

Oral Health Status and Saliva Characteristics of Drug User at the Rehabilitation Center in Makassar

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ABSTRACT

The purpose of this study is to know the oral health status and saliva characteristics of drug users at the rehabilitation center in Makassar. This research is a type of observational research with cross sectional study design. The sample size is 30 people and divided into 2 groups i.e. rehabilitation drug abuser and control group. Each study subjects went through the filling stage of informed consent sheet, OHIS, DMFT and saliva (volume, flow rate, viscosity and pH). Mean OHIS, DMF-T respectively in the drug abusers were higher (3.4±1.08) and (7.13±1.64) than in the control group (1.88±0.68) and (2.93±2.84). There was a significant difference in mean OHIS and DMFT between drug abusers group and control group ($p < 0.05$). There is a significant difference in the salivary viscosity between the user and non-user ($p = 0.005$). The oral hygiene status of rehabilitation of drug abusers is poor and caries status is very high. Oral oral hygiene Drug users with poor dental hygiene need special attention in care so as not to aggravate general health as a whole.

Keywords: Drug abuser, DMT-T, OHIS, Saliva

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INTRODUCTION

Drug abuse in the last few decades is the most alarming health problem in the world. In general, drugs are medicines that are necessary for treatment and health services, but lately, its use is more abused or used not in accordance with the standard of treatment causing various adverse effects for individuals and society.¹

United Nations Office Drug and Crime (UNODC) in 2015 reported that there are 167 to 315 million people or about 5.2% of the world's population are drug abusers. The development of this drug also influences Indonesia and almost affected all levels of society in urban and rural areas.² This case has been investigated by the National Narcotics Agency in Indonesia with the Research Center of Health University of Indonesia in 2015, and the prevalence of drug users in Indonesia reached 2.20% or about 4,098,029 people out of Indonesia's total population (aged 10-59 years). While from the same data it is known that the number of drug users in South Sulawesi in 2011 is around 125,730 people. The prevalence of methamphetamine abuse is increasing year by year. It is now estimated to reach 10 million people in the United States and 35 million people worldwide³, it raises concerns for various parties because the misuse is not creeping from students, high school students and even elementary school children who are the next generation of the nation.

In addition to physical and mental disorders, drugs are also shown to have a link to complications that occur in the oral cavity. Shekarchizade in its 2013 study¹, said drug use can lead to serious oral problems including hard tissue (increased incidence of caries, periodontal disease, bruxism, enamel erosion, tooth loss) in soft tissue (mucosal dysplasia, gingival hyperplasia, tongue carcinoma, uvulitis) and may reduce salivary gland production resulting in xerostomia.^{2,4,5,6} The data is relevant to methamphetamine (MA) with increased tooth decay, resulting from 301 MA users, 80% having xerostomia, 30, 6% experienced attrition due to bruxism,

13% of TMJ abnormalities, 33.9% experienced periodontal disease, 31% experienced caries, and 52% experienced caries loss due to searches.⁷ Later supported by Nives Protocol findings in 2013⁸, who examined DMF-T scores on heroin users who showed a DMF-T index in higher heroin users (18.78) of non-users (5.32) and caries prevalence were 44.76% and 16.20% respectively.⁸

The most common is that of xerostomia or dry mouth. This complaint is confirmed by Shetty in his research which says that there are about 80% of drug users complaint of dry mouth.⁷ Along with the study, Vinayak et al. 2013 state that xerostomia caused by drugs such as amphetamines acting on the neuroeffector junction of the sympathetic nerve will reduce salivary flow.⁹ Furthermore, other types of drug-related studies are examined by Nives Protrka in 2013⁶, statistically showing a significant correlation between heroin users and lack of salivary production with pH results and salivary flow rate in heroin users lower than those who did not use heroin.⁸

Healthy adults produce an average of 500-1500 ml of saliva per day with a flow rate of 1-3 ml / min stimulated saliva and unstimulated saliva in the range of 0.5 ml / min. However, in some cases, long-term drug use leads to depression and stress that unstimulated saliva flow rate to < 0.1 ml / min.¹⁰ While normal salivary pH ranges from 6.7-7.3, methamphetamine users generally have a decrease in salivary pH especially unstimulated salivary pH. The results of Ravenel et al in 2012, show that 57.1% of methamphetamine users had below normal salivary pH. This condition is thought to be influenced by decreasing composition in saliva including salivary buffer component. Under normal circumstances, the salivary buffer capacity is 10 -12. In the same study, the results show that from 13 methamphetamine users only 2 samples had normal buffer capacity, 10 samples had a low buffer capacity of 6-9 and 1 sample of which had a very low buffer capacity of 0-5.9.³

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The influence of drugs on oral and dental health is described in several journals with the occurrence of physiological changes and clinical appearance in the oral cavity.¹¹ The most commonly found diseases of the oral hygiene, irregular toothbrushing frequency and bad habits such as smoking. In addition to periodontal disease and caries, some of the effects of narcotics are:

1. Xerostomia

Shabu (methamphetamine) is a powerful addictive stimulation that can have an effect on the central nervous system. *Shabu* is a sympathomimetic amine acting on α and β adrenergic receptors. Stimulation of α receptors in salivary gland vascularization results in vasoconstriction and decreases the salivary flow rate. This hyposalivation minimizes the protective ability of the saliva and increases the risk of demineralization to caries.⁹ Some causes of xerostomia are associated with drugs, in the case of methamphetamine, ecstasy, antipsychotics, atropine benzodiazepine, hypnotics, opioids and other illegal drugs. In addition, opioids and cannabis can also cause salivary hypofunction resulting in xerostomia.

2. Dental Caries

Drug use indicates poor oral hygiene in terms of caries and periodontal disease. The process of caries occurs is caused by a decrease in the amount of saliva that plays a role in the protection and integrity of the teeth. The feeling of dry mouth syndrome that occurs can cause drugs to drink or drink mood to acid. Xerostomia and the acid enhancement of soft drinks will create the perfect environment to increase dental caries and erosion especially to users who neglect oral hygiene.^{12,13} The state of caries of ordinary drug users is called *meth mouth*.^{3,4,14,15} Caries are evenly distributed in the front teeth or resembling rampant caries.

3. Bruxism

Bruxism can occur due to the use of ecstasy, *shabu*, and cocaine. In *shabu*, bruxism users occur due to increased motor activity. Use of meth can cause the user to feel anxious and nervous, thus causing grinding and sharpening of teeth. Bruxism can be extreme, especially when combined with dry mouth. This can cause the tooth to crack and break and cause nerve damage.^{12,14}

METHODS

This research is analytic observational with a cross-sectional study. The subjects of this study were users (rehabilitation patients) at Rehabilitation Center of BNN Baddoka Makassar and fulfilled specified inclusion criteria. The sampling method used in this research is using purposive sampling technique. Sample with Inclusion criteria: 1. Present at the time of the research; 2. Patients can be invited to cooperate; 3. The patient can communicate well; 4. Aged ≤ 30 years. This research has been conducted in the ethics test in the ethics committee of Dentistry Faculty of Hasanuddin University, has been passed and got approval of ethics with number UH17110005. This research applies research ethics that include informed consent. The researcher fully explains the subject of freely participating or refusing. All subjects who participated in the study had signed informed consent. Operational Definition variable is Saliva volume is the amount of unsaturated saliva collected in the oral cavity for 30 minutes then excreted

by spitting into the salivary pot every 3 minutes then measured using a measuring cup, Saliva flow rate is the amount of unstimulated saliva collected in the oral cavity for 3 minutes then excreted by spitting into a salivary container and measured using a measuring cup; Saliva viscosity is the consistency or viscosity of saliva when not stimulated. Values are measured in cP (centipoises) units using the Ostwald viscometer tool; Salivary pH is the degree of salivary acidity when not stimulated. Values are measured using ATC pH meters; Dental health status is a description of the dental conditions assessed on the basis of DMF-T (Decay, Missing, Filling)¹⁶ and OHIS (Oral Health Index Simplified) indices by Green and Vermillion.¹⁷

RESULT

This research was conducted in December 2017 until January 2018 with 30 research subjects consisting of 15 rehabilitation users in BNN Baddoka Makassar, had consumed drugs and 15 non-user people who are the average student of Faculty of Dentistry Hasanuddin University. The user group in this study was between 14-30 years old while in the non-user group aged 14-23 years. This study aims to find out the description of the dental and oral health status of OHI-S and DMF-T and salivary sampling in both groups of research subjects for characteristic analysis saliva i.e. volume, flow rate, viscosity, and pH.

The subjects consisted of 8 males and 22 females between the ages of 13 and 30. Based on the table 1 showed the number of most users is 14-17 years old as much as 53.3% and non-user most aged 18-30 years is 86.67%. Among the various types of drugs, shabu is the most widely consumed type of drugs that is 30%. The average number of users was mostly from the rehabilitation group of 1-3 months, which was 7 people (46.67%) and the least were from the old rehabilitation group 6-9 months with the percentage of 13.3%.

Figure 1 shows that the average OHI-S score for the user group (3.45) is higher than the non-user group (1.88). This shows that the user's oral hygiene status is worse than non-users. Average user group debris rate was 1.89 higher than non-user group 1.47. The average calculus index is also higher for the user group of 1.56 and the non-user group 0.41.

Figure 2 shows the average value of DMF-T obtained for the user is 7.13 ± 1.64 whereas the non-user group is only 2.93 ± 2.84 . The DMFT rate for the user group is dominated by the Decay number. Decay numbers for users 6, higher than Decay numbers for non-users.

Figure 3 shows that the user group has a good OHIS risk of only 6.7% lower than the control group (13.3%), as well as the "average" percentage for the control group of 73%, and the user group only 20%. Similarly, the percentage of the category "bad" where the user group with 86.7% percentage while the control group 0%.

Table 2 shows that mean salivary volume of user group was 10.94 ml / 30 min compared with the non-user group at 11.39 ml / 30 min and the salivary flow rate between the two groups also differed 1.09 ml / 3 min and 1.14 ml / 3 min between user and non-user group showing that the mean saliva flow rate is lower. However, on the results of the viscosity assessment, the non-user group had a higher viscosity level of 1.11 cP compared with 0.97 cP users. While the pH value

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indicates that the user pH is lower (6.62) than the non-user group pH (6.78).

While the results of the study showed that salivary characteristics, which were assessed by volunteers, non-user) except on salivary viscosity assessment, it was found that the salivary viscosity level at the residence was lower than 0.97 with the standard deviation of 0.75 compared with the non-user group of 1.11 with the standard 0.16 intersection which means that there is a significant difference $p = 0.005$ ($p < 0.05$) between residual saliva viscosity and non-user group.

The results of this study show differences in dental and oral health status and salivary characteristics between users who are undergoing rehabilitation and non-user groups. From the results of debris index, calculus index, OHI-S, decay, missing, filling and DMF-T tests in Table 3 which can assess the hygiene and dental and oral health status and unidentified the value of the index debris ($p = 0.041$), calculus index ($p = 0.001$), OHI-S ($p = 0.001$), decay ($p = 0.016$) and DMF -T ($p = 0.005$) which means that the hygiene and oral hygiene status of the user is lower than the dick group seen from DIS, CIS, OHI-S, Decay and DMF-T.

DISCUSSION

Drugs are substances that when consumed can affect the body, both physical and mental users including causing complications to oral health. Several studies have shown that the prevalence of various diseases is found to be higher in the drug users group than in the non-drug group in his research mentioned that the use of drugs can cause serious oral problems such as problems in the hard tissue that is increased incidence of caries.^{1,18,19}

The dental and oral health status of the user is lower than that of non-users based on the DMF-T value (caries assessment indicator) and OHI-S (indicator of oral hygiene assessment). At the residence the average value of DMF-T was 7.13 ± 1.64 higher than non-users 2.93 ± 2.84 . Based on a statistical test that has been done that is unpaired t-test ($p < 0,05$) there is a difference of value of Decay Tooth (DT) and DMF-T which is significant between users with non non user groups. This research is in line with research conducted by Ilser Turkyilmaz²⁰ where the dental and oral health conditions of drug users are very bad. This can happen because of drug use that is exacerbated by poor oral hygiene²¹. The most common types of drugs are *shabu* and marijuana. In accordance with surveys of drug abuse on household groups in Indonesia by 2015 conducted by Djusnir et al. said that there are three types of drugs most abused over the past year, namely, *shabu*, marijuana and ecstasy²². These three types of drugs have an important role in the decrease of salivary secretion. Drugs can stimulate α -adrenergic receptors in salivary vascularization of salivary glands causing vasoconstriction and decreased salivary flow (hyposalivation). This condition undermines the properties of protection such as neutralizing acid induced by plaque and remineralization of tooth enamel¹. This study is in line with that done by Shetty about the relationship between *shabu* use and increased dental problems that the user (*shabu*) significantly has a higher DT value compared to non-users.⁷

The high incidence of caries occurring in the user may be worsened by a poor OHI-S condition. The value of debris index and calculus index and OHI-S higher at the

residence indicates a significant difference to non-users.^{13,21} This happens because the drug users tend to have a different lifestyle than the population that is not the user in general. Drug users usually ignore oral health so that they have poor oral hygiene.^{1,4} The poor level of hygiene of the oral cavity of the user is presented which shows from the total of the research subjects, the highest percentage is in the bad OHI-S category.

Dental and oral health status is closely related to saliva. Saliva is an exocrine secretion that plays an important role in oral health such as in the lubrication process and protection, buffer system, anti-bacterial, digestion and mastication and maintains the integrity of the teeth²³. Therefore, changes in salivary characteristics may affect salivary function bad on oral health and oral cavity.

In the residence there may be a decrease in salivary secretion causing low volume and salivary flow rate. Drugs especially meth is a powerful addictive stimulant that can have an effect on the central nervous system and α receptor in vascularization of the salivary glands causing vasoconstriction to decrease salivary flow rate. The assessment of salivary characteristics showed the mean salivary volume values secreted by the user within 30 minutes lower i.e. 10.94 ml while in the non-user group the salivary volume secreted within the same time was 11.39 ml. However, although there are differences, based on statistical test results shows that there is no significant difference. Similar results occurred at the salivary flow rate indicating no significant difference between user and non-user.¹⁰

This study is in line with research conducted on *shabu* addicts in the United States who stated that there was no significant difference in saliva sharp saliva flow rate with the control group. Contrary to that, a study by Nives Protrka (2012) suggests that there is a significant correlation of salivary flow rates between non-users and non-users⁸ and Rommel's study found that significantly *shabu* users had a salivary production lower (ml / 5 min)^{3,24}. Based on the result of the research, it shows that some of them large users undergoing rehabilitation who participated in the study had a salivary flow rate not much different from that of non-user groups. There are many things that cause no difference in salivary rate conditions in this study⁴. Some users have not taken drugs for a long time so the saliva function is improving. This can be seen in table 7 which shows that the average volume and salivary flow rate is increased in the user with 6-9 months rehabilitation period. In addition, in some cases it is mentioned that salivary flow rates vary greatly in different conditions because salivary secretion is a complex process. Saliva flow rate is conditional in accordance with salivary functions and reflexes. Secretion reaches at least when the reflex is not stimulated and reaches its maximum at the time of stimulated reflex. Even stimulation can affect up to 90% of the total salivary secretion²⁴. Salivary secretion can be stimulated by physical or mechanical, but even in the unstimulated state, salivary exertion can occur without physical or mechanical stimulation, salivary stimulation can occur in a chemical process by thinking, saw and smelled the aroma³. It became one of the factors affecting the uncontrollable control in this study. Also mentioned salivary characteristics associated with dental and salivary viscosity. Viscosity is a viscous state that has a close relationship with glycoprotein composition. If the salivary viscosity increases, the

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composition of water in the saliva decreases and this will cause the saliva to become more viscous. At table 7 it is seen that there is a significant difference ($p = 0.005$) between user and non-user saliva viscosity with an average value of 0.97 cP and 1.11 cP. This may occur due to differences in saliva composition between the two groups, in addition to the fluid viscosity value influenced by several factors one of which is the temperature. The viscosity of the liquid will decrease with increasing temperature and vice versa. In addition, volume, flow rate and salivary viscosity, another characteristic closely related to drugs is salivary pH. In drug users there may be a decrease in pH. The association of consuming marijuana with saliva pH showed that there was no significant difference between salivary pH in the control group and cannabis additive with the mean pH of the cannabis and control addicts²⁵. However, contrary to Rommel N et al.³ which states that in chronic methamphetamine addicts have a lower salivary pH than control group and Woyceichoski et al. studies with salivary pH results of the drug, especially marijuana which is usually consumed by burning contains carbon dioxide which can decrease salivary pH after binding to water in the saliva, secrete hydrogen ions and form acids²⁶. No occurrence of salivary pH differences in pH and may be affected by circadian rhythm and diet. In addition, the subjects studied were users of rehabilitation and undergoing the process of detoxification, which is known in the process of recovery of drugs. Also in the rehabilitation period is also known that research subjects more often consume water. Compared with other similar studies, this study has several limitations. Drug users have an impact on the value of quality of life²⁷, proven results of research by Truenf et al., that OHRQoL values are much lower than the general population in Australia²⁸. One of them is because the prohibition of drug use is very strict in Indonesia, so in this research the subject of research rehabilitation hall that is in BNN Baddoka Makassar through procedure that has been determined by the rehabilitation center controlling the number of samples can not be done with free so that the samples in this study are small.

CONCLUSION

Based on the research results obtained dental and oral health status and saliva characteristics of former drug users at the BNN Makassar rehabilitation center obtained the average value of DMFT was 7.1 categorized as very high (bad) and the average value of OHIS was 3.4 categorized level of oral hygiene the bad one. They need special attention in care so as not to aggravate general health as a whole

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Table 1. Characteristics of research subjects

| Characteristics | Group | |
|--|---------------------|-------------------|
| | User abuse n (%) | Non-user n (%) |
| Sex | | |
| Male | 5 (33.33) | 3 (20) |
| Female | 10 (66.67) | 12 (80) |
| Age Group | | |
| 14-17 year | 8 (53.33) | 2 (13.33) |
| 18-30 year | 7 (46.67) | 13 (86.67) |
| Type of Abuse | | |
| Crystal meth | 9 (60) | - |
| Marijuana | 2 (13.33) | - |
| Combined | 4 (26.67) | - |
| Time / duration of rehabilitation | | |
| 1-3 month | 7 (46.67) | - |
| 4-6 month | 6 (40) | - |
| 6-9 month | 2 (13.33) | - |

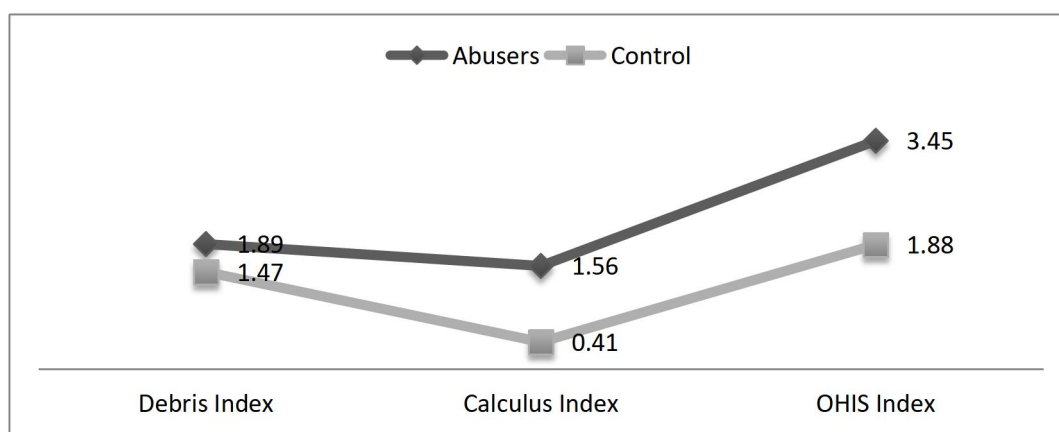


Figure 1. The mean values of DIS, CIS, and OHI-S for user groups and non-user groups

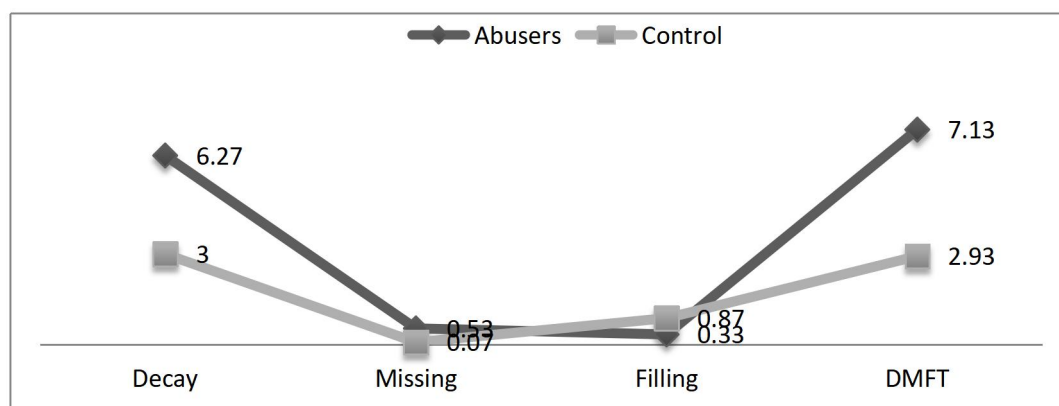


Figure 2. The average DT, MT, FT and DMFT values for user groups and non-user groups

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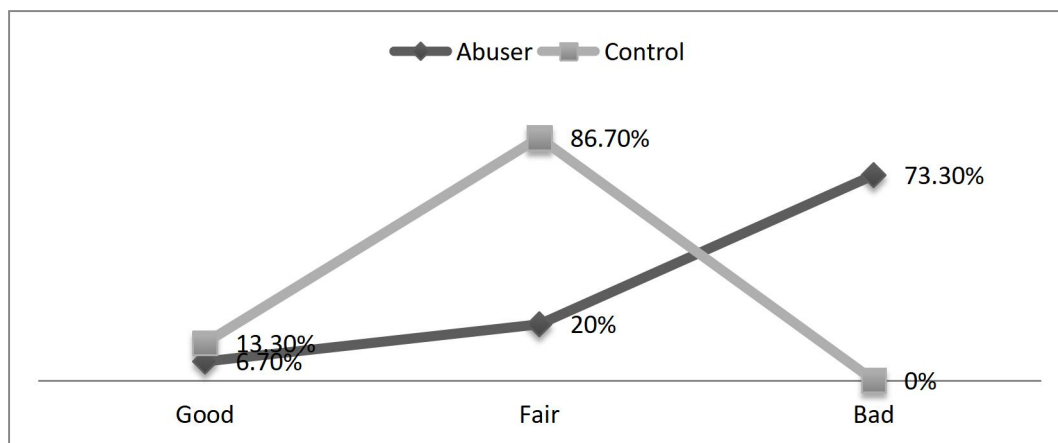


Figure 3. Percentage of oral hygiene category based on OHIS score

Table 2. Differences in dental health status and salivary characteristics between groups of study subjects

| Characteristic | User Mean ± sd | Non user Mean ± sd | Sig* |
|-----------------------------------|-------------------|-----------------------|---------|
| Oral Health Status | | | |
| <i>Debris Index</i> | 1.89 ± 0.54 | 1.47 ± 0.53 | 0.042** |
| <i>Calculus Index</i> | 1.56 ± 0.58 | 0.41 ± 0.28 | 0.001** |
| OHI-S | 3.45 ± 1.08 | 1.88 ± 0.68 | 0.001** |
| <i>Decay</i> | 6.27 ± 4.18 | 3.00 ± 2.45 | 0.016** |
| <i>Missing</i> | 0.53 ± 0.83 | 0.07 ± 0.26 | 0.054 |
| <i>Filling</i> | 0.33 ± 0.82 | 0.87 ± 1.64 | 0.273 |
| DMF-T | 7.13 ± 1.64 | 2.93 ± 2.84 | 0.005** |
| Saliva characteristic | | | |
| Volume | 10.94 ± 2.54 | 11.39 ± 3.93 | 0.710 |
| Flow rate | 1.09 ± 0.25 | 1.14 ± 0.40 | 0.683 |
| Viscosity | 0.97 ± 0.75 | 1.11 ± 0.16 | 0.005** |
| pH | 6.62 ± 0.77 | 6.78 ± 0.52 | 0.510 |
| *t-test → Significant if p < 0.05 | | | |
| ** Significant | | | |