

# Correlation between dental anxiety and salivary pH prior to the tooth extraction

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## ABSTRACT

**Introduction:** Dental anxiety can be one of inhibiting faktor in dental care that must be immediately detected and handled by dentists. Dental anxiety can cause physiological changes such as reduced salivary secretion that can cause reduced salivary pH. The aim for this study is to find correlation between dental anxiety and salivary pH, so that salivary pH can be one of indicator of dental axiety. **Methods:** This descriptive analytic study used consecutive sampling technique and was analyzed by Rank Spearman correlation test. Dental anxiety and salivary pH was measured in 53 respondents before tooth extraction using Corah's Dental Anxiety Scale and pH paper. **Results:** The results from this study show that respondents with dental anxiety have lower average salivary pH. Statistic calculation using Rank Spearman correlation test with  $\alpha = 5\%$ , shows cofficient correlation  $r_s = 0.438$  with  $t = 3.479$  and  $t_{\alpha/2}(n-2) = 2.008$ . **Conclusion:** The conclusion from this study shows that there is a correlation between dental anxiety and salivary pH before tooth extraction.

**Keywords:** Dental anxiety, salivary pH.

## INTRODUCTION

Having dental treatment is very important in maintaining oral health. For some people, dental care can causes anxiety so this can be an inhibiting factor in dental and mouth care. A study predicts that on average 5-30% of the population experiences dental anxiety.<sup>1</sup> This anxiety can be caused by several factors, such as unpleasant experience of dental care in the past and anxious feelings of pain due to dental care.<sup>2</sup>

Anxiety during dental care can be detected in various ways. This anxiety can cause a variety of physiological changes in patients such as increased pulse rate, increased blood pressure, muscle contractions, sweating palms, digestive disorders, and also dry mouth. Dry mouth occurs

as a result of reduced salivary secretion.<sup>3</sup>

Salivary pH is very dependent on salivary secretion. The faster the salivary secretion, the higher the salivary pH and vice versa, the slower the salivary secretion, the lower the pH.<sup>4</sup> Changes in salivary secretion can affect the composition of saliva. One of the compositions that are very influential on changes in salivary pH is bicarbonate. The higher the salivary secretion, the higher the bicarbonate concentration, hence it will increase the pH of saliva, and vice versa.<sup>5</sup>

Research in 2008 stated that the pH of saliva can be an efficient and inexpensive alternative to look at the psychological effects of stress.<sup>6</sup> In times of stress and anxiety, there will be a decrease in salivary pH. Hence, salivary pH can be used as an indicator for the presence of dental anxiety

in patients who will be doing dental care beside pulse and blood pressure.<sup>7,8</sup> Dentist can be alert on the presence of dental anxiety in patients and can be treated earlier. Based on this information, the authors are interested in observing salivary pH in adult patients in a state of dental anxiety prior to tooth extraction.

## METHODS

The type of research used is descriptive. The study population was adult patients aged 18-30 years old who would extract teeth in exodontia clinic of Dental and Oral Hospital of faculty of dentistry Padjadjaran University, Bandung. Samples were taken by *consecutive sampling technique*, where each subject that met the research criteria was included in the study within a certain time period. The test used to process and analyze data in this study is the *Spearman Rank* correlation test. The data consisted of the level of dental anxiety and salivary pH. The data is then arranged in pairs starting from the smallest to the largest order and given a ranking.

The study was conducted in January -

February 2014, taking place at exodontia clinic of Dental and Oral Hospital of faculty of dentistry Padjadjaran University, Bandung. The tools and materials used in this study were mouth mirror, sonde, tweezers, informed consent, Corah's Dental Anxiety Scale questionnaire to measure the level of dental anxiety, distilled water, glass for rinsing, pH paper to measure the saliva pH, plastic spoons, stationery and paper to note the results of the study. The following is the research procedure explained in the diagram.

## RESULTS

Research conducted for one month from January to February 2014 involved 53 people who met the criteria and were willing to be the subject of research. Figure 2 explains the level of dental anxiety in patients who will be extracted teeth in the exodontia clinic of Dental and Oral Hospital of faculty of dentistry Padjadjaran University, Bandung. Based on the graph, it can be seen that almost half of the respondents 49.06% have mild anxiety followed by 43.40% moderate anxiety, 5.66% high anxiety and 1.89% very high anxiety.

Table 1 shows a description of salivary pH

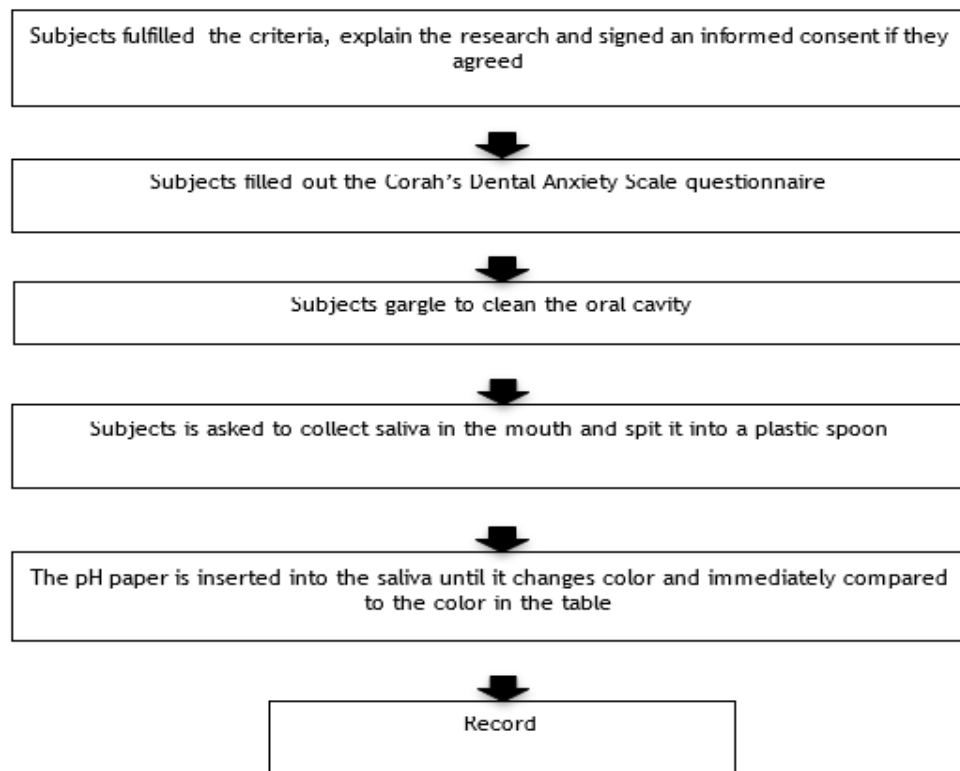


Figure 1. Chart of research procedures

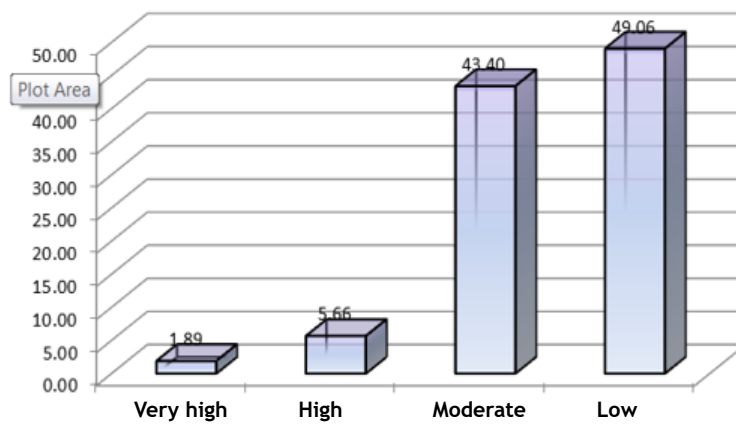


Figure 2. Dental anxiety level

Table 1. Overview of salivary ph in patients before tooth extraction

Variable	n	Highest	Lowest	Mean	Elementary School
Salivary pH before tooth extraction	53	6,9	5,9	6,41	0,25

Table 2. Frequency of dental anxiety level and average saliva ph

Anxiety Level	Frequency	Average pH of saliva
Very high	1	6.2
High	3	6.2
Is	23	6.3
Light	26	6.5

Table 3. Relationship between the level of dental anxiety with the ph of saliva before tooth extraction

Variable	n	$r_s$	t-count	t-table	Sig.	Conclusion
The Relationship Between Anxiety Level and Saliva pH	53	0,438	3,479	2,008	0,001	Significant

in patients before tooth extraction. Based on 53 respondents' salivary pH data, the highest salivary pH value is 6.9 and the lowest salivary pH is 5.9 with an average salivary pH of 6.41 and a standard deviation of 0.25.

Table 2 shows the frequency of dental anxiety levels with mean salivary pH. There is one respondent who has a very high anxiety level with an average salivary pH of 6.2; three respondents who had high anxiety with an average salivary pH of 6.2; 23 respondents who had moderate anxiety with an average salivary pH of 6.3; and 26 respondents who had mild anxiety, had an average saliva pH of 6.5.

The level of dental anxiety and salivary pH values were analyzed to determine their relationship using the *Spearman Rank* correlation test and the results are presented in Table 3. Based

on the data presented in Table 3 below it appears that the correlation coefficient value was 0.438 and it shown that the correlation relationship is meaningful.

## DISCUSSION

In this study, the majority of subjects (49.06%) had mild anxiety levels and only one person or 1.89% had very high anxiety. This shows that the patients who will be extracted teeth in the exodontia clinic of Dental and Oral Hospital of faculty of dentistry Padjadjaran University, Bandung on average have mild to moderate anxiety levels. This can be due to the high level of patient education, so the average level of dental anxiety is lower.<sup>9</sup>

Based on research data, it can be seen

that subjects with dental anxiety have lower saliva pH. According to Rensburg (1995), salivary pH varies between 6.2 to 7.6 with an average pH of 6.7.<sup>4</sup> In this study, the lowest salivary pH was 5.9 and the highest salivary pH was 6.9 with an average of 6.41 so it can be concluded that someone with dental anxiety had a lower salivary pH. When viewed from the average salivary pH based on anxiety levels, respondents with very high anxiety levels had an average salivary pH of 6.2 while respondents with low anxiety levels had an average salivary pH of 6.5, so it can be concluded that dental anxiety affects salivary pH. The results of calculations using the *Rank Spearman* correlation test states that there is a significant relationship between dental anxiety and salivary pH. The correlation coefficient value obtained is 0.438 and belongs to the category of medium correlation according to Sugiyono (2009) because it is in the interval 0,400 - 0,599.<sup>10</sup>

The results of this study are in accordance with previous studies that there is a relationship between dental anxiety with salivary pH and salivary pH can be used as an efficient and inexpensive alternative to see the presence of dental anxiety.<sup>6-8</sup> This is also in accordance with the theory which states that due to emotional responses such as dental anxiety, a physiological change occurs, one of which is dry mouth caused by reduced salivary flow which then causes a decrease in salivary pH because salivary pH is highly dependent on salivary secretion.<sup>3,4</sup> The slower the secretion of saliva, the lower the pH because changes in salivary secretion can affect the composition of saliva, one of which is that it can affect the composition of bicarbonate which affects the pH of saliva. The lower the saliva secretion, the bicarbonate composition will also be lesser, so it will make the saliva pH lower.<sup>5</sup>

Anxiety experienced by the patient before tooth extraction is a self-defense response to an unpleasant thing that will happen.<sup>11</sup> When anxious, the sympathetic nerve is more active than the parasympathetic nerve. This sympathetic nerve activity has an effect on the salivary glands through the noradrenaline *neurotransmitter* and beta-adrenergic receptors which will cause increased salivary viscosity, increased salivary protein levels and decreased salivary volume.<sup>12</sup> This decrease in salivary volume will cause a

decrease in salivary pH, hence, more acidic during dental anxiety. The reduction in salivary secretion or hyposalivation in patients with dental anxiety is only temporary and will return to normal when the emotional response is lost<sup>13</sup>.

This dental anxiety must immediately be handled properly by the dentist because it can be one of the inhibiting factors in dental and oral care<sup>11</sup>. This anxiety can be immediately detected by looking at emotional and physiological responses from patients such as increased pulse rate, blood pressure, muscle contractions, sweaty palms and dry mouth<sup>3</sup>. Salivary pH can also be used as an indicator because the measurement can use pH *paper* that is easy to use and the price is relatively affordable. Through this research, it has been proven that dental anxiety before tooth extraction affects salivary pH.

This anxiety can be treated in various ways and the dentist must be able to handle dental anxiety. Handling can be done through non-pharmacological and pharmacological approaches. Non-pharmacological approach can be done by psychological approach, relaxation therapy, and hypnosis therapy. A pharmacological approach can also be used to treat dental anxiety that tends to be high in patients and cannot be treated with a non-pharmacological approach. This pharmacological approach uses sedation agents either by inhalation, intravenously or by oral route.

Dentists must also be able to perform dental care that is free of pain because one of the factors that cause dental anxiety is the pain caused by dental and oral care. The quality of dental and oral health services must also be improved so that patients are willing to take care of their teeth and mouth, hence, improving the degree of oral health.

Further research should be conducted to determine the relationship of dental anxiety with education levels, dental experience in the past, the frequency of visits to the dentist and the most effective ways to deal with dental anxiety.

## CONCLUSION

There is a relationship between dental anxiety and salivary pH before tooth extraction in the exodontia clinic of Dental and Oral Hospital

of faculty of dentistry Padjadjaran University, Bandung

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