionnaires with continous scales.

Cues to action: External or internal triggers that motivate parents to take preventive measures against dental caries in their children, such as reminders from health workers, media, or previous experiences. Data was collected using questionnaires with continuous scales.

Parental self-efficacy: A parent's confidence in their ability to effectively perform behaviors necessary to prevent dental caries in their children. Data was collected using questionnaires with continuous scales.

5. Study Instruments

The research instrument used for data collection is using questionnaires.

6. Data analysis

The data from the questionnaire results that have been obtained are then analyzed using univariate and multivariate analysis of multiple linear regression methods with the help of the STATA 17 application. The data processed were personal data in the form of parents' employment, last education and family income, and questionnaire results in the form of perception of seriousness, perception of vulnerability, perception of obstacles, perception of benefits, cues of action, self-efficacy, and caries prevention behaviors in children.

7. Research Ethics

Research ethics issues including informed consent, anonymity, and confidentiality, are handled with care during the research process. The approval letter for the research ethics permit was obtained from the Health Research Ethics Commission of Dr. Moewardi Surakarta Hospital, Indonesia, No. 1,350/VII/HREC/2023, on July 17, 2023.

RESULTS

1. Sample Characteristics

Based on the results of a questionnaire from 111 samples, it is known that the age of the research respondents ranges from 26-49

years with an average age of 37.9 years. Based on the results of the questionnaire, it is also known that most of the research subjects are female, namely 69 respondents (62.16%). From 111 samples, it was known that the most parental jobs were working as housewives or not working, totaling 32 people (28.83%), the education level of parents was known to have the most last education level until high school or equivalent which amounted to 52 people (46.84%). The amount of income of parents. Parents in Sukoharjo Regency are also known to have mostly less than the UMR (58.56%).

Table 1. Characteristics of continuous data research

Variable	n	Mean	SD	Min.	Max.
Age (Years)	111	37.9	6.24	26	49
Perception of Vulnerability	111	12	3.10	6	19
Perception of Seriousness	111	13	2.90	6	19
Perception of Benefits	111	15	2.71	7	20
Perception of Obstacles	111	12.5	3.92	5	20
Action Signals	111	14.2	3.22	5	20
Self-Efficacy	111	13.6	3.02	5	20

Table 2. Characteristics of category data research

No	Characteristic	Category	N=111	%
1	Gender	Male	42	37.84
		Female	69	62.16
2	Occupation	Not working/housewife	32	28.83
		Farmer	9	8.11
		Labor	25	22.52
		Self employed	16	14.42
		Private employee	14	12.61
		Civil Servant	15	13.51
3	Education	PS & equivalent	13	11.71
		JHS & equivalent	20	18.02
		SHS & equivalent	52	46.84
		Higher Education	26	23.43
4	Income	Below minimum wage	65	58.56
		Higher than the minimum wage	46	41.44

2. Univariate analysis

Table 3 shows that 72 respondents have a high level of vulnerability perception (64.86%), 94 respondents have a high level of seriousness perception (84.68%), 103 respondents have a high level of benefit perception (92.79%), 91 respondents have a high level of action cues (81.98%), 89 respondents have high self-efficacy (80.18%) and 70 respondents have a low level of obstacle perception (63.06%). This shows that most respondents have high knowledge of dental and oral hygiene. Table

3 also shows that most of the respondents perceived that their children have good dental caries prevention behavior, which is as many as 69 respondents (62.16%).

Table 3. Variable frequency distribution (n=111)

Variable	Category	N=111	%
Perception of Vulnerability	High	72	64.86
	Low	39	35.14
Perception of Seriousness	High	94	84.68
	Low	17	15.32
Perception of Benefits	High	103	92.79
	Low	8	7.21
Perception of Obstacles	High	41	36.94
	Low	70	63.06
Action Signals	High	91	81.98
	Low	20	18.02
Self-Efficacy	High	89	80.18
	Low	22	19.82
Pediatric Caries Prevention Behavior	Good	69	62.16
	Poor	42	37.84

3. Multivariate analysis

This analysis uses the STATA 17 application. The presentation of data using multiple linear regression analysis aims to determine the linear relationship between two or more dependent variables and dependent variables and predict the value of the independent variable if the value of the independent variable increases or decreases and find out the direction of the relationship between the independent variable and the dependent variable whether each variable is positively or negatively related.

Table 4 reports the results of multiple linear regression analysis on the relationship of a number of constructs in the Health Belief Model (HBM) and dental caries prevention behavior in children. The results of the analysis support HBM's theory. There was a positive relationship between perception of vulnerability, perception of seriousness, perception of benefit, action cues, and parental self-efficacy on dental caries prevention behavior in children.

Each increase of 1 score of the variables of vulnerability perception, seriousness perception, benefit perception, action cues, and parental self-efficacy will be followed by an increase in the score of dental caries prevention behavior in children by 0.16 units in the vulnerability perception variable (b=0.16; p=0.024), 0.16 units in the seriousness perception variable (b=0.16; p= 0.050), 0.17 units in the benefit perception variable (b=0.173; p=0.040), 0.21 units in the action signal variable (b=0.21; p= 0.036), and 0.19 units in the self-efficacy variable (b=0.19; p=0.037).

Table 4 also shows that there is a negative relationship between the perception of parental barriers to dental caries prevention behavior in children. Every 1 increase in the barrier perception score will be followed by a decrease in the dental caries prevention behavior score in children by 0.15 units (b=0.15; p=0.047).

Table 4 shows that the variables included in this linear regression model are able to explain the variation of the dependent variable (dental caries prevention behavior in children) by 64% (Adjusted R2 = 64.04%).

Table 4. The effect of vulnerability perception, seriousness perception, benefit perception, obstacle perception, action cues, and parental self-efficacy on children's dental caries prevention behavior

Independent Variables	b	CI 95%		β	p
		Upper Limit	Lower Limit		
Constanta	-3.08	-4.28	-1.88		
Perceived vulnerability	0.09	0.01	0.17	0.16	0.024
Perceived seriousness	0.09	0.001	0.19	0.16	0.050
Perceived benefit	0.11	0.005	0.21	0.17	0.040
Perceived barrier	-0.06	-0.13	-0.01	-0.15	0.047
Cues to action	0.11	0.01	0.27	0.21	0.036
Self-efficacy	0.11	0.01	0.21	0.19	0.037
N Observation = 111 Adjusted R^2 = 64.04% $p < 0.001$					

DISCUSSION

The results of the study showed that the level of parental knowledge had a positive effect on dental caries prevention behavior in children, so that parents with high knowledge could influence their children to behave well in preventing dental caries. The role of parents plays an important role in educating and fostering children in maintaining their dental health. A person who has a high level of knowledge will influence his child to behave in a good healthy life (Sujlana and Pannu, 2015).

The results showed that 64.86% of respondents had a high perception of vulnerability and 35.14% of respondents had a low perception of vulnerability. The multivariate analysis in Table 4 also showed a positive relationship between the perception of vulnerability to dental caries prevention behavior in children. Respondents who had a high perception of vulnerability tended to have better dental caries prevention behaviors, thus encouraging their children to behave better to maintain their dental health. In accordance with the concept of the Health Belief Model, the perceived perception of vulnerability can change behavior to be more effective. Respondents who have a high perception of vulnerability feel that they are vulnerable to dental caries, so they will be more active and effective in carrying out behaviors to prevent dental caries (Setari and Sulistiyowati, 2017).

The results showed that 84.68% of respondents had a high perception of seriousness and 15.32% of respondents had a low perception of seriousness. The multivariate analysis in Table 4 also showed a positive relationship between the perception of seriousness towards dental caries prevention behavior in children. Respondents who have a high perception of seriousness feel that dental caries is a serious matter and are more likely to carry out correct dental caries prevention behaviors such as routinely brushing their teeth and frequent control to the dentist, thus encouraging their children to behave better to maintain their dental health. Behaviors carried out by parents will usually be applied to their children as well. Meanwhile, respondents who felt that dental caries was not a serious thing felt that going to the dentist would only be done when the child felt toothache (Wilson et al., 2017).

The results showed that 92.79% of respondents had a high perception of benefits and 7.21% of respondents had a perception of low benefits. The multivariate analysis in Table 4 also showed a positive relationship between the perception of benefits and the behavior of preventing dental caries in

children. Respondents who have a high perception of benefits tend to have better dental caries prevention behaviors, thus encouraging their children to behave better to maintain their dental health. Benefit perception is a construction of the Health Belief Model theory which refers to a person's belief in the benefits of conscious behavior to reduce the risk of a disease. A person who has a high perception of benefits better understands the benefits felt by the individual after performing dental and oral health measures so that the individual can avoid the risk of dental and oral health problems (Mohammadkhah et al., 2022).

The results showed that 36.94% of respondents had a high perceived barrier and 63.06% of respondents had a perception of low barriers. The multivariate analysis in Table 4 also showed a negative relationship between the perception of barriers to dental caries prevention behavior in children. Respondents who had a low perception of resistance were more likely to carry out better dental caries prevention behaviors, thus encouraging their children to avoid bad behaviors that can damage their dental and oral health, so that they could further encourage their children to behave better to maintain their dental health. A person may not take an action despite knowing the benefits because of obstacles such as high cost, remote location, troublesome, unpleasant and painful. If not, then individuals with low barriers may not take health measures because they do not feel the seriousness of the disease they feel, as well as the individual's lack of intention and motivation (Abreu et al., 2021). The results showed that 81.98% of respondents had high action cues and 18.02% of respondents had low action cues. The multivariate analysis in Table 4 also showed a positive relationship between action cues and dental caries prevention behavior in children. Signals to act are necessary by the individual before he or she performs an action, either from external factors such as the support role of family or friends, or internal factors such as the individual's own illness. Action cues are needed for a person to take health measures. It relates to an individual's perception of vulnerability, seriousness, benefits, and barriers. Individuals with strong motivation to take action are more likely to be aware of the importance of maintaining dental and oral health and are more likely to encourage their children to adopt similar behaviors for good dental and oral health (Attamimy and Qomaruddin, 2018).

The results indicated that 80.18% of respondents had high self-efficacy, while 19.82% had low self-efficacy. Multivariate analysis revealed a positive relationship between self-efficacy and dental caries prevention behavior in children. Respondents with high self-efficacy were more likely to engage in better dental caries prevention behaviors, thus encouraging their children to adopt healthier dental habits. Self-efficacy reflects an individual's belief in their own ability to perform a task. Those with high self-efficacy feel confident in their ability to improve their behavior, whereas individuals with low self-efficacy may perceive themselves as unsuccessful or incapable of making improvements (Feriyan and Ifroh, 2020).

The results showed that the influence of parental knowledge on children's dental caries prevention behavior was 64.04% while 35.96% was influenced by other variables. Other variables that affect children's dental caries prevention behavior include the age of the parents, the level of education of the parents, and the economic degree of the parents (Xu et al., 2018). Parents who have a higher level of education usually have children with good dental caries prevention behaviors. Various studies state that when a

person has a higher level of education, attention to dental health will be higher, and vice versa, when a person has a lower level of education, then attention and dental care are also low (Cianetti et al., 2017). Economic degrees affect the ability of families to meet their food intake needs and healthy lifestyle habits. Parents with low economic degrees tend to find it more difficult to improve their knowledge, so they tend to be indifferent in paying attention to their children's dental and oral health (Nota et al., 2019).

AUTHOR CONTRIBUTION

All authors have made significant contributions to data analysis as well as preparing the final manuscript.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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