



DETERMINATION OF INTERNAL AND EXTERNAL FACTORS CAUSE PULP TISSUE DISEASES

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Abstract

Factors of the oral cavity (internal) and external factors play an important role in health status of the teeth and mouth. This study was aimed to determine the causes of internal and external diseases of the pulp tissue in the North Karangasem village of Batang regency. This case study was carried out by survey methods. The independent variables were internal factors (plaques, saliva hydration, viscosity, and pH) and external factors (behavioral, health services, and genetics). The dependent variable was pulp tissue disease (pulpitis, pulp gangrene, and gangrene radix). Plaque index was measured by PHP-M, while saliva hydration, saliva viscosity, and saliva pH were measured using GC Dental Saliva Indicator guide. External factors was assessed using a close questionnaire to 99 respondents observed by purposive randomly sampling with slovin formula. The results showed that the pulp tissue disease was caused by internal factor was saliva pH (44%) and saliva viscosity (64%), while external factors were behavioral (64%) namely incorrect brushing time (54%), snacking habits of sticky sweet (70%), and snacking frequency more than 3 times a day (50%). This study concluded that major cause of pulp tissue disease in North Karangasem village communities of Batang regency was saliva pH and behavior.

FAKTOR INTERNAL DAN EKTERNAL YANG BERHUBUNGAN DENGAN PENYAKIT RONGGA MULUT

Abstrak

Faktor dari dalam rongga mulut (internal) maupun faktor dari luar (eksternal) memegang peranan yang penting dalam mempengaruhi status kesehatan gigi dan mulut. Tujuan penelitian ini adalah untuk mengetahui determinasi faktor internal dan eksternal penyebab penyakit jaringan pulpa pada masyarakat di Kelurahan Karangasem Utara Kabupaten Batang. Jenis penelitian ini adalah survey diskriptif dengan metode yang digunakan adalah *case study*. Faktor internal yang diamati adalah plak indeks, hidrasi saliva, viskositas saliva dan pH saliva. Faktor eksternal, meliputi lingkungan, perilaku, pelayanan kesehatan, dan keturunan. Cara mengukur plak indeks menggunakan metode PHP-M. Pengukuran hidrasi saliva, viskositas saliva, dan pH saliva menggunakan panduan GC *Dental Saliva Indicator*. Penilaian faktor eksternal menggunakan kuesioner. Pengambilan sampel menggunakan teknik *purposive random sampling*. Jumlah sampel sebanyak 99 responden usia 15-44 tahun. Hasil penelitian menunjukkan bahwa penyakit jaringan pulpa yang disebabkan oleh faktor internal adalah pH saliva (44%) dan viskositas saliva (64%). Faktor eksternal adalah perilaku (64%) akibat waktu menyikat gigi yang salah (54%) dan kebiasaan ngemil dalam memilih jenis makanan manis melekat (70%) dan frekuensi ngemil > 3x sehari (50%). Kesimpulan penelitian ini adalah aktor penyebab utama penyakit jaringan pulpa pada masyarakat di Kelurahan Karangasem Utara kabupaten Batang adalah pH saliva dan perilaku masyarakat.

Introductions

Health development is an integral part of national development in Indonesia, including dental health which should not be abandoned due to the impact of oral health on overall health. In this modern era, several studies conducted in many countries revealed a trend of increasing number of teeth affected by caries (Garcia-Godoy and Hicks, 2008).

Household Health Survey (Survei Kesehatan Rumah Tangga; SKRT) conducted by the Ministry of Health in 2004 found that the prevalence of dental caries in Indonesia reached 90.05% (Depkes, 2004). Health Research (Riskesdas) in 2007, also found that the prevalence of caries active in Indonesia's population reached 46.5%, where the prevalence of caries experience reached 72.1% (Depkes, 2007). Central Java was third ranked of six regions the most active caries in Java, being reached 43.1% while caries experience was 67.9%.

Caries is a disease of dental hard tissues (enamel and dentine) caused by microbial activity started by demineralization of dental hard tissue and followed by destruction of organic material lead to the pulp disease and resulting in the death of pulp (Pradhan, 2013). If this condition continuously occurred, it may allow for swelling of the root's tip contained bacteria and pus, and will be carried over into other parts of the body through blood vessels.

Caries is caused by some factors such as dietary factors, the host (tooth), bacteria and time (Abou El-Yazeed, 2009). In addition to the above causes, according to Blum in Saputra (2013), the status of health is influenced by behavior, environment, health care, and genetics factors. Of the four factors which interacts each other, the behavior factor plays an important role in influencing the health status of mouth and teeth. Modernization change the lifestyle of the people to be very practical, such as demanding soft meal which easy being eat, chewed and fast. As a result, the use of stomatognathic system components decreased as well as saliva secretion reduced and resulting in the declining of oral hygiene system. The eating habits have evolved and tend to being established from generation to generation through the process of socialization (Kent, 2005).

Previous study on the state of dental and oral diseases in patients come to Batang II Public Health Centers observed the highest rank was the pulp and periapical tissues diseases (63.5%). From this percentage, 49% of patients with pulp and tissue diseases found in North Karangasem village and 52% was in 15-44 year age group. The high percentage of pulp disease considered that the causes of the pulp disease should be studied. Therefore, the purpose of this study was to determine the cause of internal and external diseases of the pulp tissue in the North Karangasem village of Batang regency.

Methods

This research was case study which carried out with survey methods combined with cross sectional design. The independent variables in this study was internal factors include plaques, hydration saliva, saliva viscosity, and pH of saliva, while external factors were behavioral, health services, and genetics. The dependent variable was the pulp tissue disease (pulpitis, pulp gangrene, and gangrene radix).

Plaque index was measured by Personal Hygiene Performance-Modified (PHP-M) method from Marters and Meskins 1972, while saliva hydration, saliva viscosity, and pH of saliva were measured using GC Dental Saliva Indicator guide.

Assessment of external factors was obtained using a close questionnaire (yes and no answers) where the correct answers were scored 1 and incorrect answers were scored 0. The questionnaire was tested the validity and reliability prior to using. The results of questionnaire were grouped into good ($> + 1SD$), moderate (between $- 1SD$ to $+ 1SD$), and poor ($< - 1SD$). The pulp diseases were classified as pulpitis (advanced pulp inflammation, where bacteria have undermined the pulp tissue), gangrene pulp / GP (death of the tooth pulp which the tooth still crowned), gangrene radix / GR (death of the pulp in the root canal, which the tooth usually was uncrowned).

This study was done on the population (9477 people) of North Karangasem village community aged 15-44 years old in Batang regency. The sample was purposive randomly sampled with Slovin formula, and found 99

respondents. North Karangasem village has 17 hamlets, therefore proportionally was taken 6 respondents for 14 hamlets and 5 respondents for the rest 3 hamlets, respectively.

Data was analysed descriptive quantitatively, and USG (Urgency, Seriousness, Growth) method was used to determine the priority factors causing the pulp tissue disease.

Results and Discussion

The grouping the causing in pulp tissue disease in North Karangasem village, of Batang regency are presented in Table 1.

Table 1. Age and Pulp Tissue Disease Categorization

Age (year)	pulp tissue disease			Total
	Pulpitis	Pulp Gangrene	Radix Gangrene	
15-17	2 (66.6%)	1 (33.3%)	0	3
18-34	16 (13.91)	54 (46.95)	45 (3.13%)	115
35-44	3 (3.125%)	34 (35.41%)	59 (61.45%)	96
Total	21	89	104	214

Source : primary data

The study of internal factors on the pulp tissue disease caused by plaque, saliva hydration, viscosity of saliva and saliva pH are shown in Table 2.

Table 1 and 2 showed that the pulp tissue disease was getting worse when the age was getting older. The first cause was saliva viscosity which categorised in medium. This medium viscosity of saliva was considered to lead to reduce the self-cleansing ability of saliva on oral cavity. The second cause was the low salivary pH or in acidic condition that may lead to the tooth demineralization and in turn the pulp tissue disease.

Figure 1 shows that most respondents were categorised in fair, with behavioral and heredity factors were lower than the environmental and health care factors.

The priority problem of cause pulp tissue disease was determined using the USG method, and it can be sorted as follows. a) Behavior. This included false teeth brushing time and snacking habits, b) Salivary pH. The results showed 44% of salivary pH was acid , c) Salivary viscosity. 64% of respondents has a

Table 2. Results of Plaque Index, Saliva Hydration, Saliva Viscosity and Saliva pH Examinations

Score	Criteria	Total	Percentage
plaque index			
0	Very Good	1	1
0.1 – 1.7	Good	51	52
1.8 – 3.4	Moderate	41	41
3.5 – 5.0	Poor	6	6
Total		99	100
saliva hydration			
< 30 second	High	27	27
30 – 60 second	Normal	61	62
> 60 second	Low	11	11
Total		99	100
saliva viscosity			
Clear, aqueous, non-foaming	Normal	21	21
white, foamy	Moderate	63	64
sticky, white, and foamy	Poor	15	15
Total		99	100
pH of saliva			
5.0 – 5.8	Acid	44	44
6.0 – 6.6	Neutral	35	36
6.8 – 7.8	Alkalic	20	20
Total		99	100

Source : primary data

problem on viscosity, d) Environment, including a education level, no permanent jobs, insufficient income, inavailable dental clinic around work place, well-water for daily consuming, e) Health care, including lack of dental health education, h) Hydration of saliva, plaque index, and genetics.

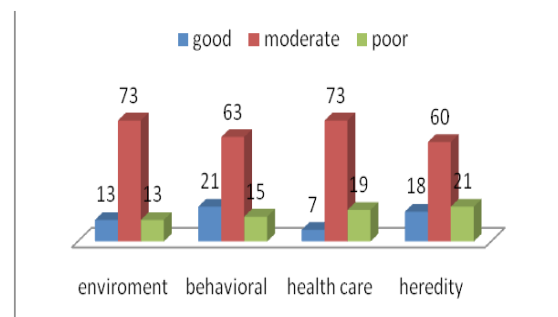


Figure 1. External Factors that Related with Pulp Tissue Disease

Source : primary data

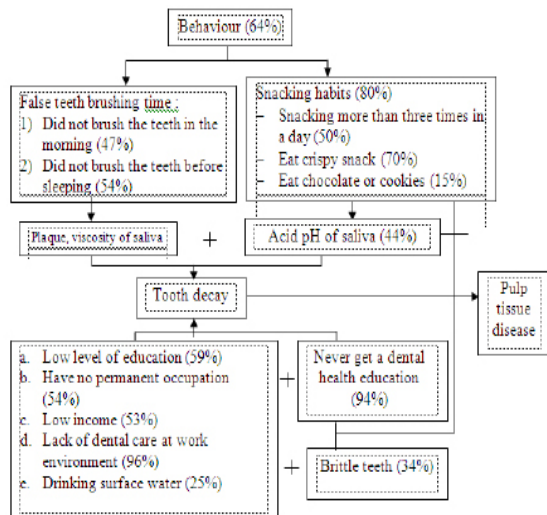


Figure 2. Factors Caused Pulp Tissue Disease

Figure 2 shows that people’s behavior in maintaining oral hygiene was poor. They tend to brush the teeth not in the time after breakfast, or at night before bed. Thus, this resulting in a residual food in the mouth which unfortunately cannot be cleaned because of low self-cleansing in oral cavity due to the high salivary viscosity, and in turn it lead to become plaque. Plaque contains bacteria. Bacteria will convert carbohydrates into glucose and acid through the fermentation process, so that the teeth is the place for adhesion plaque which causing caries (Pradhan, 2013). Moreover, snacking habits with the sticky kind of food and in often frequencies result in in the changes of salivary pH in the oral cavity. Salivary pH is always influenced by some changes on the day and night live rythm, diets, and secretion rate (Dawes, 2003; Anderson, 2007). Diets rich in carbohydrates could increase the production of acid by oral bacteria. The acid will damage tooth enamel through demineralization process and forming dental caries (Stookey, 2008; Jawed, 2012).

Blum theory stated that there were four factors interrelated and influenced each other Bad tooth conditions (tooth cavities) supported by no permanent jobs, less income, and inavailable dental services in the working place, lead the people to take the priority on fulfilling the needs for daily live than to keeping health (Borges, 2012). Low education level make the public into perception that dental observation is not required, and in turn ignoring in oral

health. Then, when the fragile condition of tooth was occurred, together with the lack of health workers in providing counseling, this will result in continuous process of dental caries to achieve the pulp tissue. Suhat and Hasanah (2014), said that the low education, work odd jobs, income is not fixed causes people are more concerned with day-to-day needs. Increased knowledge of public can be done by providing counseling by health personnel.

Alternative solutions to that problem is by doing counseling to increase the knowledge about oral health (Borges, 2012). The preventive action could be done by controlling to consume the diet or foods containing fluorine, reducing the consumption of foods that are sweet and sticky, increase the consumption of foods that fibrous and watery. Control the plaque by brushing the teeth at the right time and right way, at least two times a day in the morning after breakfast and the night before sleep.

Conclusion

The main factors on pulp tissue disease in North Karangasem village, Batang regency was the pH of saliva and the community behavior.

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