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Research Article

The Effect of Reciting the Qur'an with *Makhraj* on Saliva Volume and pH During Fasting in IIK Bhakti Wiyata Kediri Students

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Abstrak

Saliva adalah cairan rongga mulut yang berperan dalam menjaga homeostasis rongga mulut. Saliva diproduksi oleh kelenjar saliva mayor dan minor. Puasa merupakan aktivitas menahan diri dari makan dan minum. Saat puasa, aliran saliva menjadi lambat oleh karena kelenjar saliva tidak mendapat stimulasi. Produksi saliva dapat distimulasi oleh rangsangan mekanis salah satunya dengan mengaji Al-Qur'an. Mengaji Al-Qur'an dengan makhorijul huruf artinya melafadzkan ayat Al-Qur'an sesuai dengan tempat keluarnya suara huruf hijaiyah. Gerakan yang dihasilkan dapat menstimulasi kelenjar saliva serta meningkatan produksi saliva. Tujuan penelitian ini untuk mengetahui pengaruh mengaji Al-Qur'an dengan makhraj terhadap volume dan pH saliva saat puasa pada mahasiswa IIK Bhakta. Metode penelitian ini menggunakan desain *true experimental*, dengan rancangan *pretest-posttest control group design*. Data yang diperoleh kemudian dianalisis dan diinterpretasi untuk menguji hipotesis menggunakan uji *Independent t test* dengan skala data variabel adalah rasio. Hasil penelitian diperoleh nilai signifikan *Independent t test* pada selisih data pretest dan postest volume serta pH kelompok eksperimen sebesar 0,000 Asymp. Sig. (2-tailed). Nilai p < 0,05 artinya terdapat pengaruh yang signifikan. Kesimpulan penelitian ini adalah terdapat pengaruh mengaji Al-Qur'an dengan makhraj terhadap volume dan pH saliva saat puasa pada mahasiswa IIK Bhakta.

Kata Kunci: Saliva; Makhorijul Huruf; Mengaji Al-Qur'an; Puasa.

Abstract

An oral fluid called saliva contributes to the preservation of oral homeostasis. Both the main and minor salivary glands create saliva. The practice of not eating or drinking is known as fasting. Since the salivary glands are not stimulated while fasting, saliva production is low. Salivary production can be stimulated by mechanical stimuli, one of which is by reciting the Qur'an. Reciting the Qur'an with makhorijul huroof means reciting Qur'anic verses according to where the sound of the hijaiyah letters comes out. The resulting movement can stimulate the salivary glands and increase saliva production. The study aims to determine the effect of reciting the Qur'an with makhraj on the volume and pH of saliva during fasting in IIK Bhakta students. This study employed a true experimental method, with a pretest-post-test control group design. The results data were analysed and interpreted to test the hypothesis using the independent t-test with the variable data scale being ratio. The results showed the significance value of the independent t-test on the difference between the pretest and post-test data on volume and pH of the experimental group of 0.000 Asymp. Sig. (2-tailed). The p-value <0.05 indicates that there was a significant effect. This study concludes that there is an effect of reciting the Qur'an with makhraj on the volume and pH of saliva during fasting in IIK Bhakta students.

Keywords: Saliva; Makhorijul Huroof; Recitation of The Qur'an; Fasting.

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INTRODUCTION

Saliva has an important role in maintaining homeostatic conditions in the oral cavity. Some of these are, assisting the digestive process, having anti-bacterial properties, playing a role in the process of swallowing food, helping phonation, and playing a role in oral hygiene as well as maintaining the pH balance of the oral cavity. Saliva production is generally produced by the activity of the major salivary glands, namely, the submandibular glands, parotid glands, sublingual glands, and minor salivary glands.[1]

During fasting, the flow of saliva becomes slow because the salivary glands do not get stimulation either chemically or mechanically. Furthermore, the average salivary volume during fasting is only 0.561 ml/5 minutes. The slow flow of saliva might have an impact on decreasing the buffer capacity of saliva. As a result, the salivary pH will also decrease which might increase the risk of developing caries in the oral cavity.[2]

Saliva production can be stimulated by mechanical stimulation by carrying out activities that involve movement of the oral cavity such as speaking, singing, and reciting the Qur'an. A previous study conducted by Nugraheni (2012) on students at an Islamic boarding school revealed that reciting the Qur'an with *makhraj* involves several parts of the organs such as the mouth, throat, tongue, lips, and bridge of the nose can stimulate the salivary glands mechanically as well as increase the volume of pH of saliva during fasting. However, this study had not quantitatively revealed the value of the increase in pH before and after being given the treatment of reciting the Qur'an with *makhraj* during fasting.[3]

This study aims to determine the effect of reciting the Qur'an with *makhraj* on the volume and pH of saliva during fasting in IIK Bhakti Wiyata students aged 19-21 years. In this study, salivary pH was measured using a pH meter to obtain quantitative results. The type of surah read at the time of recitation was surah An-Naba with the health condition of the selected respondent being good in general and the condition of the oral cavity free from caries (cavities). Furthermore, a week before taking saliva samples, oral cavity scaling was carried out to create a homogeneous oral cavity.

RESEARCH METHOD

This study employed a true experimental research method, with a pretest-post-test control group research design. The research procedure has been declared to have passed ethical eligibility by the IIK Bhakti Wiyata Research Ethics Commission. The population of the study was students of the Institut Ilmu Kesehatan Bhakti Wiyata Kediri (IIK Bhakta) and the sample was students who were active as members of the Student Activity Unit of the Islamic Studies Forum who had met the inclusion criteria. After that, a simple random sampling technique was carried out using the Slovin formula, and a total sample of 34 people was obtained, divided equally into 2 groups, 17 samples of the control group and 17 samples of the experimental group. Before carrying out the study, they filled out informed consent in advance as a form of approval. Those in the experimental group were given

the treatment of reciting the Qur'an with *makhraj*, while the rest in the control group did not recite the recitation, and were given a 10-minute pause during saliva sampling as an assumption to wait for the recital.

This study was conducted in several places. The scaling of the oral cavity samples was carried out at the dentist's office. Meanwhile, salivary sampling and measurement of saliva samples after the treatment (reciting the Qur'an with *makhraj*) were carried out at the Bacteriology Laboratory of IIK Bhakta.

The research instruments consisted of a sterile saliva pot tube, pH meter, 6 ml syringe, paper and stationery, al-Qur'an, rubber gloves, mask, hand sanitizer, camera, and stopwatch. The sampling of saliva began with scaling the oral cavity to create a homogenous oral cavity. Saliva sampling was carried out twice, namely before treatment and after treatment. The data obtained were then analysed. The normality test was carried out using the Shapiro-Wilk test to determine the distribution of data. After that, a statistical test was carried out using the independent *t-test* statistic to determine the difference in pretest and post-test values on the volume and pH of the saliva of the experimental group.

RESULTS

The results of the study (**Table 1**) obtained a comparison of the average volume of saliva in the experimental group before the treatment of 2.1 ml and after the treatment of 2.3 ml. Meanwhile, the average volume of saliva in the control group was 1.9 ml before treatment and 1.7 ml after treatment. The average salivary pH in the experimental group before treatment was 70.9 and after treatment was 72.6. Meanwhile, in the control group, the average salivary pH before treatment was 70.1, and after treatment was 70.3.

Table 1. Comparison of Average Saliva Volume and pH results Before and After Reciting the Qur'an with *Makhraj*

	Experimental Group		Control Group	
	Pretest	Post-test	Pretest	Post-test
Volume Saliva	2.1	2.3	1.9	1.7
pH Saliva	70.9	72.6	70.1	70.3

The results of the normality test using Shapiro-Wilk show that the data is normally distributed, indicating that parametric tests can be carried out. Furthermore, the homogeneity test using the Levene test found that the variance of the data was not homogenous. The independent *t-test* as a parametric test was carried out to investigate the difference in the pretest and post-test values of salivary volume and pH in the experimental group (**Table 2**).

Table 2. Independent *t-test* Results of Volume and pH of Saliva in the Experimental Group

t-test		Sig. (2-tailed) *p*-value
pH	PretestEks – PostestEks	.000
Volume	PretestEks – PostestEks	.000

The significance value of the independent *t-test* (**Table 2**) on the volume and pH data of the experimental group in the pretest and

post-test treatment was 0.000 sig. (2-tailed). This value is smaller than the specified research error rate, 95% (0.05), indicating that there is a significant effect. Interpretation of these values means that H_0 is rejected and H_1 is accepted, which means that there was an effect of reciting the Qur'an with *makhraj* on the volume and pH of saliva during fasting in IIK Bhakta students.

DISCUSSION

The results of the study in the control group where the respondents were fasting showed that the salivary volume values of fasting people ranged from 1.7 to 1.9 ml/minute. According to Booy (2016), the volume and buffer of saliva are lower than normal conditions during fasting, where the average volume of saliva during fasting is 0.561/5 minutes.[4] This study found that saliva production was lower during fasting, but still within physiological limits. This supports a previous study done by Almeida (2008) which revealed that fasting in the short term can reduce salivary flow but cannot be categorized as hyposalivation and salivary flow will return to normal after the fasting period is over.[5]

The decrease in salivary secretion has an impact on decreasing the salivary pH value. Sharmila, et al (2013) suggest that the normal value of salivary pH is in the range of 6.2-7.6 with an average pH of 6.7. Meanwhile, the results of the study presented that fasting people revealed that fasting people's salivary pH ranged from 7.1 to 7.3. This finding indicates that there was no significant change in salivary pH due to the inability of salivary glands to receive mechanical or chemical stimulation, causing the flow of saliva tends to be constant and slow. This supports the research of Novy and Young (2010) which revealed that the average pH of saliva without stimulation ranged from 6.10 to 6.47.[4]

The degree of salivary acidity is influenced by psychological factors, gender, and oral hygiene. Measurement of salivary pH is required to pay attention to factors that may affect the measurement results such as differences in diet, gender, psychology, and smoking habit. In this study, the psychological condition of the respondents was thought to be a factor influencing salivary pH.

Haryani (2016) suggests that psychological conditions, one of which is stress, can inhibit secretion, while tension can inhibit salivary gland stimulation.[7] Reciting the Qur'an with *makhraj* in this study was carried out for fasting people. Reciting the Qur'an was done by reading the verses of the Qur'an, Surah An-Naba, using the correct as well as precise *makhraj* guided and corrected by the Ustadzah. The results showed that there was an effect of reciting the Qur'an with *makhraj* on increasing the volume and pH of saliva in fasting people. This is evidenced by the results of the parametric statistical test independent *t-test* on the volume and pH data of the experimental group in the pretest and post-test conditions, namely p = 0.00 Asymp. Sig. (2-tailed). This value was lower than the specified error range of 95% (0.05), indicating that there was an effect. From the results of observations, the volume of saliva obtained from respondents by reciting the Qur'an with *makhraj* was the lowest at 2 ml/minute and the highest at 3.8 ml/minute.

These findings indicate an increase in salivary volume after stimulation. This is in line with an experiment conducted by Indriana (2011) by providing a mechanical stimulus (chewing) to respondents by measuring salivary flow.[8]

The result was an increase in the salivary flow rate of 1.24 ml/minute from the value of the unstimulated salivary volume of 0.81 ml/minute. Besides volume, the results of the study also revealed an increase in salivary pH after reciting the Qur'an with a *makhraj*. The lowest pH was 6.6 and the highest pH was 7.8. Indriana (2011) believes that the average pH of saliva without stimulation was 6.61 and the average pH with mechanical stimulation (chewing) was 8.82.[8]

The findings of this study support the study conducted by Nugraheni (2011) on students at the Nurul Haq orphanage by measuring the degree of acidity (pH) of saliva using pH strips. The results of the study reported that there were differences in the increase in the volume and pH of saliva before and after reciting the Qur'an with the correct *Makhraj*. This is due to the pressure when pronouncing letters which stimulates saliva.[3]

Reciting the Qur'an means reciting the verses of the Qur'an in accordance with the law of recitation (*Tajwid*) and studying the content of the verse of the Qur'an to be implemented in the life of the world and the hereafter. *Makhraj* letters are classified into 5 namely *halq* (throat), *jauf* (space in the mouth), *syafatain* (lips), *lisan* (tongue), and *khoisyum* (the deepest bridge of the nose).[12]

Reciting the Qur'an with *makhraj* produces movements that can stimulate the salivary glands mechanically. For example, the movement of the mouth and throat which is obtained from pronouncing the letters *Kha', Ghain, Ha, Ain, Hamzah*, and *Ha'* can stimulate the major salivary glands including the submandibular, parotid, and sublingual glands. Movement of the tongue and lips obtained from the pronunciation of the letters *Qaf, Kaf, Kha', Ya', Syin', Lam, Nun, Ra, Wau, Mim, Wau, Fa', Tha, Dal, Ta', Tsa, Zha, Dzal, Sin, Zai,* and *Shad* can stimulate the major salivary glands, namely the sublingual glands and minor salivary glands spread over the buccal, labial, and lingual parts.

Salivary secretion increases with the salivary reflex being stimulated. The salivary reflex after being stimulated begins when the chemoreceptors or receptors that play a role in the occurrence of pressure begin to be sensitive to the presence of food in the cavity. These receptors will send signals to afferent nerve fibers to convey information to the salivary centre in the brainstem medulla. The salivary centre in the form of sympathetic nerves will then continue the impulse through the extrinsic autonomic nerves to the salivary glands to secrete saliva. Chewing activity will produce movements that can increase the stimulation of salivary secretion even though no food is consumed due to manipulation of the pressure receptors in the oral cavity.[9]

The speed of salivary secretion after mechanical stimulation is related to the increase in salivary pH value. Much stimulated saliva is produced by the parotid glands, and the salivary pH ranges from 6.0 to 7.4 with a secretion time of 1 ml/minute. Salivary pH and bicarbonate concentration influence each other, with an increase in the rate of secretion of the parotid gland spout it

increases. Therefore, the saliva produced is thinner and richer in enzymes.[11]

The salivary reflex can be stimulated through mechanical movements in the mouth by stimulation of taste receptors that occur in the trigeminal nerve (N.V) and facial nerve (N.V2).[10] Mechanical stimulation of the salivary glands will provide stimulation that stimulates the sympathetic nerves. Then, the blood vessels in the salivary glands will experience vasodilation. Thus, the glands get adequate nutrition from blood to increase salivary secretion.[10]

CONCLUSION

Reciting the Qur'an with *makhraj* can increase the volume and pH of saliva during fasting because the mechanical stimulation from the movements produced when pronouncing *hijaiyah* letters can suppress various receptors in the salivary glands. It is necessary to conduct further study on the effect of reciting the Qur'an with *makhraj* on the volume and pH of saliva during fasting by taking into account other factors such as the comparison of the use of saliva collection methods, duration of fasting, age, gender, oral conditions such as the use of dentures, orthodontic appliances, and other dental treatments.

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