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Impact of Family Support on Oral Health and Dental Caries Among Type 2 Diabetes Mellitus Patients in Pakong Community Health Center

Siti Fitria Ulfah, Izzatun Nuriy Taufik, Bambang Hadi Sugito, and Imam Sarwo Edi

Department of Dental Health, Poltekkes Kemenkes Surabaya, Indonesia

Corresponding author: Izzatun Nuriy Taufik (e-mail: izzatunnuriytaufik@gmail.com)

ABSTRACT Diabetes mellitus causes manifestations in the oral cavity which are usually called oral diabetes which include dental caries, dry mouth, gums that bleed easily (gingivitis), tartar, alveolar bone resorption, and periodontitis. Dental caries is the most common complication in people with diabetes mellitus type 2 with a high prevalence rate of up to 55%. It was found that on average patients suffering from diabetes mellitus type 2 at the Pakong Community Health Center, Pamekasan Regency experienced dental caries of 4.6, which is included in the high category. The problem of dental caries in patients suffering from diabetes mellitus type 2 is still high, and family support in efforts to maintain dental and oral health is still lacking. The aim of this research is to determine the relationship between family support in maintaining oral health and dental caries in patients suffering from diabetes mellitus type 2. This type of research is a cross-sectional correlation analytical research by means of examination and filling out questionnaires. The respondents in this study were 56 patients suffering from diabetes mellitus type 2 using the Slovin formula and using a purposive sampling technique. The data analysis technique uses the chi-square test. This research shows that there is a significant relationship between family support in maintaining oral health and dental caries in patients suffering from diabetes mellitus type 2 at the Pakong health center, Pamekasan district.

INDEX TERMS Family support, Diabetes mellitus type 2, Dental caries

I. INTRODUCTION

Indonesia is ranked seventh for the highest prevalence of diabetes sufferers in the world along with China, India, the United States, Brazil, Russia and Mexico with an estimated number of people with diabetes of 10 million. Diabetes mellitus (DM) is a chronic disease that is a challenge in the world of health in line with health transformation. Diabetes mellitus is a non-communicable disease (NCD) that causes 1.6 million deaths worldwide [1]. The results of the 2018 Basic Health Research (Riskesdas) show an increase in the number of non-communicable diseases. Diabetes mellitus (DM) is a metabolic disorder with hyperglycemia (high glucose levels in the blood) due to insulin deficiency, insulin resistance or both [2].

Health services for diabetes mellitus sufferers at FKTP in 38 districts/cities throughout East Java have reached 842,004 cases (97.5% of the estimated existing DM sufferers). Pamekasan Regency is ranked 10th among the districts/cities with the highest cases of diabetes mellitus type 2 in East Java. In the Pakong sub-district health center, diabetes mellitus cases reached 54% according to data from the Disease Prevention and Control Sector.

Public knowledge about maintaining dental and oral health is still limited. It is possible that if you do not have knowledge about maintaining proper dental and oral health, you will not understand how to care for your dental and oral health properly, this can result in a high index of dental caries in people with diabetes mellitus type 2. Uncontrolled diabetes causes a decrease in saliva flow, so the mouth feels dry. Saliva has a self cleansing effect, functions as a rinse for food debris and dirt from the mouth, so that if saliva flow decreases it causes discomfort, is more susceptible to ulceration (wounds), dental caries, and can become a fertile field for bacteria. to grow and develop.

Diabetes mellitus causes manifestations in the oral cavity which are usually called oral diabetes which include dental caries, dry mouth, gums that bleed easily (gingivitis), tartar, alveolar bone resorption, and periodontitis. According to the 2018 Basic Health Research, 57.6% of the Indonesian population has problems with their teeth and mouth. Where 10.2% received care and treatment by dental medical personnel, while the other 89.2% did not receive treatment [4]. Dental caries is the most common complication in diabetes

mellitus sufferers with a high prevalence rate of up to 55% [5]. Oral health in people suffering from diabetes is very important but often goes unnoticed. High levels of sugar in the blood can cause several problems in the oral cavity. Vice versa, oral health problems can affect the condition of diabetes. Most diabetes sufferers don't know this so they don't feel they need dental care and pay more attention to their general health.

The results of Riskesdas show that the prevalence of dental caries in Indonesia has also reached 88.8% with an average DMF-T index of 7.1, which is in the very high category [4]. The DMF-T score is adjusted to the caries index criteria according to WHO, namely very low (0.0-1.1), low (1.2-2.6), moderate (2.7-4.4), high (4.5-6.5) and very high (≥ 6.6). Based on the results of an initial survey conducted on October 22 2023 on patients suffering from diabetes mellitus who visited the Pakong Community Health Center, Pamekasan Regency with a total of 10 people, it was found that the caries index or DMF-T was 4.6. Based on the background above, the problem in this research is the high level of dental caries in patients suffering from diabetes mellitus at the Pakong health center, Pamekasan district.

Friedman said that family support includes emotional support, assessment support, informative support, and instrumental support. Encourage patients suffering from diabetes mellitus to have their dental health checked by health services, provide time to accompany them to check their dental health, provide funds and help to find information about dental health and the condition of the oral cavity which usually occurs in patients with diabetes mellitus, including family support. If support from the family is very important in maintaining dental and oral health, such as helping, giving an example, and facilitating in maintaining oral health and hygiene, this will help to support diabetes mellitus sufferers in having good dental and oral health.

Family support can encourage families to function optimally and increase adaptation to family health [7]. Study [8] explained that family support for patients suffering from diabetes mellitus is still very lacking in maintaining the health of their teeth and mouth, even though support from the family is very important to maintain the health of the teeth and mouth of diabetes mellitus sufferers. Family education and knowledge do not guarantee daily behavior to care for their dental and oral health [9]. Dental disease is still often ignored by many people, they consider tooth decay to be a normal thing, which causes activities to maintain dental and oral health to be less than optimal. Support from the family is very necessary in guiding, providing understanding, reminding and providing facilities to patients suffering from diabetes mellitus so that they can maintain healthy teeth and mouth. Apart from that, the family also has a large role in preventing caries in patients with diabetes mellitus [10].

So, this study aims to determine the relationship between family support in maintaining oral health and dental caries in

patients suffering from diabetes mellitus type 2 at the Pakong Pamekasan health center.

II. METHODS

This research was conducted at the Pakong Community Health Center, Pamekasan Regency, which was held from January to February 2024. This type of research is correlation analytical research. Correlation analytical research is looking for relationships between variables and analyzing the data that has been collected. This research was conducted using a cross sectional approach. The population in this study were 65 patients suffering from diabetes mellitus type 2 at the Pakong Pamekasan health center, the sample in this study were all 56 patients suffering from diabetes mellitus type 2 at the Pakong Pamekasan health center, Pamekasan Regency. The number of repetitions carried out in this study used the Slovin formula. The data collection method to determine family support in maintaining dental and oral health is by filling out a questionnaire. The data collection method to determine DMF-T (number of teeth with caries) is by carrying out an examination using an examination sheet. Visiting patients suffering from diabetes mellitus type 2 at the Pakong Community Health Center, Pamekasan Regency, respondents filled out informed consent followed by giving a questionnaire sheet to patients suffering from diabetes mellitus type 2 and providing an explanation in filling out the questionnaire. After the questionnaire sheet has been filled in, it is then taken back. After that, carry out dental examinations on patients suffering from diabetes mellitus type 2 and record the results of the examination on the examination sheet that has been made. The analysis technique used in this research is analysis of relationship test data in this research using the Chi square statistical test.

III. RESULT

Based on the data presented in [TABLE 1](#), it can be concluded that the majority of respondents in this study were mostly aged between 41-45 years, namely 60.7%, 34 people. Gender characteristics can be seen that the majority of respondents were female at 57.1% with 32 people. Educational characteristics show the results that the highest level of education of respondents is high school, namely 62.5%, 35 people. The results of the job characteristics show that it can be seen that the majority of respondents' job levels are housewives, namely 42.8%, 24 people. Characteristics of dental caries in patients with diabetes mellitus type 2. The results showed that the majority of diabetes mellitus type 2 patients at the Pakong Community Health Center, Pamekasan Regency experienced dental caries in the high category, 46.4%, 26 people. Based on [TABLE 2](#) For the length of time they have had DM, most of the subjects had a high caries index category with the number of sufferers being 37 people with DM for 2 years. Analysis of the Relationship between Family Support in Maintaining Dental and Oral Health with Dental

Caries in Patients Suffering from Type 2 Diabetes Mellitus at the Pakong Community Health Center, Pamekasan Regency, 2024 is known that the p value is $0.033 < \alpha (0.05)$, so it can be concluded that there is a relationship between family support in maintaining oral health and dental caries in patients suffering from diabetes mellitus type 2 at the Pakong health center, Pamekasan district. So H_1 is accepted while H_0 is rejected.

TABLE 1
Respondent Characteristics

Characteristics	Frequency	Percentage
Age		
35-40 years old	6	10.7 %
41-45 years old	34	60.7 %
46-50 years old	16	28.6 %
Gender		
Man	24	42.9 %
Woman	32	57.1 %
Education		
Elementary School	4	7.1 %
Junior High School	12	21.4 %
Senior High School	35	62.5 %
SI	5	8.9 %
Work		
IRT	24	42.9 %
Self-employed	16	28.6 %
Private employees	10	17.9 %
Civil servants	6	10.7 %
Dental caries		
Very Low 0.0-1.1	0	0 %
Low 1.2-2.6	10	17.9 %
Medium 2.7-4.4	18	32.1 %
Height 4.5-6.5	26	46.4 %
Very High ≥ 6.6	2	3.6 %

TABLE 2

Distribution : Distribution of the caries index (DMF-T) based on the length of time you have had DM

Length of DM (Years)	DMF-T Caries Index					Total
	Very low	Low	Current ly	Tall	Very high	
<2	0	4	7	8	0	19
≥ 2	0	6	11	18	2	37
Total	0	10	18	26	2	56

IV. DISCUSSION

The support provided by the family makes family members able to care for themselves with various intelligence and resourcefulness. This family support is also a form of assistance provided by family members which can provide physical and psychological comfort to individuals who are facing stressful situations. The family support process occurs throughout the life span, with the nature and type of support varying in each stage of the family life cycle.

Family support in maintaining dental and oral health with dental caries in patients with diabetes mellitus type 2 at the Pakong Community Health Center, Pamekasan Regency, results were lacking because most families rarely get used to

consuming foods that are healthy for their teeth, namely fibrous and watery foods, families also often do not listen to patients' complaints. when you have a toothache. The results of this study are also supported by research which states that family support is still very minimal given to diabetes mellitus sufferers.

Other research also states that families are indifferent to the condition of diabetes mellitus sufferers, even though family support is very important because it is a form of interpersonal relationship which includes attitudes, actions and acceptance of family members, in the form of informational support, instrumental support, emotional support and internal support. form of appreciation [8].

The results of this research also show that many families rarely provide special time for patients to undergo dental care/treatment. Families also rarely provide information about dental and oral health due to the family's lack of knowledge. This is in line with research conducted by which states that family support in fulfilling personal hygiene has less support which can have an effect on the patient's personal hygiene which is characterized by families who never wait for the patient at home or are busy with daily activities, families who pay little attention to the patient's condition, families who are lacking in knowledge about personal hygiene or self and family care that is less friendly in helping patients in meeting patient needs.

Other research also states that if there is support from the family, self-confidence will increase and motivation to face problems that occur will increase, therefore family support must be increased to support the welfare of patients, especially those who are very dependent on other people in fulfilling personal hygiene [14].

Other research also states that if family support is good then it includes a form of assistance provided by family members to provide physical and psychological comfort when someone experiences illness. The family has a very important role in the survival of diabetes mellitus sufferers. Family support includes all forms of positive behavior and attitudes provided by the family to a family member who is sick or experiencing health problems. The DM disease suffered and the treatment undertaken can affect the social health and well-being of DM sufferers, as well as the functional capacity, psychological, social health and well-being of sufferers of the disease which is defined as quality of life [16].

Poor family support is also due to lack of communication with family, and lack of socializing with family so that respondents lack information and motivation and lack of good support from family in providing attention and information, so that the quality of life for diabetes mellitus becomes worse [17].

The results of this study also showed high dental caries results in patients suffering from diabetes mellitus type 2, supported by research which states that caries is an infection of hard tooth tissue (enamel and dentin) which has a high

prevalence in society. Caries is evidence that the condition of Indonesian people's teeth and mouths are not well maintained. One of the causes of dental caries is food residue that sticks to the surface of the teeth, one of which is brushing your teeth with the correct technique and at the right time [18]. However, brushing teeth using the correct technique and at the right time is often ignored by people, so that food residue in the oral cavity is not removed properly. Other research also states that uncontrolled chronic diabetes mellitus affects the formation of dental caries because glucose levels in gingival crevicular fluid (GCF) are higher compared to people with controlled diabetes mellitus or non-diabetes mellitus [19].

This research is also in line with research which shows that the majority of diabetes mellitus sufferers experience dental caries. This shows that dental hygiene is not in good condition. Dental caries is formed due to food and drink still sticking to the teeth and not brushing the teeth thoroughly. Caries occurs due to several things, namely lack of oral and dental hygiene, improper way of brushing teeth and using toothpaste as well as habits when brushing teeth that are not as recommended [8].

Other research also states that the high incidence of caries in people with DM is due to an inability to control blood glucose which results in high levels of glucose in saliva, especially people with DM who rarely or never go to the dentist to clean debris or food remains stuck to the surface of their teeth. The food remains that stick to it then mix with bacteria in the oral cavity, especially streptococcus, which causes thick plaque to form. Debris that has been mixed with bacteria and causes plaque will reduce the pH of saliva. The results of this study are also supported by research who found a significant relationship between DM and caries in terms of the length of time they had DM. A person with long-term diabetes has a greater chance of experiencing tooth decay due to increased glucose levels in saliva. The glucose in saliva will be metabolized by bacteria in the oral cavity which produces acid and lowers the pH of the saliva. If the pH of saliva becomes acidic, there will be an increase in the number of streptococcus bacteria in the oral cavity. These bacteria then produce substances that will speed up the enamel demineralization process which results in caries on the teeth.

According to Lawrence Green's theory, a person's behavior is influenced by three factors, namely predisposing factors consisting of knowledge and attitudes. Driving factors (reinforcing factors) contain the role of teachers, health workers and family support, and supporting factors (enabling factors) contain facilities and infrastructure. These three factors influence each other so that they encourage or strengthen behavior. Many factors cause the high incidence of dental caries, other factors such as knowledge, attitudes and facilities are possible causes of dental caries [23].

A good habit of brushing your teeth is in the morning after breakfast and before going to bed at night. This is in accordance with what is explained about brushing your teeth properly, namely at least twice a day, every morning after

breakfast and at night before bed. This aims to clean food residue left on the teeth and gums. Teeth brushing behavior can reduce the occurrence of dental diseases such as caries and periodontal tissue. The acid formed from this metabolism can damage teeth. This acid will be retained by the plaque on the enamel surface and result in a decrease in the pH in the plaque. Plaque will remain acidic for some time and it takes 30 to 60 minutes to return to normal pH. If a person frequently and continuously consumes sugar, the pH will remain below normal pH and result in demineralization of the vulnerable enamel surface, namely the dissolution of calcium which causes enamel damage resulting in caries.

The importance of family support in helping maintain healthy teeth and mouth to reduce the occurrence of caries is intended so that respondents are able and able to maintain good dental and oral health. Family support, in the form of guidance and supervision, will be able to motivate patients suffering from diabetes mellitus. This support is also a supporting factor in the success of the respondent's health so that their teeth and mouth remain healthy [24]. Other research also states that diabetes mellitus is a chronic disease or is a lifelong disease for sufferers, therefore the management of this disease does not only rely on medical support but the support of other parties, especially family support, is very necessary. Forms or aspects of family support that can be provided include support that involves physical strength and the desire to trust other people.

V. CONCLUSION

Family support in maintaining dental and oral health with caries in patients suffering from diabetes mellitus type 2 at the Pakong Community Health Center, Pamekasan Regency is in the poor category. Dental caries in patients with diabetes mellitus type 2 at Pakong Health Center, Pamekasan Regency is in the high category. Family support in maintaining oral health has been shown to be significantly related to dental caries in patients with diabetes mellitus type 2 (study at the Pakong Community Health Center, Pamekasan Regency).

Puskesmas officers can improve the level of dental and oral health, through additional lessons about dental and oral health, then they can hold patient family meetings and explain the importance of maintaining healthy teeth and mouth and carry out toothbrushing activities together at least once a week. Families must also take part in educational programs about dental and oral health. The family also always gives sufferers the opportunity to communicate and listen to the complaints of DM sufferers so that they can provide appropriate treatment.

People, especially people with DM type 2, should always keep their sugar levels normal so that complications do not occur that increase problems in the oral cavity. Patients suffering from DM should also diligently spend time doing physical activity both inside and outside the home so that they can reduce blood sugar levels.

Treatment in cases of dental caries needs to be very careful and precise. Treatment of dental caries has shifted from surgery and restoration to effort caries prevention. The most common way to remove dental caries is by carrying out restoration or filling.

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