International Journal of Advanced Health Science and Technology
Multidisciplinary : Rapid Review : Open Access Journal e-ISSN:2808-6422; p-ISSN:2829-3037

RESEARCH ARTICLE OPEN ACCESS

Manuscript received May 15, 2024; revised June 11, 2024; accepted June 11, 2024, date of publication June 30, 2024

Digital Object Identifier (DOI): https://doi.org/10.35882/ijahst.v4i3.322

How to cite: Silvia Prasetyowati, Dian Fitri Ana Dewi, Siti Fitria Ulfah, and Anshad Ansari, "Analysis of the Association between Stunting and Saliva Potential of Hydrogen (pH) in Preschool Children", International Journal ofAdvanced Health Science and Technology, vol. 4, no.3, pp 95 -99, June 2024

Analysis of the Association between Stunting and Saliva Potential of Hydrogen (pH) in Preschool Children

Silvia Prasetyowati[1], Dian Fitri Ana Dewi[1], Siti Fitria Ulfah[1], and Anshad Ansari[2]

[1] Department of Dental Health, Politeknik Kesehatan Kemenkes Surabaya, Indonesia
[2] Diploma in Oral Health Therapy at Nanyang Polytechnic, Singapore

Corresponding author: Silvia Prasetyowati (e-mail: silviaprasetyowati@poltekkesdepkes-sby.ac.id).

ABSTRACT Stunting can affect dental health due to changes in saliva content. Saliva that cannot work optimally will increase the risk of dental caries. This study highlights the importance of paying attention to oral health in children who are stunted, as changes in their salivary characteristics can increase the risk of dental caries. Provide a foundation for educational campaigns to parents and the community about the importance of oral health care for preschool children at risk of stunting. The problem in this research is the high level of caries in preschool children at the DWP V Jatirejo Kindergarten. This study aims to determine the association between stunting and the potential of hydrogen (pH) in the saliva of preschool children at DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency. The study design was ananalytic observational with a cross-sectional approach, the sample in this study was 40 students who were determined using the Slovin formula with a proportional stratified random sampling technique. The stunting variable data collection method was measuring of Height/Age using microtoise and the saliva pH variable was measured using pH meters, and the data analysis techniques used the chi-squared test. Results: There is an association between stunting and the saliva pH in preschool children at DWP V Jatirejo Kindergarten. The Height/Age measurement results to determine the stunting status of respondents were found to be dominated by short height (stunted), and the saliva pH category of respondents was dominated by the acidic category.

INDEX TERMS Caries, pH Saliva, Preschool Children, Stunting.

I. INTRODUCTION

Malnutrition or nutritional imbalance is a health problem that cannot be fully overcomed by Indonesian government [1]. Height is a single parameter for WHO anthropometric examination which indicates malnutrition status over a long or chronic period of time. A height of children that is shorter or if it is below minus 2 standard deviations (<-2SD) from the WHO median anthropometric standard is said to be experiencing stunting or undernutrition [2][3].

Based on stunting prevalence data obtained by WHO in 2018, Indonesia is included as the third country with the highest prevalence of stunting in the Southeast Asia region. The results of the 2018 Basic Health Research show that the average prevalence of stunted toddlers in Indonesia reached 30.85%, ranking fifth in the world for the highest number of stunting cases. East Java Province has a stunting prevalence of 32.7%, this figure shows that the prevalence of stunting in East Java Province is still above the national average prevalence [4].

This stunting condition can cause several health problems in children, including oral health problems. Children who experience stunting will be more susceptible to dental health problems, including caries because there is a change in the characteristics of saliva, namely a decrease in flow rate and the degree of pH acidity in the oral cavity [5].

The risk factor for dental caries is saliva. Saliva which has a pH value of 5.7 is said to be the critical point for tooth decay. This happens about 2 minutes after the sugar enters the plaque. If sugar enters food and drink that has been swallowed, it takes about 13 minutes to raise the pH above the critical point to stop tooth decay [6][7] Data obtained from the 2019 Global Burden of Disease Study states that the most common oral disease is caries (cavities) which is experienced by around 3.5 M of the world's population and it is estimated that there are 520 million children who experience caries in primary teeth [8]. The percentage of children who experience cavities (caries) reaches 93% in the 5-6 year age range, meaning that only 7% of children in Indonesia are free from dental caries [4].

Data obtained from the 2019 Global Burden of Disease Study states that the most common oral disease is caries (cavities) which is experienced by around 3.5 M of the world's population and it is estimated that there are 520 million children who experience caries in primary teeth [8]. The percentage of children who experience cavities (caries) reaches 93% in the 5-6 year age range, meaning that only 7% of children in Indonesia are free from dental caries [4].

Preschool children are children aged 3 to 6 years, growing with various kinds of potential which, if stimulated and developed, will develop their potential optimally [6]. At this time, almost all children experience a sensitive period where children grow and develop quickly and strongly. A child's growth and development is greatly influenced by health factors, therefore it is very important to pay attention to this from an early age. If a child gets balanced and healthy nutrition, he will grow and develop optimally. The aim of maintaining children's health is to prevent diseases that can hinder children's learning and intelligence [9].

According to several recent studies, it is clear that there is a association between malnutrition, stunting and dental caries [10],[5], [6],[9],[11]. This is also in line with other research which concluded that there was a association between the average value of saliva flow rate, and saliva pH in stunted children and dental caries [13][14].

Dharma Wanita Persatuan (DWP) V Jatirejo Kindergarten is located in Pasuruan Regency, under the working area of the Lekok Health Center. According to data recorded in the Pasuruan Regency Government's Stunting Data Publication Information System (SIPuDing) in August 2023, Jatirejo Village is the Stunting LOKUS (Focus Location) village with the highest number of toddlers experiencing stunting compared to other villages in the Lekok Health Center working area.

The results of the initial examination carried out by researchers at the DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency on 18-19 August 2023 from 14 students found that the average def-t was 10.4, which means it was included in the childhood caries category. severe early onset according to the dental caries standards applied by WHO (World Health Organization) [15].

Based on the background above, the problem in this research is the high level of caries in DWP V Kindergarten students. This research aims to see the association between stunting and the potential of hydrogen (pH) of saliva in preschool children in DWP V Jatirejo Kindergarten , Lekok District, Pasuruan Regency.

II. METHODS

This research was conducted at the Dharma Wanita PBB V Jatirejo Kindergarten, Lekok District, Pasuruan Regency, which was held in January 2024. The study design is an analytic observational study with a cross-sectional approach. The population in this study was all 45 DWP V Jatirejo Kindergarten students. The research sample was determined using the Slovin formula with proportional stratified random sampling technique so that the sample size in this study was 40 students.

The method for collecting data on the stunting variable is by observing TB/U measurements using microtoise. Then the researcher identified the respondent's height and calculated using the TB/U formula to determine stunting status. For ages ≤ 60 months (5 years), identified using the WHO Z-Score anthropometric index (Height divided by Age), and for ages > 60 months (over 5 years), using the CDC-2000 growth curve plot with the formula actual TB divided by ideal TB multiplied by 100% then interpreted into the Waterlow classification.

The data collection method for the saliva pH variable was carried out by observing the degree of saliva acidity using a pH meter. Saliva samples were collected by spitting, namely the respondent's saliva sample was allowed to collect in the oral cavity for 30 seconds and then the saliva was released into a saliva sample container [16], this was done repeatedly until the sample was collected at ± 10 ml. Next, saliva will be measured using a digital pH meter measuring indicator that has been calibrated [17]. The pH meter is inserted into the saliva sample container until it reaches the tip of the electrode, then the tool will automatically show the results of the degree of acidity of the pH saliva.

The data analysis technique used in this research is the chi-squared test to determine the association between the stunting variable and the potential of hydrogen (pH) of saliva in preschool children at DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency.

III. RESULTS

Based on the data presented in TABLE 1, it can be concluded that based on gender the majority of respondents in this study were men (60%). In terms of age, the majority of respondents were 5 years old (57.5%).

TABLE 1
Characteristic of Respondent

Characteristic of Respondents	Frequency (N)	Percentage (%)
Gender		
Boy	24	60
Girl	16	40
Total	40	100
Age (Years)		
4	4	10
5	23	57,5
6	13	32,5
Total	40	100

TABLE 2
Distribution of Height/Age

Height/Age Masurement (Category)	Frequency (N)	Percentage (%)
Normal	9	22,5
Short	31	77,5
Total	40	100

TABLE 2 shows the results of the data collection based on Height/age examination to determine the stunting status of respondents in this study who were dominated by short height, namely 31 students (77.5%).

TABLE 3
Distribution of pH Saliva

pH Saliva	Frequency (N)	Percentage (%)
Acidic	38	95
Neutral	2	5
Alkaline	0	0
Total	40	100

TABLE 3 shows that the majority of respondents in this study had the potential of hydrogen (pH) of saliva in the acidic category, 38 students (95%).

TABEL 4
Chi-squared analysis test between stunting and pH saliva of preschool children

Potential of Hydrogen (pH) Saliva	Stunting (Height/Age measurement)		Total	ρ value
	Normal	Short		
Acidic	7	31	38	0.007
Neutral	2	0	2	
Alkaline	0	0	0	
Total	**9**	**31**	**40**	

Based on TABLE 4 the ρ value is 0.007, so it is known that there is a association between stunting and the potential of hydrogen (pH) of saliva in preschool children at Dharma Wanita PBB V Kindergarten, Jatirejo, Lekok District, Pasuruan Regency.

IV. DISCUSSION

Stunting is also known as a condition where a child experiences a decrease in growth faltering ability as a result of long-lasting malnutrition. The incidence of stunting in Indonesia is still a big problem that requires serious handling from all parties. Therefore, the Indonesian government has now made the stunting management program a national priority program that requires integrated treatment to reduce the increase in the number of cases [18].

Children who experience stunting have a association with dental and oral health based on causal factors related to the First 1000 Days of Birth (HPK). Malnutrition that occurs in the mother and before the child is 2 years old will cause the child to experience stunting, lack of nutrition at 1000 HPK makes stunted children have a higher risk of dental health problems than normal children [19].

The condition of stunting can cause several dental health problems in children, because there is a change in the characteristics of saliva, namely a decrease in the rate of saliva flow and the acidity of the pH of saliva in the oral cavity. Stunting has an impact on susceptibility to infection, especially dental caries and affects the development of teeth, soft tissue and saliva composition in the oral cavity [5].

Saliva has a function, namely to lubricate the oral cavity, as a buffer system and protect against dehydration, to protect the oral cavity by preventing the colonization of pathogenic bacteria and neutralizing the oral cavity from acidic conditions so as to avoid enamel demineralization which causes dental caries [20].

According to the caries theory from Kidd & Bechal there are 3 main factors that cause dental caries, namely the host (saliva and teeth), bacteria, and food. The condition of stunting triggers dental caries due to problems with host components, which increases the risk of dental caries [21]. The condition of stunting causes children to experience hyposalivation, as a result of changes in the characteristics of saliva this causes dry mouth conditions and the pH in the oral cavity becomes acidic so that children who experience stunting are susceptible to dental caries [14].

The degree of pH acidity of saliva is in the neutral category in the oral cavity, namely 6.5-7.5 and if the pH value of saliva falls to ≤ 5.5, it means the situation is very critical. Bacterial growth occurs at low saliva pH (acidic). If the pH of saliva is in a normal state, this can maintain the balance of tooth remineralization and demineralization [22]. The thing to worry about is that if the saliva pH is in the acidic category, it can trigger enamel demineralization and increase the risk of developing bacteria that cause dental caries [23]. During the demineralization process, the result of a decrease in pH to acid causes the buffer to not function properly, thereby triggering the formation of cavities [24][25].

Based on the results of research observations, respondents' height measurements were dominated by short TB (stunting) and the results of measuring the average respondent's saliva pH were low (acidic) or (< 7). Low saliva pH (acidic) in the oral cavity as a result of stunting will facilitate the development of acidogenic bacteria such as streptococcus mutans and lactobacillus, which are the main microorganisms that cause the formation of dental caries [26]

This is in accordance with research conducted by Rahayu et al. which explains that there is a association between salivary pH and the occurrence of dental caries in preschool children. The lower the saliva pH, the higher the risk of dental caries, however, dental caries will still occur when the saliva pH is alkaline or normal. Therefore, many other factors influence the formation of dental caries, but saliva has a big influence which is also supported by other factors such as food, which makes the pH of saliva acidic.

According to research conducted by oleh Kazakova N.N & Sobirov there are several factors that influence the pH of saliva in the oral cavity, including food selection and level of oral hygiene, age, and other factors. When you don't consume balanced nutritious foods rich in fiber and don't reduce your consumption of cariogenic foods and don't practice proper maintenance of dental and oral hygiene, this can cause the pH of your saliva to become more acidic. Several factors that influence changes in saliva pH include the average saliva flow rate, microorganisms in the oral cavity, saliva buffer capacity, and food [29]. A significant and continuous decrease in saliva pH will result in enamel demineralization which is susceptible to the risk of cavity formation [22]. pH will result in enamel demineralization which is susceptible to the risk of cavity formation [22].

Based on the results of the research, it shows that there is a association between stunting and the potential of Hydrogen

(pH) of saliva in preschool children at DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency. Also supported by research conducted explains that there is a association between salivary pH and the occurrence of dental caries in preschool children. The lower the saliva pH, the higher the risk of dental caries, however, dental caries will still occur when the saliva pH is alkaline or normal. The lower the saliva pH, the higher the risk of dental caries, however, dental caries will still occur when the saliva pH is alkaline or normal.

Also supported by research conducted by Asriawal & Jumriani it is explained that there is a association between the level of dental caries in preschool children and stunting, the lower the saliva pH, the higher the risk of dental caries. Acidic and basic conditions can be shown on a pH measurement scale of around 0-14 with the lower the inverse ratio, the more acidic the pH value is in the solution. Meanwhile, increasing the pH value means increasing alkaline in the solution, a value of 0 is a very low pH compared to acid, pH 7 is neutral, and a pH above 7 is alkaline with a pH limit of 14.8. This is also supported by the results of research conducted by Setyorini et al. stated that the reason why stunted children have a high risk of dental health problems is because the role of host saliva or saliva as self-cleaning is disrupted.

Research conducted by Pebruanti & Rokhaidah has explained several factors that cause stunting in preschool children, namely low level of education and family income. Both conditions of stunting and saliva pH are chronic, therefore further research is needed to further analyze the association between stunting and saliva pH on dental caries.

The implications of this study are to demonstrate that children experiencing stunting have a tendency towards acidic saliva pH, which poses a risk factor for the formation of dental caries. The findings of this research highlight the importance of understanding the relationship between general health conditions, such as stunting, and dental health in preschool children [31]. These implications emphasize the importance of early detection of stunting in preschool children and taking appropriate preventive measures to reduce the risk of dental caries [32].

The study findings can serve as a basis for the development of dental health education programs targeting preschool children at risk of stunting. These programs can include information about the importance of good dental care and healthy eating habits to reduce the risk of dental caries and improve overall health [33]. The implications of this research can also provide a foundation for the development of more holistic health policies that integrate general healthcare with dental care, especially within the context of preschool education in kindergartens [34].

V. CONCLUSION

The purpose of this study is to determine the relationship between stunting and the potential of hydrogen (pH) in the saliva of preschool children at DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency. Based on the results of previous research and discussion, it can be concluded that there is a association between stunting and the potential of Hydrogen (pH) of saliva in preschool children at DWP V Jatirejo Kindergarten, Lekok District, Pasuruan Regency with ρ (0.007) < 0.05.

Even though a child only has primary teeth in his oral cavity, a child still needs to get serious attention from his parents because milk teeth will affect the growth of the child's permanent teeth later. The role of parents is very important and needed in guiding, understanding, reminding, and providing and seeking facilities that support children to maintain healthy teeth and mouth [35].

Recommendations for further research is to include other factors that have the potential to influence saliva pH, such as diet and oral health maintenance to deepen understanding of the association between nutrition and oral health in stunted toddlers.

REFERENCES

[1] Isnanto, H. Maryam, and C. M. Ida, "Determinan Status Gizi Pada Status Kesehatan Gigi Anak Usia Sekolah: Systematic Literature Review," *JDHT J. Dent. Hyg. Ther.*, vol. 2, no. 2, pp. 62–71, 2021, doi: 10.36082/jdht.v2i2.336.

[2] Sirajuddin, S. Rauf, and N. Nursalim, "Asupan Zat Besi Berkorelasi Dengan Kejadian Stunting Balita Di Kecamatan Maros Baru," *Gizi Indones.*, vol. 43, no. 2, pp. 109–118, 2020, doi: 10.36457/gizindo.v43i2.406.

[3] M. T. Rini, K. Suryani, B. D. Hardika, and N. K. Widiastari, "Analisis Faktor Penyebab Kejadian Stunting," *J. Keperawatan Florence Nightingale*, vol. 6, no. 1, pp. 8–12, 2023, doi: 10.52774/jkfn.v6i1.112.

[4] Kemenkes RI, "Hasil Riset Kesehatan Dasar Tahun 2018. Kementrian Kesehatan RI, 53(9), 1689–1699.tan Dasar Tahun 2018," *Kementeri. Kesehat. RI*, vol. 53, no. 9, 2018.

[5] A. Lutfi, R. Flora, H. Idris, and M. Zulkarnain, "Hubungan Stunting dengan Tingkat Keparahan Karies Gigi pada Anak Usia 10-12 Tahun di Kecamatan Tuah Negeri Kabupaten Musi Rawas," *J. Akad. Baiturrahim Jambi*, vol. 10, no. 2, p. 426, 2021, doi: 10.36565/jab.v10i2.395.

[6] Asriawal and Jumriani, "Hubungan Tingkat Karies Gigi Anak Pra Sekolah Terhadap Stunting Di Taman Kanak-Kanak Oriza Sativa Kecamatan Lau Kabupaten Maros," *Media Kesehat. Gigi Politek. Kesehat. Makassar*, vol. 19, no. 1, pp. 33–40, 2020, doi: 10.32382/mkg.v19i1.1576.

[7] I. A. D. K. Ratih and N. L. P. S. I. Dewi, "Hubungan Perilaku Makan Permen Dengan Karies Pada Siswa Sdn 1 Dawan Kaler Kabupaten Klungkung Tahun 2017," *Dent. Heal. J.*, vol. 6, no. 2, pp. 2017–2020, 2019.

[8] World Health Organization, "Global oral health status report 2022: Actions, discussion and implementation," *Oral Dis.*, vol. 000, no. December 2022, pp. 1–7, 2022, doi: 10.1111/odi.14516.

[9] Z. Nina and Suparni, "Perkembangan Dan Pemeliharaan Kesehatan Pada Anak Usia Dini Sebagai Upaya Deteksi Dini Tumbuh Kembang Anak di Paud/TK ABA Bligo Kecamatan Buaran Kabupaten Pekalongan," *JABI J. Abdimas Bhakti Indones. Vol. 2, No. 1*, vol. 2, no. 1, pp. 1–10, 2021.

[10] D. Andriyani, A. Arianto, and R. Chandra, "Short Nutrition Status (Stunting) With Dental Carries in Preschool Children in Sukabumi Indah Village, Bandar Lampung City," *JDHT J. Dent. Hyg. Ther.*, vol. 4, no. 1, pp. 8–12, 2023, doi: 10.36082/jdht.v4i1.903.

[11] I. K. Wardani, R. K. Dewi, and E. Norfitriah, "Correlation Between Caries And Stunting Incidence Among Children In Banjarmasin Elementary School," *J. Mitra Rafflesia*, vol. 14, no. 2, 2022.

[12] M. O. Folayan *et al.*, "Association between early childhood caries and malnutrition in a sub-urban population in Nigeria," *BMC Pediatr.*, vol. 19, no. 1, pp. 19–21, 2019, doi: 10.1186/s12887-019-1810-2.

[13] M. T. Abadi and A. Abral, "Pathogenesis of Dental Caries in Stunting," *J. Kesehat. Gigi*, vol. 7, no. 1, pp. 1–4, 2020, doi:

10.31983/jkg.v7i1.5383.
[14] A. P. Pratiwi, R. Adhani, and I. K. Wardani, "Correlation Of Salivary Flow Rate in Stunting Children to Dental Caries Level The Overview of Elementary School Students in Sungai Tiung, Kecamatan Cempaka, Banjarbaru," *Dentin*, vol. 7, no. 1, pp. 22–27, 2023, doi: 10.20527/dentin.v7i1.8334.
[15] A. Fitriana and N. Kasuma, "Gambaran Tingkat Kesehatan Gigi Anak Usia Dini Berdasarkan Indeks Def-T Pada Siswa Paud Kelurahan Jati Kota Padang," *Andalas Dent. J.*, vol. 1, no. 1, pp. 29–38, 2013, doi: 10.25077/adj.v1i1.3.
[16] I. K. Harapan, A. A. Tahulending, and S. I. Andolo, "Differences in Salivary pH Brushing Before and After Consuming Sweet Foods in Grade 7 Students of State Junior High School 05 Tuminting, Kota Madya Manado," vol. 2, no. 1, pp. 19–25, 2019.
[17] A. Hindayani, F. I. Permatasari, and A. S. Putri, "Guide to pH Measurement with Two-Point Calibration Technique," *Direktorat Standar Nas. Satuan Ukuran Termoelektr. dan Kim. Badan Stand. Nasiona*, p. 1, 2022.
[18] H. Rahman, M. Rahmah, and N. Saribulan, "Upaya Penanganan Stunting di Indonesia Analisis Bibliometrik dan Analisis Konten," *J. Ilmu Pemerintah. Suara Khatulistiwa*, vol. VIII, no. 01, pp. 44–59, 2023.
[19] A. T. Normansyah, D. Setyorini, R. Budirahardjo, B. Prihatiningrum, and S. Dwiatmoko, "Caries index and nutritional intake of stunted children," *J. Kedokt. Gigi Univ. Padjadjaran*, vol. 34, no. 3, p. 266, 2022, doi: 10.24198/jkg.v34i3.34080.
[20] H. Sawitri and N. Maulina, "Derajat pH Saliva Pada Mahasiswa Program Studi Kedokteran Fakultas Kedokteran Universitas Malikussaleh Yang Mengkonsumsi Kopi Tahun 2020," *AVERROUS J. Kedokt. dan Kesehat. Malikussaleh*, vol. 7, no. 1, p. 84, 2021, doi: 10.29103/averrous.v7i1.4729.
[21] E. A. M. Kidd and S. J. Bechal, *Essentials of dental caries : the disease and its management*, 2nd ed. Jakarta: Penerbit Buku Kedokteran ECG, 2013.
[22] D. Anisa, "The effect (pH) of saliva on the occurrence of dental caries in school-age children," *Politek. Kesehat. Kemenkes Medan Jur. Kesehat. Gigi*, no. 13, 2021.
[23] I. S. A. Habib, R. Wihardja, and S. Kintawati, "The difference of salivary pH in pregnant and non-pregnant women," *J. Kedokt. Gigi Univ. Padjadjaran*, vol. 31, no. 1, pp. 37–42, 2019.
[24] L. T. Marthinu and M. Bidjuni, "Penyakit Karies Gigi Pada Personil Detasemen Gegana Satuan Brimob Polda Sulawesi Utara Tahun 2019," *JIGIM (Jurnal Ilm. Gigi dan Mulut)*, vol. 3, no. 2, pp. 58–64, 2020, doi: 10.47718/jgm.v3i2.1436.
[25] D. R. Janah, W. Widodo, and R. Adhani, "The effect of fruit juice drinks on changes in the degree of acidity (pH) of saliva," *Dentin*, vol. 5, no. 3, pp. 154–161, 2021.
[26] E. Zahara, Niakurniawati, and Mufizarni, "Derajat Keasaman (pH) Saliva dengan Karies Gigi di SDN Kayee Leue Kabupaten Aceh Besar," vol. 4, pp. 13–17, 2023, doi: 10.36082/jdht.v4i1.925.
[27] C. Rahayu, N. S. Meilasari, and H. Miko, "The relationship between salivary pH and children's behavior in maintaining dental health with the occurrence of dental caries in preschool-aged children," *Heal. Inf. J. Penelit.*, vol. 15, pp. e844–e844, 2023.
[28] Kazakova N.N and Sobirov, "Changes in saliva in children with comorbidities," *J. Innov. Dev. Pharm. Tech. Sci.*, vol. 2021, no. 3, pp. 14–17, 2021.
[29] N. Kusuma, "Fisiologi dan Patologi Saliva," *Andalas University Press*, vol. 2, no. 5. p. 54, 2015. [Online]. Available: http://eprints.undip.ac.id/43725/%0Ahttp://repo.unand.ac.id/3650/1/01.Buku-Fisiologi-dan-Patologi-Saliva.pdf
[30] P. Pebruanti and Rokhaidah, "Hubungan Picky Eating Dengan Kejadian Stunting Pada Anak Prasekolah Di Tka Nurul Huda Tumaritis Kabupaten Bogor," *J. Keperawatan Widya Gantari Indones.*, vol. 6, no. 1, pp. 1–11, 2022, [Online]. Available: https://ejournal.upnvj.ac.id/Gantari/article/view/3181
[31] G. Gunawan, J. I. C. Manoppo, and R. Wilar, "The Relationship between Stunting and Learning Achievement of Elementary School Children in Tikala Manado District," *e-CliniC*, vol. 6, no. 2, pp. 147–152, 2018, doi: 10.35790/ecl.6.2.2018.22128.
[32] C. Angelica, L. S. Sembiring, and W. Suwindere, "The influence of higher education level and maternal behaviour on the def-t index in children aged 4–5 years old," *Padjadjaran J. Dent. Res. Students*, vol. 3, no. 1, p. 20, 2019, doi: 10.24198/pjdrs.v3i1.22484.
[33] C. M. Amelinda, A. T. W. Handayani, and Kiswaluyo, "Oral Health Profile Based on WHO Standards in Community of Kaliwates Subdistrict Jember Regency," *Stomatogantic, J. Kedokt. Gigi UNEJ*, vol. 19, no. 1, pp. 37–44, 2022.
[34] H. Y. Ningsih and T. P. Agustin, "Overview of pH Saliva in Children Aged 5-10 Years (Study on Pediatric Patients at the Pedodonsia Clinic of FKG Usakti)," *J. Kedokt. Gigi Terpadu*, vol. 1, no. 1, pp. 40–44, 2019, doi: 10.25105/jkgt.v1i1.5149.
[35] N. S. Prasiska, L. Maria, and P. Zeisar Rahmawati, "Hubungan Antara Peran Orangtua dengan Teknik Menggosok Gigi yang Baik dan Benar pada Anak Pra Sekolah Usia 4-6 Tahun," *Prof. Heal. J.*, vol. 2, no. 2, pp. 90–100, 2021, doi: 10.54832/phj.v2i2.129.