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Research Article

The relationship between oral health and confidence of resident after the COVID-19 booster vaccination: a descriptive study

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ABSTRACT

Introduction: The governments globally, including in Indonesia, aimed to return to pre-pandemic conditions via widespread vaccination. Indonesia mandated full and booster doses. The pandemic had impacted oral health, leading to increased stress and difficulties in oral cavity checks. This study investigated the link between dental/oral health and confidence of community post-COVID-19 booster vaccination. **Methods:** The study was a descriptive correlational research on oral health's connection to confidence among Medan City residents who had received a COVID-19 vaccine booster. It employed non-probability sampling with convenience samples. The respondents were individuals who completed an online Google Form questionnaire. The research took place from May to June 2023, and the relationship between dental/oral health and confidence was analyzed using the Spearman correlation test. **Results:** The gathered data that met the population criteria consisted of 460 individuals. 412 (89.6%) individuals were categorized as having good oral health, while 448 (97%) were categorized as having good self-confidence. There was a positive and moderate correlation between oral health and self-confidence in the people of Medan City after receiving the COVID-19 booster vaccine, with a Spearman correlation coefficient of p=0.363. There was a positive correlation between oral health and self-confidence in the people of Medan city after receiving the COVID-19 booster vaccine. **Conclusion:** The relationship between oral health and confidence in health of residents after the COVID-19 booster vaccination based on this study was a positive correlation with moderate strength.

KEY WORDS: dental health, community, confidence, post vaccination, COVID-19, booster.

Hubungan kesehatan gigi dan mulut dengan kepercayaan diri masyarakat pasca vaksin COVID-19 taraf booster: studi deskriptif

ABSTRAK

Pendahuluan: *Pemerintah secara global, termasuk di Indonesia, bertujuan untuk kembali ke kondisi sebelum pandemi melalui vaksinasi massal. Indonesia mewajibkan dosis penuh dan dosis penguat. Pandemi telah berdampak pada kesehatan gigi dan mulut, meningkatkan stres dan kesulitan dalam pemeriksaan rongga mulut. Studi ini menyelidiki hubungan antara kesehatan gigi/mulut dan kepercayaan diri masyarakat setelah vaksinasi penguat COVID-19.* ***Metode:*** *Studi ini merupakan penelitian deskriptif korelasional tentang hubungan antara kesehatan gigi dan mulut dengan rasa percaya diri di antara penduduk kota Medan yang telah menerima vaksin booster COVID-19. Penelitian ini menggunakan teknik sampling non-probabilitas dan convenience. Responden penelitian adalah individu yang telah menyelesaikan kuesioner Formulir Google secara daring. Penelitian ini dilakukan dari Mei hingga Juni 2023. Hubungan antara kesehatan gigi/mulut dan rasa percaya diri dianalisis menggunakan uji korelasi Spearman.* ***Hasil:*** *Data yang terkumpul yang memenuhi kriteria terdiri dari 460 individu. Sejumlah 412 (89,6%) individu dikategorikan memiliki kesehatan gigi yang baik, sedangkan 448 (97%) dikategorikan memiliki kepercayaan diri yang baik. Terdapat korelasi positif dan sedang antara kesehatan gigi dan kepercayaan diri di masyarakat setelah menerima vaksin booster COVID-19, dengan koefisien korelasi Spearman p=0,363. Terdapat korelasi positif antara kesehatan gigi dan kepercayaan diri di masyarakat Kota Medan setelah menerima vaksin booster COVID-19.* ***Simpulan:*** *Hubungan antara kesehatan gigi dan kepercayaan diri penduduk setelah menerima vaksin booster COVID-19 memiliki korelasi positif dengan kekuatan sedang.*

KATA KUNCI: *kesehatan gigi, masyarakat, kepercayaan diri, pasca vaksin, COVID-19, booster.*

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INTRODUCTION

Oral health pertains to the condition characterized by the absence of oral and facial ailments, oral diseases, and impairments that hinder an individual's ability to perform essential functions such as biting, chewing, smiling, and speaking, along with their overall psychosocial well-being.[1] Self-confidence is a positive attitude of an individual that enables them to cultivate positive self-assessments, both towards themselves and their environment.[2] High self-confidence is associated with life satisfaction and fewer health issues, such as regular tooth brushing and dental check-ups, resulting in fewer oral health impacts. On the other hand, low and unstable self-confidence increases the risk of oral health problems.[3] Good oral health, coupled with strong self-confidence, will foster life satisfaction without limiting an individual's capacity.[3]

An individual's self-confidence concerning their health encompasses several aspects, such as knowledge, which refers to the extent of understanding of one's own health condition, the ability to maintain personal health, social skills to navigate health care and treatment systems to access needed services, and the capacity to make health-related decisions for oneself.[4] Self-confidence is linked to an individual's ability to recognize and maintain their health condition and the necessary care it requires.[4]

In December 2019, an outbreak of pneumonia emerged in Wuhan, China, linked to a https://docs.google.com/document/d/1H8iWW9BXysISltqG9hK8DNFFSIoZjOQW/editseafood market. On January 7, 2020, it was identified as COVID-19 caused by the novel coronavirus, SARS-CoV-2. COVID-19 primarily spreads through respiratory droplets, causing symptoms like fever, cough, and shortness of breath, with severe cases leading to pneumonia and even death. Vaccines like AstraZeneca, Johnson & Johnson, Moderna, Pfizer/BioNTech, and others have been recommended by the WHO since April 8, 2022. Indonesia had implemented vaccination programs, with a high percentage of the population receiving primary and booster doses. Medan City had also organized vaccination drives, including booster shots, to combat the rapid transmission of COVID-19.

The COVID-19 pandemic had also impacted oral health, such as an increase in individual stress and difficulties in accessing oral health check-ups during this pandemic period. As a result, COVID-19 had affected the oral health of many people worldwide. This new adaptation was also related to promoting a healthy self-confidence within the society.[2,10] The COVID-19 pandemic, which induced anxiety, stress, and challenges in accessing healthcare services, including dental and oral care, had significant impacts on the community of Medan City.

Medan City is the third-largest city in Indonesia, with a population of 2,970,032 people distributed across 21 sub-districts.[11] Medan City is the capital of North Sumatra Province and had been affected by Coronavirus Disease (COVID-19) until the first week of October 2022, with a total of 75,589 confirmed positive cases of COVID-19 and 74,431 individuals declared as recovered.[12,13] On January 15, 2021, the city of Medan commenced the COVID-19 vaccination program. The Regional Secretary (Sekda) of Medan was the first person to receive the COVID-19 vaccine in the city.[12] According to the data from the Medan City Health Department's website, 89.55% of the provincial target population has received the first dose of the vaccine, 79.44% have received the second dose, and 27.42% have received the third dose of the vaccine.[13] The Health Department of Medan City stated that they are still negligent in implementing the COVID-19 health protocols.[14] As a result, the community of Medan city experienced anxiety both among patients and dental practitioners regarding dental polyclinic services during the COVID-19 pandemic.[15]

While there is general awareness of the impact of the COVID-19 pandemic on public health, including mental health, there may be a lack of specific research focusing on the effects of the pandemic on oral health outcomes, as well as self-confidence in relation to health behaviors, among individuals who have received the COVID-19 booster vaccination in Medan City. A considerable portion of the Medan City population has already received the COVID-19 booster vaccination. Based on this data, the author aimed to examine the relationship between

oral health of the community and the self-confidence of resident after receiving the COVID-19 booster vaccination.

METHODS

The type of research conducted was a descriptive correlational study, with the population comprising respondents who had been impacted by the COVID-19 pandemic and had received the COVID-19 booster vaccination in Medan City. The inclusion criteria for this study were Indonesian citizens aged above 17 years, residing in areas affected by the COVID-19 pandemic, who had already received the COVID-19 booster vaccination, and are currently residing in Medan city. The exclusion criteria for this study were incomplete data from respondents. The minimum sample size was determined using the correlations sample formula The number of respondents obtained was 460.

The development of this questionnaire referred to the research conducted by Benson, *et al*.,[4] and Balafif et al.,[17] in which the questionnaire served as a tool to evaluate oral health, encompassing seven dimensions: efforts to maintain dental and oral hygiene, history of dietary consumption patterns, dental practitioner visits, history of calculus, history of smoking, history of alcohol consumption, and history of dental and oral diseases. Each dimension comprised specific items designed to assess various aspects of oral health behaviors and conditions. The questionnaire items were derived from established measures utilized in oral health research, and had been cross-culturally adapted into Bahasa Indonesia. Responses to the questionnaire were scored based on a predetermined scale, with a minimum total score of 0 and a maximum total score of 19, with each item contributing to a total score reflecting the overall oral health status of the respondents.

The data collected through this questionnaire facilitated statistical analysis to explore correlations with other variables. On the other hand, the Benson questionnaire focused on assessing self-confidence in health, featuring four dimensions: knowledge, self-management, access to help, and shared decision-making. The questionnaire items were possibly adapted from existing measures of self-efficacy or confidence in health, and had been cross-culturally adapted into Bahasa Indonesia. Each item in the questionnaire measured specific aspects of an individual's confidence in managing their own health-related decisions and behaviors. Responses to the questionnaire items were scored using a predetermined scale, allowing for the calculation of a total score representing the overall self-confidence of the respondents in health. The minimum score was 1 and the maximum score was 3. To examine the correlation between these two variables with an ordinal scale, the Spearman statistical test would be used. The measurement for each dimension was calculated by dividing the respondent's score by the maximum score and then multiplying it by 100%. The results of these calculations were then categorized as "poor" if the score ranged from 0% to 49% and "good" if it ranged from 50% to 100%. The data in this study were obtained through the completion of a questionnaire in the form of a *Google Form* given to the respondents. Subsequently, the data were processed, measured, and calculated using Microsoft Excel 2013 and statistical analysis to describe the implementation of the data.

RESULTS

The researchers distributed the questionnaires from May 20, 2023, to June 5, 2023, after obtaining approval from the Research Ethics Commission of Universitas Padjadjaran. The number of respondents obtained exceeded the predetermined target and amounted to 460 respondents. The data collection that met the population criteria surpassed the minimum sample size relatively quickly because the community in Medan City, especially the Batak ethnic group, has a culture of close family relationships, where members of the community are supportive and helpful to one another. The questionnaire was tested for validity using the Content Validity Index (CVI) method, and it obtained a mean I-CVI of 0.98, which indicated very high validity [18] Additionally, for the test-retest reliability method, the results from the

software showed excellent reliability, confirming that the questionnaire was both valid and reliable, and the data obtained could be processed.[19] The data of the research respondents and their distribution can be seen in Table 1. The number of male and female respondents accounted for 53% and 47% of the total, respectively. The majority of respondents resided in Kec. Medan Denai (13.9%), Kec. Medan Kota (7.8%), and Kec. Medan Amplas (7.8%). The highest proportion of respondents fell within the late adolescent age group, specifically between 17 and 25 years old (41.5%). A significant portion of the respondents were civil servants or government employees (28.9%).

Table 1. Distribution of respondents based on characteristics (n=460)

Characteristic of respondents	n	%
Gender		
Female	216	47%
Male	244	53%
Age		
17-25	191	41.5
26-35	115	25
36-45	91	19.8
46-55	42	9.1
56-65	21	4.6
Place Of Residence		
District of Medan Amplas	36	7.8
District of Medan Area	9	2
District of Medan Barat	11	2.4
District of Medan Baru	25	5.4
District of Medan Belawan	8	1.7
District of Medan Deli	13	2.8
District of Medan Denai	64	13.9
District of Medan Helvetia	36	7.8
District of Medan Johor	27	5.9
District of Medan Labuhan	8	1.7
District of Medan Kota	36	7.8
District of Medan Maimun	2	0.4
District of Medan Marelan	10	2.2
District of Medan Perjuangan	15	3.3
District of Kec.Medan Petisah	15	3.3
District of Medan Polonia	4	0.9
District of Medan Sunggal	26	5.7
District of Medan Selayang	32	7
District of Medan Tuntungan	24	5.2
District of Medan Timur	13	2.8
others	46	10
Occupation		
Healthcare Professional	28	6.1
Student/Scholar	101	22
Employee	85	18.5
Educator	8	1.7
Housewife	16	3.5
Civil Servant/Government Employee	133	28.9
Other	89	19.3
Educational Level		
Elementary School or Equivalent	0	0
Junior High School or Equivalent	0	0
Senior High School or Equivalent	119	25.9
Diploma 1 (D1)	11	2.4
Diploma 2 (D2)	0	0
Diploma 3 (D3)	36	7.8
Bachelor's Degree (S1)	254	55.2
Master's Degree (S2)	40	8.7
Doctoral Degree (S3)	0	0

Table 2 shows that the variable of self-confidence among the residents of Medan city was good, with an overall percentage of 80%.

Table 2. Presents the data of respondents' answers for the variable of self-confidence (n= 460)

Dimension	Question	Answer: strongly agree	Answer: agree	Answer: disagree	Score	Maximum score	%	Criteria
Able to know one's own health condition	P1	223	226	11	1132	1380	82	Good
Able to know one's own dental health condition	P2	189	231	40	1069	1380	77	Good
Able to take care of one's own health	P3	229	214	17	1132	1380	82	Good
Able to obtain appropriate help	P4	193	250	17	1096	1380	79	Good
Able to make decisions	P5	207	234	19	1108	1380	80	Good
	Total				**5537**	**6900**	**80**	**Good**

Table 3. presents the data of respondents' answers based on the variable of oral health

Dimension	Answer	Total	Score	Maximal score	%	Criteria
Frequency of toothbrushing	Twice a day	420	420	460	91	Good
	Once a day	40				
Using fluoride toothpaste	Yes	391	391	460	85	Good
	No	69				
Using dental floss after brushing	Yes	148	148	460	32	Not Good
	No	312				
Using mouthwash	Yes	213	213	460	46	Not Good
	No	247				
Reducing the consumption of sugary foods and drinks	Yes	216	216	460	47	Not Good
	No	244				
Consuming foods and drinks according to Recommended Dietary Allowances (RDA)	Yes	367	367	460	80	Good
	No	93				
Consuming at least 5 types of fruits and vegetables daily	Yes	229	229	460	50	Good
	No	231				
Consuming 2 servings of fish per week	Yes	392	392	460	85	Good
	No	68				
Reducing the consumption of red and processed meat	Yes	254	254	460	55	Good
	No	206				
Meeting the daily water intake of 6-8 glasses per day	Yes	436	436	460	95	Good
	No	24				
Dental Consultation	Once a year or more often	206	206	460	45	Not Good
	Once every few years or when there is pain	254				
Undergoing Calculus Removal	Once a year or more	268	268	460	58	Good
	Never	192				
Cigarette Smoking	Never	358	358	460	78 %	Good
	Yes, 1-10 cigarettes per day	68				
	Yes, more than 10 cigarettes per day	34				

Alcohol Consumption	Yes	85	375	460	82	Good
	No	375				
Experiencing Gingival Bleeding	Very rarely or never	409	409	460	89	Good
	Every toothbrushing or almost every toothbrushing	51				
Having Tooth Mobility	Not at all	405	405	460	88	Good
	Yes	55				
Having Cavities in Teeth	No teeth with cavities	331	331	460	72	Good
	One or two teeth with cavities	116				
	Three or more cavities in teeth	13				
Experiencing Toothache	Yes	126	334	460	73	Good
	Not at all	334				
Having Unpleasant Breath Odor	Yes	128	332	460	72	Good
	No	332				
Total			**6084**	**8740**	**70**	**Good**

Table 3 also indicates that the oral health of the residents of Medan city was good. However, the use of dental floss, mouthwash, consumption of sugary foods and drinks, and dental consultations were found to be less satisfactory, with percentages below 50%. Overall, the oral health of the residents of Medan City was considered good, with a percentage of 70%.

Table 4. Relationship between oral health and self-confidence

Oral Health	Self-confidence				Spearman's correlation coefficient
	Good		Not good		
	f	%	f	%	
Good	405	88	7	2	0.363
Not Good	43	9	5	1	

The analysis of respondents' answers regarding the relationship between oral health and self-confidence of the residents of Medan City after receiving the COVID-19 booster vaccination showed a positive correlation with moderate strength based on the Spearman test, with a Spearman correlation coefficient of 0.363 and a p-value of 0.001 in Table 4.

DISCUSSION

Oral health is a crucial aspect of overall body health. This is because the teeth and mouth act as the gateway for the entry of germs and bacteria, which can disrupt the health of other bodily organs.[20] Self-confidence is an attitude or a feeling of assurance in one's abilities, leading the individual to be less anxious in every action and take responsibility for all their action.[21] Research in Saudi Arabia suggested that the oral health condition, especially satisfaction with one's appearance, significantly influences an individual's self-confidence in engaging in social interactions.[22] COVID-19 vaccination offers several benefits, namely stimulating the immune system, reducing the risk of transmission, mitigating severe virus impacts, and contributing to achieving herd immunity. Research in Turkey indicated that COVID-19 booster vaccinations influence a decrease in individuals' anxiety when visiting dental professionals, and as a result, there has been an increase in the number of patients visiting dentists.[23]

This research indicated that almost all respondents had good self-confidence. This included the fact that almost all respondents strongly agreed and agreed with the statement on being able to assess their own health (p1) in table 2. The public's self-confidence in their ability to understand and maintain their health yielded positive outcomes in preventing various diseases such as diabetes, depression, and heart diseases. [4] In another study in 2020.[24] it was found that 46.4% of the elderly population had a poor self-assessment of their health. This could be attributed to the fact that self-assessment of health was heavily influenced by the

respondents' age, as they belong to the elderly age group. However, in this current study, almost all participants had a positive self-assessment of their health and oral health, mainly due to the dominance of adult respondents. Moreover, 91.3% of the respondents agreed and strongly agreed with the statement on being able to assess their own dental health (p2)

This research showed that 96.3% of the respondents strongly agreed and agreed with the statement on the ability to maintain one's own health (P3). Self-health maintenance behavior is influenced by an individual's capability, opportunity, and motivation to improve their health. Therefore, behavior change interventions form the foundation for clinical medical practice and public health. Self-health maintenance behavior can be defined as a series of coordinated activities designed to alter specific behavioral patterns. Generally, these behavioral patterns are measured in relation to the prevalence or incidence of certain behaviors within a specific population.[25] Other research indicated that the level of public awareness in improving health during the pandemic was 78.8%. Adopting a healthy lifestyle during the pandemic was one of the preventive measures against COVID-19 infection. Healthy habits such as consuming nutritious food, engaging in regular exercise, and getting sufficient rest appeared to have increased during the COVID-19 pandemic.[24]

The statement can obtain appropriate assistance (P4). As many as 96.3% (443) of the respondents stated that they strongly agreed and agreed that it was easy to get help. Obtaining appropriate assistance means being able to receive the right help and care when in need of assistance and treatment in the field of health.[4] In Another study, the occurrence of the COVID-19 pandemic had led to many communities experiencing anxiety and confusion in accessing medical treatment. The reduction in access to healthcare services, surgeries, and other hospital services, coupled with the fear of virus exposure, had made it increasingly challenging to obtain medical treatment.[26] The difficulty in accessing medical treatment and the increase in disease symptoms were being addressed by the emergence of Telemedicine, as a means to access healthcare professionals and seek assistance for illnesses.[27]

The statement "Decision-making" could be done by 95.8% (441) of respondents who strongly agreed and agreed (p5). Making decisions about health is the involvement of the community in decision-making that affects all aspects of their health related to opportunities and how healthcare services and treatments support the decisions made. Decision-making is a means to protect patient autonomy and to understand regional variations in the use of medical care. An individual's ability to make decisions about their health has a positive influence on their well-being.[4] This is consistent with other research where the majority of respondents indicated a high level of proficiency in making healthcare decisions. This is also related to the increasing health literacy and the public's familiarity with technology, which enables them to make informed decisions regarding their health.[63]

Anxiety about visiting dental practices is a common phenomenon, but the pandemic situation had exacerbated this anxiety due to dental clinics being environments where the risk of contracting viruses was very high.[28] A study in Pakistan showed that after receiving the vaccine, the level of patient anxiety significantly decreased when visiting dental practices. Vaccination was one of the efforts to control the transmission rate and infectivity of the COVID-19 virus. COVID-19 vaccination affected the willingness of the community to visit dental practices. Self-confidence, which includes knowledge, self-management, access to help, and shared decision-making, has a relationship with age and anxiety experienced by the community.[28]

Table 3 shows that the oral health of the Medan City community after receiving the COVID-19 booster vaccine was mostly good (70%). This research showed that 91% of the respondents had the behavior of brushing their teeth twice a day. Brushing teeth is a healthy behavior that, according to the Federation Dentaire Internationale (FDI), should be done at least twice a day,[29] after breakfast to clean plaque/dirt from the tooth surface and to remove food debris from the mouth, and at night before bedtime because bacteria become more active due to reduced saliva flow during sleep, increasing the risk of tooth decay if teeth are not brushed, making them susceptible to cavities. In another study,[30] it was stated that the

frequency of teeth and oral cleaning as a form of behavior would affect the poor dental and oral hygiene, which in turn could influence the prevalence of dental caries and periodontal diseases.

The results of this data showed that the majority of respondents already practiced brushing their teeth twice a day, which was also consistent with another study conducted in Bandung where 87.9% of the respondents brushed their teeth twice a day. This might be attributed to the fact that most respondents were civil servants (PNS) and had a bachelor's degree. Education is a socioeconomic factor that influences health status, including dental health.

Education significantly impacts oral health by enhancing knowledge and awareness of oral hygiene practices, particularly among those with higher education levels. Additionally, education correlates with higher socioeconomic status, providing better access to dental care resources such as preventive care and treatments. Moreover, education influences behavioral factors, leading individuals to make healthier lifestyle choices that positively affect oral health. Furthermore, higher education levels are associated with higher income levels, enabling individuals to afford dental treatments and preventive care. Overall, education plays a crucial role in promoting oral health through improved knowledge, access to resources, and behavioral changes.[64,65]

The use of fluoride toothpaste was found in the majority of respondents (85%). Fluoride has three mechanisms for controlling dental caries, namely enhancing remineralization, inhibiting demineralization, and inhibiting glycolysis in cariogenic bacteria. [31] Fluoride is an essential mineral in preventing tooth decay. There is a relationship between fluoride and dental caries. The use of toothpaste containing fluoride can help prevent tooth decay by strengthening tooth enamel.[32,33,34] Based on the data from this study, the majority of respondents were already aware of the contents of toothpaste, and this was consistent with another research where 60% of the respondents agreed with the statement that fluoride toothpaste was used for brushing teeth, indicating that respondents had knowledge about toothpaste contents.[35]

The use of *dental floss* was found to be present in only 32% of the respondents, indicating that there were still many respondents who had not understood the benefits of using dental floss for oral cavity hygiene. One of the methods to clean interproximal teeth is by using dental floss. In previous research, the plaque index for individuals who brushed their teeth accompanied by dental floss was lower compared to those who only brushed their teeth without using dental floss.[36]

A study found that brushing teeth accompanied by dental flossing was effective in reducing the dental plaque index.[37] The data in this study indicated that only a small fraction of the respondents used dental floss to clean their oral cavities. This aligns with the American Dental Association's statement that approximately 60% of the population in the United States have not yet adopted dental flossing due to the requirement for good manual dexterity, and improper use can lead to gum injury. In the effort to improve oral health, which requires a certain skill set, many respondents have not yet adopted this practice.[38] Other studies in Indonesia have found that the level of attitude and practice regarding the use of dental floss remained low, possibly due to the difficulty in using dental floss. Many people are not accustomed to cleaning between their teeth and tend to only brush them.[66]

The use of mouthwash was found to be present in only 46% of the respondents. This data indicated that more than half of the respondents had not fully understood the use of mouthwash. Some mouthwashes have demonstrated efficacy against oral microorganisms or in alleviating gingivitis symptoms.[38] In another study conducted in Scotland, almost all respondents did not use mouthwash (38%). This may be related to behavior associated with habits and perceived health needs, which can be difficult to change.[64,65]

Efforts to reduce the consumption of sweet foods and beverages were reported by 47% of the respondents. Sweet foods containing sugar are cariogenic to teeth. Sugar, particularly sucrose, plays a role in the occurrence of dental caries by lowering salivary pH, making

demineralization more likely to occur.[39] The research data indicated that the majority of respondents had not reduced their consumption of sweet foods and beverages. This is consistent with the findings from the 2018 Riskesdas data, which reported that 61.3% of the respondents consumed sweet beverages more than once a day, and 40.1% consumed sweet foods more than once a day.

Food and beverage consumption according to the Recommended Nutrient Intake (RNI) was found in 80% of the respondents. This aligns with the notion that a balanced nutritional intake supported and enhanced immunity during the pandemic. A significant portion of the population understands that prior to medical vaccination, consuming nutrients in line with the RNI acts as a natural and beneficial vaccine.[40] The Recommended Nutrient Intake (RNI) is the average sufficiency of nutrients consumed daily by an individual based on age, gender, body size, and activity level to achieve optimal health status.[41] The RNI includes the sufficiency of energy, protein, fat, carbohydrates, fiber, water, vitamins, and minerals. Consuming carbohydrates that do not meet the Adequate Intake (AI) can trigger dental caries. Carbohydrates are cariogenic to teeth.[43]

There is a significant relationship between the level of carbohydrate consumption and the occurrence of dental caries, meaning that low carbohydrate consumption is associated with a low incidence of dental caries.[42] Proteins and fats are non-cariogenic; proteins do not lower saliva pH, and fats have more of a localized effect, making it difficult for food residues to adhere to the tooth surface. Bacteria do not ferment the food residues, and fats are hydrophobic, exhibiting antibacterial properties.[43] Insufficient consumption of vitamins and minerals can trigger an increase in dental caries.[43]

The consumption of 5 types of fruits and vegetables was found in 50% of the respondents. In a study, it was stated that the higher the consumption of fruits and vegetables, the better the quality of life concerning oral health.[44] This research data showed that half of the respondents already understood the benefits of consuming fruits and vegetables. This aligned with a study by Posman Sibuea.[45] conducted in Medan, where 74.4% of the respondents consumed food derived from fruits and vegetables. Good consumption of vegetables and fruits can be associated with education level and occupation. Most of the respondents in a study were found to be graduates and civil servants.[46] showing a correlation between knowledge and the behavior of consuming fruits and vegetables. In the research, it was evident that the consumption of fruits and vegetables among the respondents was already good. The dissemination of information regarding the benefits of fruits and vegetables had also increased since the COVID-19 pandemic.

The consumption of 2 portions of fish was found in 85% of the respondents. Consuming fish rich in protein and low in cholesterol can be beneficial for growth and repairing damaged cells 69. In a study, it was stated that preventing gingivitis could be achieved, in part, by consuming fish because it contains many beneficial substances. One of the components of fish is calcium, which can enhance the strength of teeth through mineralization.[47] The research data revealed that the majority of respondents were already aware of the benefits of consuming fish. This is also supported by another study.,[48] conducted in 2017, which indicated that 76% of Indonesians consume fresh fish. This can be attributed to the abundant fish resources in Indonesia and the public's knowledge that fish is a good source of essential nutrients for overall health, including dental health.[48]

More than 55% of the respondents had reduced their consumption of red meat and processed meat. Excessive consumption of red meat can have negative health effects as it is a source of animal protein that contains relatively high cholesterol. According to the World Health Organization (WHO), consuming processed meat can cause colorectal cancer, while red meat may also be a cause of cancer.[49] Based on another study, the consumption of processed meat could increase the risk of oral cancer. The data from this research showed that more than half of the respondents already understood the negative impact of red meat and processed meat.[49] There were 95% of the respondents who met their water intake needs, consuming 6-8 glasses of water, indicating that some respondents maintained good hydration

habits. The Ministry of Health of the Republic of Indonesia (KEMENKES RI) recommends a daily water consumption of 2.5 liters for men and 2.1-2.3 liters for women.[69]

This study showed that 78% of the respondents did not smoke, and 82% did not consume alcohol. Alcohol is a primary cause of oral cancer and can lead to tooth surface loss due to erosion, increasing the risk of being more susceptible to COVID-19 infection because it could lower the body's immunity. When alcohol and tobacco are used together, the risks to oral health multiply.[50] The local effects of smoking on teeth and the oral cavity include causing gum inflammation, periodontal disease, root caries, alveolar bone loss, tooth loss, and being associated with the appearance of characteristic lesions on the soft tissues of the oral cavity.[51]

This was in line with another study regarding tobacco use before the COVID-19 pandemic, where 89.1% of the research participants indicated that they were non-smokers [52] Based on data from the Central Statistics Agency (BPS), the per capita alcohol consumption by individuals aged 15 and above has decreased. This may be related to the fact that some respondents had a high level of education, with 55.2% holding a bachelor's degree (S1), and a significant proportion of them were civil servants (ASN/PNS) at 28.9%. As a result, they possessed the ability to maintain good oral health. There is a strong correlation between educational level and knowledge of oral health.[65,64]

There were 45% of the respondents who consulted the dentist once a year or more frequently. This data indicated that more than half of the respondents had not been regular in their dental check-ups. This aligned with the findings of the study by Birant S, Koruyucu M, Ozcan H, *et al*.[53] which reported that only 24% of the respondents had regular dental check-ups. Another study showed that during the COVID-19 pandemic, 72.9% of the respondents visited the dentist only when experiencing pain.[54] In a certain study, it was found that many people still perceived dental problems as not being a serious matter. Visits to the dentist were often made by the public only when they experienced conditions that cause pain.[70]

The data showed that 89% of the respondents rarely or never experienced gum bleeding. The main cause of gum bleeding is the accumulation of plaque and calculus in the oral cavity, a condition known as gingivitis or gum inflammation. The data also indicated that 88% of the respondents did not have tooth mobility. Tooth mobility is a sign of periodontal disease, which is an inflammatory condition affecting the tissues surrounding the teeth, starting with gingival inflammation and progressing to other supporting structures, including cementum, periodontal ligament, and alveolar bone.[55]

As many as 72% of the respondents did not have cavities. Cavities, also known as dental caries, are the process of destruction or softening of the enamel or dentin. Dental caries is the damage to the hard tissues of the teeth caused by acids produced from the interaction of microorganisms, saliva, and food debris.[56] In 73% of the respondents, toothache was not experienced. Not experiencing toothache indicated good oral cavity health.[58] Oral cavity health refers to the well-being of teeth, gums, and the entire oral system, including the face, ensuring there are no disruptions in smiling, speaking, and chewing.[56]

The data showed that 72% of the population did not have unpleasant breath odor. Having unpleasant breath odor, known as halitosis, is quite common in the general population, with over 50% of people experiencing it. Halitosis is a multifactorial condition, with 90% of cases originating from the oral cavity due to factors such as poor oral hygiene, periodontal disease, tongue coating, impacted food, unclean dentures, improper restorations, oral carcinoma, and throat infections.[55] In another study conducted on dental students, 61% of respondents reported halitosis. This can occur because the majority of halitosis sufferers are unaware of their condition.[67,68]

The results of this research showed that 89.5% of the population in Medan City had good oral health. In a study conducted in the city of Bandung during the pandemic, 67.1% of the population also had *excellent* oral health. [17] This difference can be attributed to the fact that the majority of respondents did not consume alcohol and followed a healthy diet. Diet significantly influences the condition of oral health in many ways. The majority of the population during the post-COVID-19 booster vaccination period did not exhibit poor oral

health conditions. This can be attributed to the fact that most people had made considerable efforts to maintain good oral health, such as brushing their teeth twice a day, performing calculus removal, refraining from smoking, and avoiding alcohol consumption.[57,58]

Table 4 shows that the results of the Spearman Rho test indicated a positive correlation between oral health and self-confidence following the COVID-19 booster vaccination showing moderate strength of correlation (0.30-0.39).[59] There was a statistically significant and specific relationship between oral health and an individual's self-confidence in the city of Medan after receiving the COVID-19 booster vaccine. Another study indicated that good oral health is associated with an individual's self-confidence and quality of life, with a Spearman correlation coefficient of 0.85, indicating a strong correlation. The observed differences might be attributed to the fact that the study was conducted exclusively on women who consistently demonstrated good oral hygiene habits. This particular research revealed that women with good periodontal health tend to have higher self-confidence and better overall quality of life.[60,61] The relationship between oral health and general health remains uncertain, but oral health is considered one of the risk factors contributing to the occurrence of systemic diseases within the body.[62] Good oral health is associated with self-confidence and the quality of an individual's life, as indicated by a study that revealed women with good periodontal health possess high self-confidence and overall well-being.[60]

Based on the research findings obtained, the researcher provides recommendations for the people of Medan city to better understand oral health and its role in life, as well as to continuously seek to improve self-confidence. For the government, it is essential to consistently strive to provide health education and safe health services, enabling the public to enhance their oral health and self-esteem. For future researchers, it is hoped that they will refine the study by directly conducting oral health examinations for the community.

The limitations of this study include sampling bias from the non-random convenience sampling technique, where respondents were more easily accessible or willing to participate in the study, as well as the lack of follow-up in the study design, which limited assessing changes over time. However, understanding and mitigating these limitations enable future researchers to optimize findings. For future researchers, it is hoped that they will refine the study by directly conducting oral health examinations for the community.

CONCLUSION

There was a positive correlation with moderate strength between self-confidence and oral and dental health of the community in the city of Medan post-COVID-19 Booster Vaccination. Based on this research, the oral and dental health of the community in the city of Medan post-COVID-19 Booster Vaccination was considered to meet good criteria. Additionally, the confidence level of the city's residents post-COVID-19 Booster Vaccination was also considered to meet good criteria. There is a correlation between oral and dental health and the confidence of the community in the city of Medan after receiving the booster vaccine. This research provides implications for enhancing public awareness of the importance of maintaining dental health post-COVID-19 vaccination and advocating for the development of community dental health programs and better dental health education within the community.

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