ORIGINAL ARTICLE

Dental Caries Risk and Quality of Life of Middle Age and Older Adults during COVID-19 Pandemic in Indonesia

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ABSTRACT

Objective: To evaluate the correlation between caries risk and OHRQoL in middle age and the older population during the COVID-19 pandemic in Indonesia. **Material and Methods:** The subjects ranged in age from >45. The participants were asked to complete the Caries Management by Risk Assessment (CAMBRA) and the Oral Health Impact Profile-14 (OHIP-14) questionnaires. The data were analyzed using Mann-Whitey Test, Kruskal-Wallis Test, and Spearman Test with a significance level of p<0.05. **Results:** Two hundred sixteen people participated in this study. The average CAMBRA score for middle-aged and older people was 5.31 ± 1.111 and 5.27 ± 1.094, respectively. The mean scores for the OHIP-14 were 34.90 ± 6.164 for older adults and 35.79 ± 5.908 for middle-aged people. The correlation between caries risk and OHRQoL showed r=-0.400; p=0.00 for the middle age group and r=-0.143; p=0.170 for the older adults. **Conclusion:** During the COVID-19 pandemic in Indonesia, there was no association between caries risk and OHRQoL in the older adult population and a low correlation between caries risk and OHRQoL in the middle-aged group.

Keywords: Dental Caries; Quality of Life; Middle Age; Aged.

◾ Introduction

The United Nations defines an aged (older adults) person as someone over 60 [1]. The World Health Organization (WHO) mentioned that in 2019, there were 1 billion people aged 60 years and older. This number was projected to rise to 1.4 billion by 2030. It means that 1 in 6 people worldwide will be 60 or older. The statistics will keep increasing, particularly in developing countries.

Indonesia is a developing country with more than 200 million people. According to the Indonesian Ministry of Health, Indonesia's older adult population has also increased. In 2010, the number of older individuals was 18 million (7,56%), while in 2020, the number increased to 26,82 million people (9,92%) [2]. The national survey of the Indonesian Statistic Center showed that the number of older individuals in East Java province is 13,48% [3]. The Indonesian Ministry of Health defined the aging population as starting when the proportion of older people in each province is more than 10% [2]; in that case, East Java Province in Indonesia is already in the aging population stage.

Health is essential for everyone, especially older people, to enjoy their last years of life [4]. WHO defines health as "a state of complete physical, mental, and social well-being, not merely the absence of disease and infirmity" [5]. Oral health (OH) is an essential indicator of people's general health and is closely associated with overall health [6]. WHO reported that among oral diseases, caries remains the top global burden [7]. Dental caries is determined as a prolonged demineralization process of teeth caused by a metabolic imbalance of the dental biofilm. Multivariate behavioral, biological, and environmental factors impact this condition [8,9,11]. Untreated or neglected caries is still a significant problem because it is globally widespread among older individuals, with a prevalence of 50% or more [10]. The WHO describes Quality of Life (QoL) as 'the individual's perception of their position in life, within the cultural context and value system they live in, and in connection to their goals, expectations, parameters, and social relations [12]. A person's perspective of how oral health impacts the quality of life, referred to as Oral Health Relates to Related Quality of Life (OHQoL), is complex and multidimensional, including many facets of existence [13,14]. Numerous tools are available to assess OHRQoL, and Oral Health Impact Profile-14 (OHIP-14) is one of them. The most widely researched test, the OHIP-14, has 14 items [15].

Since the WHO proclaimed the novel coronavirus illness 2019 (COVID-19) a global pandemic on March 11, 2020, the global population has had to adjust their everyday routines over the last two years completely. Lockdowns, stay-at-home orders, movement restrictions, and the closure of schools and non-essential businesses were among the restrictive measures used to regulate the pandemic. Numerous countries temporarily halted non-urgent medical activity to provide the most excellent care for COVID-19 cases [16,17]. These memorable experiences are linked to several risky behaviors, including poor eating habits, heavy drinking, and more frequent smoking [18]. In particular, the general quality of life and personal safety have been harmed by the COVID-19 pandemic [19]. The COVID-19 pandemic puts older adults and middle-aged people at risk for dental caries due to their incapacity to maintain adequate oral hygiene and difficulties accessing dental and oral health care services [16,17]. Therefore, this study aims to evaluate the effect of caries risk in OHRQoL in middle-aged and older adults during the COVID-19 pandemic in Indonesia.

◾ Material and Methods

Ethical Clearance

This study was approved by the Ethical Committee of Medical Research, Faculty of Dentistry, Universitas Jember No.1319/UN25.8/KEPK/DL/2021. Informed consent was obtained from the participants before the study. All the data from participants were protected confidentially.

Study Population and Sampling

The study population of this study was middle-aged (45-59) and older adults (>60 years old) in Malang, East Java, Indonesia. Kepanjen, Kalipare, and Kromengan in Malang were chosen areas for this study. Kepanjen represented the suburban area, while Kalipare and Kromengan represented the rural area. The study population and minimum sample size were calculated using Lameshow's formula $n=\{Z^2 1-\alpha/2\ P(1-P)\}/d2$ [20,21]. $Z^2 1-\alpha/2$. P is the confidence interval (99%=2.5760); d2 is the statistic corresponding to the level of confidence; P is the expected proportion of the population (0.5), and d is the acceptable degree of error (corresponding to effect size) (10%). The calculation found the minimum sample for the questionnaire was 166 people. Additional participants were added to prevent possible data losses or exclusion from inclusion and exclusion criteria. Criteria inclusion were (1) participants>45years old, (2) live in Kepanjen, Kalipare, and Kromengan, Malang, (3) capability to mobile without help from another person, and (4) possible to communicate during the process while the exclusion criteria are: (1) <45 years old, (2) participant with an unhealthy condition, and (3) lives in Malang but not in Kepanjen, Kalipare, or Kromengan area [4].

Questionnaires and Data Collection

This cross-section analytic observation study was conducted during the COVID-19 pandemic from October 2021 to January 2022. Questionnaires were collected through Google Forms and paper-based. The older adults and middle-aged participants received assistance and direct interviews if they could not use the internet, could not read, or for other reasons. The demographic information included data on gender, age, area of living, educational background, occupation, and insurance coverage were collected.

The questionnaire consists of 18 questions for modified Caries Management by Risk Assessment (CAMBRA) and 14 for OHIP-14. CAMBRA consisted of two questions related to the caries indicator, ten questions related to the risk factors, and six questions related to the protection factors [22]. Due to the pandemic, which prevented us from doing the intraoral examination, we modified the number of CAMBRA assessments, questions, and scoring. The total score of CAMBRA 8-9 indicates low caries risk, scores 5-7 indicate moderate caries risk, and scores 3-4 indicate high-risk caries.

We adjusted the OHIP-14 for the present study. The OHIP-14 questions were the same as the standard OHIP-14 [14,15]. In this study, a 3-point Likert scale was employed, with 1 denoting "never," 2 denoting "rarely," and 3 denoting "often" experiencing problems or pain, and the maximum score for OHIP-14 was 42. The modification was made due to the difficulty of the 5-point Likert scale in our preliminary survey, especially for older adults. They had a very slow response to the 5-point Likert. In contrast, they answered quickly to the 3-point Likert. Considering the time efficiency and the limited time needed for face-to-face contact, we decided to modify. The questionnaire was collected from Google Forms and paper-based had the same format using a 3-point Likert scale. The use of a 3-point Likert had been reported in the previous study [23,24]. The total Likert score used as a base for categorizing the OHRQoL according to the Azwar formula: Low OHRQoL: $X < M - 1SD$; Medium OHRQoL: $M - 1SD < X < M + 1SD$; High OHRQoL: $M + 1SD < X$ [25]. M is the mean, and SD is the standard deviation. The total score of OHIP-14 lower than 23, 23-32, and more than or equivalent to

33 indicate a low, moderate, and high quality of life. Both CAMBRA and OHIP-14 responses were categorized as "low", "moderate", and "high". The response scored 1, 2, and 3, respectively, for the analysis statistic.

Data Analysis

The SPSS program version 22 (IBM Japan, Ltd., Tokyo, Japan) was used to analyze the data using the mean, standard deviation, frequency, and percentage. The standard error for this study was 10%. The Mann-Whitney Test was used to evaluate differences between two groups of experimenters, whereas the Kruskal-Wallis test was used to evaluate differences between groups. The correlation between caries risk and OHQoL was assessed using Spearman's correlation. P-values < 0.05 were considered significant.

■ Results

A total of 220 subjects were invited; however, only 216 participants were included in the inclusion and exclusion criteria. The demographic information was collected (Table 1). Participants were aged 43-108 years with a mean of 60.19, of whom 123 (56.94%) were middle-aged, and 93 (43.056%) were older adults. Male participants (57.41%) were higher than the women participants (42.60%). The participants were collected from the rural and suburban areas, with a percentage of 68.05% and 14.35%, respectively. The educational background of the middle-aged participants was assumed to be higher than that of the older adult participants due to the higher number of participants who graduated from university (36.0%) and fewer participants who did not attend school (0.8%). More than half of the participant in participants majority were working, 73.61%, while only 26.39% were already retired or not working. The occupations varied between the middle age and older adults. Most participants did not have insurance coverage in the middle-aged and older adult groups (52.78%).

Table 1. Distribution of participants according to socio-demographic characteristics.

Variables	Middle Age		CAMBRA		Older Adults		CAMBRA		p-value
	N	%	Mean	SD	N	%	Mean	SD	
Gender									
Male	67	54.5	2.25	0.472	57	61.3	2.32	0.469	0.748
Female	56	45.5	2.23	0.426	36	38.7	2.31	0.467	
Area									
Rural	85	69.1	2.28	0.478	62	66.7	2.37	0.487	0.096
Suburban	38	30.9	2.16	0.370	31	33.3	2.19	0.402	
Educational Background									
Elementary	15	12.2	2.14	0.359	26	28.0	2.29	0.463	0.402
Junior High School	29	23.6	2.19	0.512	18	19.4	2.44	0.511	
Senior High School	12	9.8	2.43	0.507	15	16.1	2.33	0.488	
University	32	26.0	2.16	0.375	16	17.2	2.19	0.403	
Not Attend	1	0.8	2.00	0*	18	19.4	2.39	0.502	
Occupation									
Civil Servant	15	12.2	2.07	0.258	3	3.2	2.33	0.577	0.79
Private Employee	29	23.6	2.19	0.402	12	12.9	2.42	0.515	
Self-Employee	12	9.8	2.25	0.452	10	10.8	2.10	0.316	
Farmer	32	26.0	2.24	0.539	28	30.1	2.24	0.436	
Part-Time Worker	3	2.4	2.67	0.577	1	1.1	3.00	0.000	
Other	12	9.8	2.58	0.515	3	3.2	2.67	0.577	
Not Working	20	16.3	2.15	0.366	36	38.7	2.43	0.507	
Insurance Coverage									
Yes	61	49.6	2.18	0.426	41	44.1	2.22	2.385	0.084
No	62	50.4	2.31	0.467	52	55.9	0.42	0.491	

*Data analysis was not performed due to insufficient samples for statistical analysis; Kruskall-Wallis test (p<0.05).

We assessed the CAMRA and OHIP scores from Google Forms and paper-based methods. Our findings indicate no notable difference in collecting the CAMRA score via either method ($p>0.05$). However, we did observe a difference in the OHIP score between the two collection methods ($p<0.05$). The participant's responses to the CAMBRA questionnaire are shown in Table 2. The minimum and maximum scores for the CAMBRA were 4 and 7, with the average for middle age 5.31 ± 1.111 and older individuals 5.27 ± 1.094.

In middle-aged and older adults, moderate caries risk had the highest percentage, followed by high and low caries risk (Figure 1A). CAMRA consists of three categories, and in the risk factor category, the middle age group's score was significantly higher compared to the older adults ($p=0.006$) (Figure 1B). However, analysis statistics using the Mann-Whitney test showed no significant difference between CAMBRA scores in middle-aged and older adults ($p=0.774$). The CAMBRA score was also evaluated in participants' characteristics, but there was no significant difference in CAMBRA score with participant's characteristics ($p<0.05$) (Table 1).

OHIP-14 questionnaire responses are shown in Table 3. The minimum and maximum scores for the OHIP-14 were 14 and 42, with the average for middle-aged (35.79 ± 5.908) and older adults (34.90 ± 6.164). The middle-aged and older individuals group had a high OHQoL based on OHIP-14, followed by moderate and low quality (Figure 1C). Each section of OHIP-14 was also evaluated. In the category functional limitation ($p=0.001$) and physical disability ($p=0.014$), the score was higher in middle age, while the social disability score ($p=0.036$) was higher in the older adult group ($p<0.05$) (Figure 1D). On the contrary, the Mann-Whitney test analysis indicated no significant difference between OHIP-14 scores in middle-aged and older adults ($p<0.05$). In the middle age group, Spearman's correlation coefficient was -0.400 and $p=0.00$. The correlation between CAMBRA (caries risk) and OHIP-14 (OHRQoL) in the middle age group was a low negative correlation. This means that the higher the CAMBRA score, the lower the score for OHIP-14. The data interpretation suggested that as caries risk increases, so did OHQoL. The interpretation was based on the fact that the lower CAMRA score means high caries risk, while the higher OHIP-14 score indicates a higher quality of life. A significant correlation between CAMBRA and OHIP-14 was observed ($p<0.05$). In older people, Spearman's correlation coefficient was -0.143, and the p-value was 0.170. The correlation between CAMBRA and OHIP-14 in the older individuals group was negligible, and the p-value showed no significant correlation between caries risk and OHRQoL.

Table 2. Response of CAMBRA modification questionnaire.

CAMBRA Variables	Middle Age				Older Adults			
	Yes		No		Yes		No	
	N	%	N	%	N	%	N	%
Caries Indicators								
Tooth decay within 1-2 years	87	70.7	36	29.3	58	62.4	35	37.6
Filled teeth due to tooth decay within 1-2 years	23	18.7	100	81.3	13	14.0	80	86.0
Risk Factors								
Dental calculus	117	95.1	6	4.9	89	95.7	4	4.3
Drugs consumption	19	15.4	104	84.6	18	19.4	75	80.6
Dry mouth	33	26.8	90	73.2	29	31.2	64	68.8
Snacking between meals	71	57.7	52	42.3	64	68.8	29	31.2
Denture	20	16.3	103	83.7	19	20.4	74	79.6
Vomit	6	4.9	117	95.1	3	3.2	90	96.8
Systemic disease (diabetes, heart disease, etc).	19	15.4	104	84.6	18	19,4	75	80.6
Smoking	37	30.1	86	69.9	47	50.5	46	49.5
Radiation therapy for head and neck	3	2.4	120	97.6	4	4.3	89	95.7

Healthy and regular meal/diet	99	80.5	24	19.5	86	92.5	7	7.5
Protective Factors								
Frequency of tooth brushing: 1-2 times/day	120	97.6	3	2.4	87	93.5	6	6.5
Mouthwash usage	14	11.4	109	88.6	9	9.7	84	90.3
Anchovy consumption	31	25.2	92	74.8	23	24.7	70	75.3
Milk consumption	16	13.0	107	87.0	16	17.2	77	82.8
Calcium/Fosfat supplement	17	13.8	106	86.2	7	7.5	86	92.5
Dental visit every 6 months	11	8.9	11	8.9	3	3.2	90	96.8
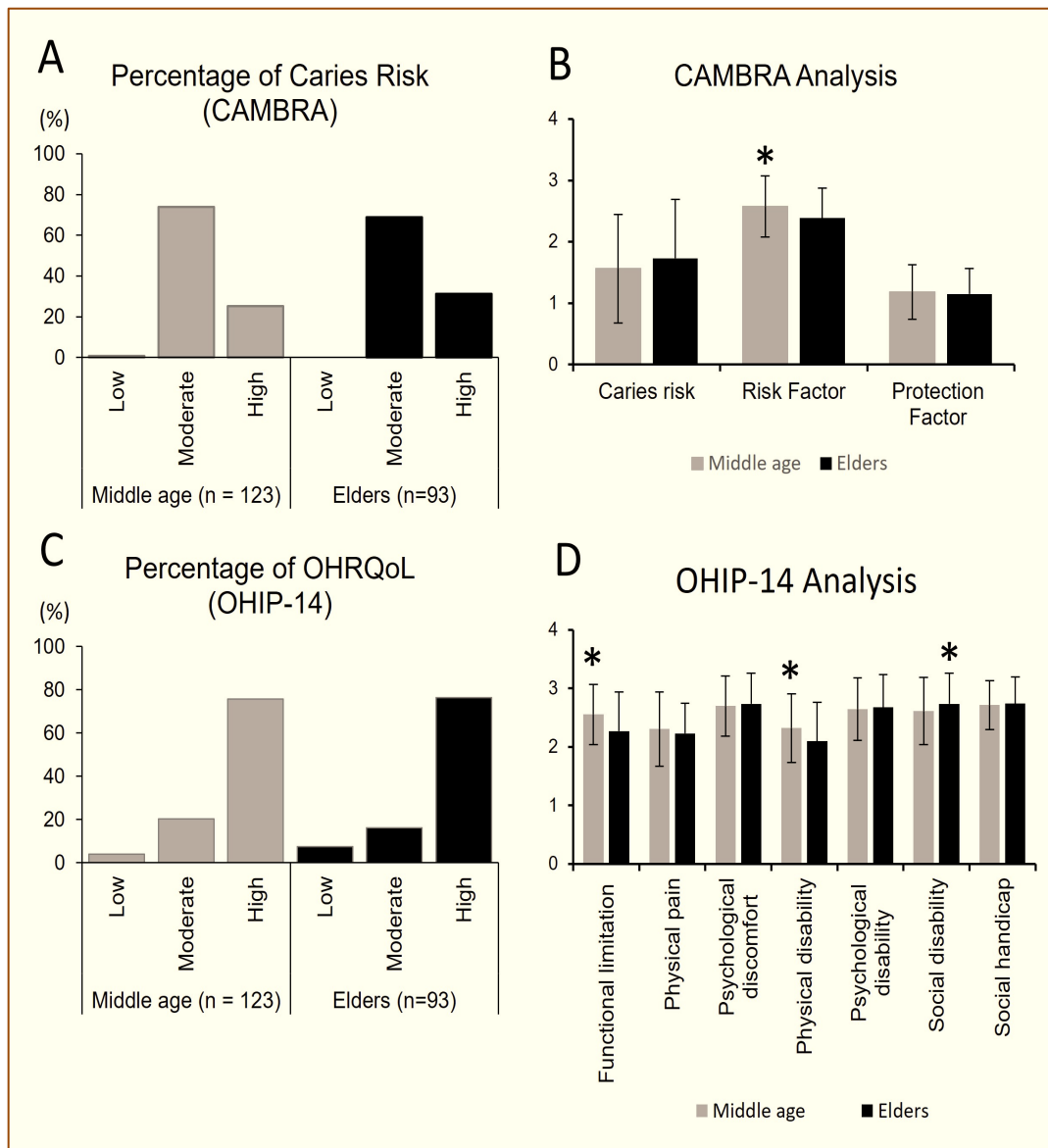
Figure 1. Percentage of caries risk from CAMBRA questionnaire (A) and analysis of each section (B). The percentage of OHRQoL according to OHIP-14 questionnaire (B) and analysis of each section of OHIP-14 (D).

Table 3. Response of Oral Health Impact Profile-14 (OHIP-14) Questionnaire.

OHIP-14 Variables	Middle Age						Older Adults					
	Never		Rarely		Often		Never		Rarely		Often	
	N	%	N	%	N	%	N	%	N	%	N	%
Functional Limitation												
Trouble pronouncing any words due to problems with your teeth, mouth, or denture	84	68.3	35	28.5	4	3.3	41	44.1	41	44.1	11	11.8
Sense of taste worsened due to issues with your teeth, mouth, or dentures	71	57.7	38	30.9	14	11.4	38	40.9	38	40.9	17	18.3
Physical Pain												
Painful aching in mouth	39	31.7	60	48.8	24	19.5	22	23.7	58	62.4	11	11.8
Uncomfortable eating any foods due to problems with your teeth, mouth, or denture	77	62.6	29	23.6	17	13.8	42	45.2	42	45.2	9	9.7
Psychological Discomfort												
Feeling self-conscious due to problems with your teeth, mouth, or denture	93	75.6	21	17.1	9	7.3	66	71.0	18	19.4	9	9.7
Feeling tense due to issues with your teeth, mouth, or denture	104	84.6	12	9.8	7	5.7	76	81.7	14	15.1	3	3.2
Physical Disability												
Unsatisfactory diet due to problems with your teeth, mouth, or denture	64	52.0	43	35.0	16	13.0	27	29.0	46	49.5	20	21.5
Interrupted meals due to issues with your teeth, mouth, or denture	46	37.4	60	48.8	17	13.8	31	33.3	41	44.1	21	22.6
Psychological Disability												
Difficulty relaxing due to problems with your teeth, mouth, or denture	81	65.9	35	28.5	7	5.7	67	72.0	20	21.5	6	6.5
A bit embarrassed due to issues with your teeth, mouth, or denture	93	75.6	22	17.9	8	6.5	73	78.5	12	12.9	8	8.6
Social Disability												
A bit irritated with other people due to problems with your teeth, mouth, or denture	94	76.4	20	16.3	9	7.3	76	81.7	10	10.8	7	7.5
Difficulty in doing a usual job due to issues with your teeth, mouth, or denture	73	59.3	37	30.1	10	8.1	76	81.7	15	16.1	5	5.4
Social Handicap												
Less satisfaction due to problems with your teeth, mouth, or denture	77	62.6	34	27.6	12	9.8	64	68.8	20	21.5	9	9.7
Unable to function because of problems with your teeth, mouth, or denture	114	92.7	63	51.2	3	2.4	84	90.3	6	6.5	3	3.2

■ Discussion

Maintaining good oral health is essential for maintaining good health. Caries are still the most prevalent oral disease, especially in developing countries. It is believed that middle-aged and older adults have a higher risk factor and incidence of dental caries. Untreated caries increase the possibility of tooth loss and edentulism [26]. Poor oral health is associated with many systemic conditions, such as diabetes, hypertension, cardiovascular mortality, dementia, and decreased cognitive function [27]. This condition would impact middle-aged and older people's quality of life. More than 223 nations and regions were affected by the COVID-19 pandemic, which spread rapidly and prompted significant concern [28]. Numerous restrictions that may negatively impact middle-aged and older adults's quality of life have been implemented in many nations due to the possibility of developing a severe and frequently life-threatening illness. Therefore, this study aims to evaluate the effect of caries risk in OHRQoL in middle-aged and older adults during the COVID-19 pandemic in Indonesia.

The middle-aged group participated more actively and completed the Google form during surveying compared to older adults. The majority of older adult respondents completed the questionnaire on paper with assistance. Compared to older adults, the middle-aged group still actively used cell phones and the internet effectively. According to the report, just 5.2% of all internet users were older than 60 [29]. Physical and mental limitations, cost, mistrust, and lack of time were just a few of the challenges the older adults faced when accessing the internet. The internet only affects older individuals' lives if they use it in middle age [30].

The correlation between the participant's characteristics and the risk of developing caries was assessed. The distribution of male participants was particularly high in the middle-aged and older groups. This outcome was consistent with the 2020 survey carried out by the Indonesian Statistic Center. The population proportion in Malang was higher (50.40%) than the female population percentage (49.60%) [3]. Older women tend to favor sweet foods and consume more sugar. Consequently, their risk of developing cavities is higher than older men [30]. In this study, the risk of dental caries was equal for both men and women in the middle-aged and older adult groups. COVID- 19 restricted many activities outside; people stayed at home and tended to increase food consumption and change their food behavior. Other factors, including saliva composition, lifestyle, psychosocial factors, and economic issues, may also affect the chance of developing caries besides gender [31].

The area where the people live connects with population income. The economic factors of income are considered to be associated with the rising caries risk and dental treatment [31]. Another study showed that despite living in the same income category, different areas reported varying dental caries rates [32]. In this study, suburban residents have a lower chance of developing dental caries than those who live in rural areas. However, there was no significant difference between middle-aged and older adults' caries risk and the areas in which they lived. One of the causes of this problem is that during COVID-19, the accessibility to dental services was limited due to the government temporarily halting non-urgent medical activity. In addition, the middle-aged and older adults feared going outside due to the deadly COVID-19 disease.

The educational background was higher in middle age than in older adults. Previously, there weren't many educational options available, and the economic situation wasn't stable, so they didn't feel the importance of education. The middle-aged group had better living conditions than older adults, meaning they had more education. The study found that employment and educational background impacted the risk of dental caries [33-35]. In this study, various educational backgrounds and occupations did not affect the risk of caries. Despite the COVID-19 pandemic, highly educated Indonesians sometimes tend to sideline the treatment of oral health issues due to it being a time-consuming task. As a result, their occupation and educational background did not increase their likelihood of developing dental caries.

Insurance is crucial in sustaining oral health, particularly for older adults. Dental care is benefited by insurance coverage. Older adults without insurance had a double chance of not getting dental care [36]. National insurance is required in Indonesia; however, more than half of the middle-aged and older adults in this survey did not have insurance coverage. The caries risk between middle-aged and older adults was similar, from moderate to high.

The current study discovered that most middle-aged and older people had equal percentages of moderate to high caries risk during COVID-19. This result was obtained solely by a questionnaire, without an oral examination during the pandemic. It was predicted that an oral exam may result in a more significant percentage. The COVID-19 epidemic affected people's diets globally [35]. In the COVID-19 situation, people tend to consume more frequently, eat more ultra-processed food, and consume more calories due to increased

alcohol consumption [37]. As a result, the prevalence of caries may rise due to changes in people's eating behaviors, such as greater sweets consumption and poorer oral hygiene [38].

In the CAMRA section evaluation, the middle-aged group had a higher risk factor than the older adults for caries risk. According to the score, a high-risk factor indicates a reduced risk factor for caries risk. This section is mainly related to the lifestyle and behavior of the participants. This outcome demonstrated that a middle-aged group had a healthier way of living and behavior. High-risk factors in the senior population may also be influenced by physiological change, which is more common in older adults, and unhealthy lifestyle choices, including smoking and snacking between meals [37-39].

During the COVID-19 pandemic in Indonesia, there were no differences in OHRQoL between middle-aged and older adults. The analysis of each section revealed that the middle-aged group had greater functional restriction and physical disability scores than the older adults. This indicates that functional limitation and physical disability were higher in older adults than in middle age. It was well-recognized that physical disability and functional limitation increased with age [40]. The functional limitation was related to the trouble of pronouncing, and the sense of taste deteriorated. The patient's pronunciation was impacted by tooth loss and denture issues, including a thick denture, an incorrect vertical dimension height, and the relationship between the upper and lower anterior teeth [41]. It was estimated that older adults had higher tooth loss than middle age group. In addition, age also decreases the overall number of taste buds, the density of the taste bud epithelium, and the number of taste cells [42]. Moreover, as people age, their taste buds become less sensitive, increasing their perception of bitterness [43]. Loss of appetite and decreased food intake were caused by altered taste buds and declining oral health [44].

The social disability was higher in older people compared to the middle age group. It interpreted that social disability was better in the older individuals group compared to the middle age. Social disability is related to irritation with other people and difficulty doing the usual job due to the oral problem. It was estimated that even middle-aged people had lower tooth loss, but they might have another oral problem that affects their social activity [45]. For example, if they had a toothache, the pain they felt would affect their job, while in the older adults group, most of them were already retired.

In this study, middle-aged and older adults have a high quality of life despite moderate to high caries risk. The previous research in a different province in Indonesia showed the opposite result; the higher caries index brought a lower quality of life before the pandemic [27]. The Indonesian population believed that oral health issues were not life-threatening and, hence, did not consider them to be significant. They were unaware that their dental health might affect their overall health; thus, they did not seek treatment. In addition, some general misperceptions; for example, if the older individuals were capable of chewing the food, they thought they had no problem with oral health. The misconception during COVID-19 was that if they went to find health care, they were suspected of being COVID-19 positive. In this situation, they would be distancing from the other people. This behavior and misconception should be changed; otherwise, oral health conditions will be neglected. The National Health Survey conducted by the Ministry of Health in 2018 showed that 54.2%-62.1% of middle-aged and older adults have oral problems, but only 6.4-11.3% received treatment from the dental health service [46].

It is important to consider the study's limitations. Since we only evaluated a small portion of the population of Java in the Indonesian population. It is necessary to do further research with a larger population of Indonesians. Second, because this study was undertaken during the COVID-19 pandemic, significant changes were made to CAMBRA and OHIP-14's approach. With all of this in mind, gaining insight that goes beyond the

findings is still feasible. This report is useful as a benchmark that contributes to the current body of knowledge about the impact of the COVID-19 pandemic on the correlation between caries risk and the quality of life. In addition, this study might be a valuable reference for decision-makers who want to make better policies for middle-aged and older individuals in other pandemic situations.

◼ Conclusion

During the COVID-19 pandemic in Indonesia, there was no association between caries risk and OHRQoL in the older individuals population and a low correlation between caries risk and OHRQoL in the middle-aged group.

◼ Authors' Contributions

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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

◼ Financial Support

None.

◼ Conflict of Interest

The authors declare no conflicts of interest.

◼ Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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