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Enhanced Knowledge Inversed Attitude of Oral Cancer Risk Habit Associated With Sociocultural: A Quantitative and Qualitative Pilot Study

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ABSTRACT **Aim:** In 2023, the global incidence of oral cancer reached 54,540 new cases, with risk factors including smoking (S), alcohol consumption (A), and betel quid chewing (BQC). The knowledge and attitudes about these risk factors impact this practice, particularly in communities that follow local traditions. The aim of this study was to determine the level of knowledge and attitude regarding risk factors for oral cancer on Flores Island, East Indonesia. **Materials and Methods:** This was an analytical observational study with a cross-sectional design using quantitative and qualitative approaches. Structured questionnaires and focus group discussions (FGDs) were conducted with the community, local government, and dentists to obtain data; quantitative analysis was performed using regression; and qualitative analysis was performed using themes. **Results:** Of 542 participants (men 66.42 %; women 33.57 %), 64.4% had a high level of knowledge and a low level of attitude for S = 62.5%, A = 66.7%, and BQC = 50.0%. There was a correlation between knowledge and attitudes about S ($P = 0.009$) and BQC ($P = 0.011$). The FGDs yielded 14 subjects (five men and nine women) with three themes of knowledge (betel nut ingredients, causes of cancer, and impacts of habits) and three themes of attitude (type of habit, desire to stop, and oral cancer prevention programs). On the basis of FGDs, most of the subjects already knew the causes of oral cancer, but the desire to stop and prevent oral cancer was difficult. **Conclusion:** The population on Flores Island has a high level of knowledge but a low level of attitude. Nevertheless, it is difficult to minimize or eliminate oral cancer-risk behaviors due to their cultural and socioeconomic conditions.

KEYWORDS: Attitude, knowledge, oral cancer, risk habits

INTRODUCTION

Sociocultural factors have a significant impact on many geographic regions where individuals respond differently to illness.^[1] Factors such as level of education, level of income, cultural status, the presence of local indigenous people, and other factors may impact the susceptibility of a population to disease.^[2,3] Other elements, such as family history and motivation, and the involvement of well-known influential persons, as well as social influences and pressures, play a significant role in an individual's health efforts against a disease.^[4]

This also affects the prevalence of oral cancer. Oral cancer is one of the many causes of oral and dental health issues and can involve the lips, oral cavity, and pharynx.^[5] The American Cancer Society's most recent estimates for oral cavity and oropharyngeal cancers in the United States for 2023 indicate approximately 54,540 new cases and 11,580 deaths. The cause of oral

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cancer is multifactorial, but the established risks are smoking, alcohol consumption, and betel quid chewing (BQC).^[6] According to Petti, tobacco use—smoking and/or chewing—causes 25% of oral cancers, alcohol use causes 7%–19% of oral cancers, poor nutrition causes 10%–15% of oral cancers, and more than 50% oral cancers are detected in areas where areca nut chewing is common.^[7]

In Indonesia, research on oral cancer risk factors is scarce, restricted to academic institutions, and not multicenter. According to the 2018 Indonesian National Health Survey, the prevalence of alcohol use and smoking was 3.3% and 28.8%, respectively. In 2015, a preliminary study conducted in Bajawa, East Nusa Tenggara, indicated that 15 of 192 patients had premalignant lesions. All 15 individuals had the habit of chewing betel nuts (100%), whereas 86.6% (13 subjects) enjoyed drinking traditional alcohol and 13.3% (two subjects) enjoyed smoking kretek.^[7] A study by Sari *et al.*^[8] showed that the prevalence of betel quid chewers within five provinces in Indonesia was 12.6% and significantly associated with the oral potentially malignant disorder ($P < 0.01$).

One of the components that affect the establishment of attitudes is knowledge.^[9] Since no study has addressed risk factors for oral cancer in East Indonesia, this study attempts to identify the elements that contribute to oral cancer risk-related knowledge and attitudes. This research is conducted utilizing quantitative and qualitative approaches on the Flores Island population, which include community members, dentists, and local government officials.

MATERIALS AND METHODS

This observational analytic study used a cross-sectional design with quantitative and qualitative methods. The study was conducted from July to August 2022 on the island of Flores, East Nusa Tenggara province, Indonesia. Ethical clearance was obtained from the Ethics Commission, Faculty of Dentistry, Universitas Trisakti (022/S3/KEPK/FKG/7/2022).

QUANTITATIVE RESEARCH

The questionnaire used in this research was developed based on a prior epidemiological study on oral cancer and habits conducted in Bajawa city a decade ago.^[7] Drawing from the collected data, the author meticulously constructed the questionnaire. Using questionnaires pertaining to knowledge (12 items) and attitudes (28 items) about oral cancer risk factors, a quantitative data set was constructed. The data set was confirmed using the Rasch model.^[10] For the knowledge

questionnaire, the Guttman scale was utilized, while the Likert scale was utilized for the attitude questionnaire. The validity and reliability of the questionnaires were analyzed by the Rasch model, which showed a Cronbach α of 0.85, an item reliability of 0.87 with a separation of 2.59, and a unidimensional eigenvalue of 5.57.

The consecutive sampling of the quantitative study was carried out on the participants who visited dental clinics in all (total of eight) districts in Flores Island and provided signed informed consent to participate in this study (13 July–20 August 2022). The presence of nonparticipants in the quantitative study was attributed to the dentist, who selected respondents and collected respondents' questionnaires. The inclusion criteria for subjects were still having the habit of smoking, consuming alcohol, and chewing betel nuts. The exclusion criteria for participants were having abstained from oral cancer-risk habits for at least three years. Each participant was required to complete an informed consent form.

To obtain patients with oral cancer risk habits, dentists from eight cities on the island of Flores underwent questionnaire calibration and subject recruitment. A sample size calculation indicated that a minimum of 520 subjects have to be recruited, which means 65 subjects from each district.^[11] The collected data were analyzed by Pearson correlation (Jamovi, GNU Affero General Public License, and GNU General Public License) with a significant score of $P < 0.05$. Descriptive data are presented in tables and percentages.

QUALITATIVE RESEARCH

This qualitative research addresses the general populace, dentists, and local government officials in the health sector. The samples of the qualitative study are participants who visited the public hospital and primary health care facilities in Bajawa. The inclusion criteria for participants were age >18 and ongoing use of betel nuts, alcohol drinking, or smoking. Subjects who have quit smoking, drinking alcohol, or chewing betel nuts within the past year are excluded. One researcher conducted interviews or focus group discussions (FGDs) using questions that had been developed beforehand.

A qualitative study was conducted employing five to eight questions prepared in conjunction with the quantitative study's theme before the study commenced. The participants, consisting of five individuals, six dentists, and three local government officials, were recruited using a purposive sampling method. Before the interview, participants were required to provide

informed consent. The 15- to 30-min interviews were performed face to face, and the audio was recorded by phone and then properly transcribed for subsequent investigation by a blind investigator. There were no repeated interviews conducted in this study. The field notes and general comments from participants were documented. The transcripts were not returned to the participants for any feedback to avoid bias in the answers post-interview. The questions of the conceptual framework of knowledge (oral cancer etiology, ingredients of BQC, and impact of risk habits) and attitudes (willingness to stop and effort to prevent mouth cancer) of oral cancer risk factors were provided, and used to produce categorical codes, without conducting pilot testing. The application of a broad inductive thematic analysis to the data led to the establishment of themes. The primary topics and subthemes were finalized, and codes were assigned to meaningful data. A single coder was responsible for the data coding. Then, from these codes, themes were created, which reflected information that appeared to establish a profile of knowledge and attitudes toward oral cancer risk factors. Subsequently, themes were reanalyzed and confirmed. The saturation was fulfilled by the consistency of the responses from respondents. A minimal 60% of similar responses regarding the knowledge and attitudes about risk factors for oral cancer were considered theme saturation. Conformability attempts were made to validate results by comparing responses to the point of saturation and cross-examining the data. All data were analyzed by the Nvivo 12 program (Lumivero, Denver, USA).

RESULTS

QUANTITATIVE STUDY

Based on inclusion criteria, of the 648 subjects recruited, 106 were excluded due to the exclusion criteria or incomplete data. The representativeness of subjects was fulfilled based on the number of samples, the appropriateness of the inclusion criteria, and the representation from all districts in Flores Island. In total, there were 542 individuals, of whom the majority were male (66.42%) and between the ages of 25 and 34 (26.93%). Of the respondents, 36.34% had a high school diploma or its equivalent, while 71.95% had a monthly salary of less than 5 million IDR [Table 1].

QUALITATIVE STUDY

The respondents' consistent responses in this qualitative study helped achieve saturation. The description of the coding tree was not completely described; however, we provided a summary of the coding tree that represented

each aspect of the conceptual framework of the respondents.

It was found that sociocultural influences may serve as supporting factors for oral cancer attitudes [Table 3]. Oral cancer risk habits are more frequent when socializing with friends. The intention to quit smoking, drinking alcohol, and chewing betel nuts already exists, but it is difficult to achieve (quotes #2 and #3) due to factors surrounding friendships and substance addiction. Environmental factors that pay less attention to oral health (quote #4) should also be highlighted regarding the population's attitudes toward oral cancer risk habits. This issue is further complicated by the existence of traditions and culture (quotes #7 and #9), particularly with the habit of chewing betel nuts, which tends to remain a family tradition (attitudes questionnaire and quote #1). Indeed, the local government and local dentists should play an active role in efforts to prevent oral cancer by informing individuals about oral cancer risk factors (quotes #5, #6, and #7) either directly or through the development of posters (quote #8). However, it is also necessary to formulate regulations for the control of products and materials that pose a risk of oral cancer (quote #10) to ensure the effectiveness of initiatives aimed at preventing oral cancer.

MODEL OF QUANTITATIVE AND QUALITATIVE RESULTS

The quantitative results [Figure 1] show that income ($r = -0.102$), family history of oral cancer ($r = 0.134$), and education ($r = 0.085$) are significantly associated with the level of knowledge ($P < 0.05$). The level of knowledge is significantly related ($P < 0.05$) to attitudes toward smoking ($r = 0.141$) and BQC ($r = 0.176$) but not associated with the respondents' attitudes toward alcohol consumption. Age group ($r = 0.14$) and income ($r = 0.113$) are significantly related to attitudes toward smoking ($P < 0.05$). Education level ($r = -0.171$) is significantly related to attitudes toward BQC ($P < 0.05$). Among the three risk factors, each habit is found to be interrelated ($P < 0.05$), but respondents who smoke tend to be more associated with a desire for BQC ($r = 0.375$, $P < 0.05$) compared to alcohol consumption ($r = 0.371$, $P < 0.01$). Similarly, respondents who have a habit of alcohol consumption are also more likely to chew betel quid ($r = 0.283$, $P < 0.05$). This finding indicates that BQC is the dominant habit among the respondents on Flores Island.

Based on the quantitative model, qualitative confirmation shows that despite having a high level of knowledge, the respondents still engage in oral cancer risk behaviors, especially BQC, as supported by the qualitative results [Table 3] (quotes #1, #3, #7, #9, and

Table 1: Population for quantitative characteristics

Variabel	n (%)	Variable	n (%)
Gender		Family history with oral cancer	
Male	360 (66.42)	Yes	23 (4.24)
Female	182 (33.57)	No	519 (95.75)
Age group (years)		Education level	
<18	8 (1.47)	Primary school	98 (18.08)
18-24	63 (11.62)	Secondary school	61 (11.25)
25-34	146 (26.93)	High school	197 (36.34)
35-44	135 (24.90)	Bachelor degree	174 (32.10)
45-54	81 (14.94)	Master degree	4 (0.73)
55-64	62 (11.43)	Philisopher degree	0
≥65	47 (8.67)	Never study	8 (1.47)
Income level (IDR millions)		Risk factors	
<5	390 (71.95)	Smoking (S)	63 (11.62)
5-10	27 (4.98)	Alcohol drinking (AD)	26 (4.79)
>10	4 (0.73)	Betel quid chewing (BQC)	133 (24.53)
No income	121 (22.32)	S + AD	243 (44.83)
		S + BQC	7 (1.29)
		AD + BQC	42 (7.74)
		S + AD + BQC	28 (5.16)
Questionnaire		Alcohol drinking attitude	
Knowledge		High (9-14)	13 (3.8)
Low (12-15)	8 (1.5)	Moderate (15-21)	100 (29.5)
Moderate (16-19)	185 (34.1)	Low (22-27)	226 (66.7)
High (20-24)	349 (64.4)	Betel quid chewing attitude	
Smoking attitude		High (9-14)	4 (1.9)
High (10-16)	11 (3.2)	Moderate (15-21)	100 (47.6)
Moderate (17-23)	117 (34.3)	Low (22-27)	106 (50.5)
Low (24-30)	213 (62.5)		

IDR Indonesian Rupiah; S smoking, AD alcohol drinking; BQC betel quid chewing

Table 2: Frequency and condition for oral cancer risk habits

Variable	Smoking	Alcohol drinking	Betel quid chewing
Frequency of habit (per day)			
Smoking			
<20	298 (54.98)		
>=20	43 (7.93)		
Alcohol drinking			
<=4		307 (55.72)	
>4		32 (5.90)	
Betel quid chewing			
<=6			193 (35.60)
7-12			16 (2.95)
Condition for habit			
Friend gathering	270 (49.82)	318 (58.67)	189 (34.87)
Relaxing	247 (45.57)	102 (18.82)	112 (20.66)
Stress	161 (29.70)	67 (12.36)	25 (4.61)
After meal	238 (43.91)	59 (10.89)	86 (15.87)
Cold temperature	151 (27.86)	61 (11.25)	30 (5.54)

#10). The FGD responses indicate that this condition is influenced by local sociocultural factors that contribute to the persistent practice of BQC [Table 3].

DISCUSSION

In this study, most adults smoke less than 20 cigarettes per day [Table 2]. This is contrary to the findings of a

Table 3: Participants’ responses about oral cancer risk habits

No	ID participant	Quotes
1	General population #3	In our locality, the main ingredients for betel quid are areca nut, limestone chalk, and betel leaf, although betel leaf is predominantly used. My mother used to chew it with tobacco, but after she stopped using tobacco, she felt exhausted.
2	General population #5	Although I am aware of the harmful effects, quitting the habit is challenging. I have a strong urge to stop, but the withdrawal feels quite overwhelming. As a result, I ended up resuming smoking and drinking over the next few days.
3	General population #5	Chewing betel quid makes me feel weak, as if something is missing, especially after meals.
4	Local government #6	There hasn’t been a specific program focused on oral cancer prevention. However, the public health center does have a health promotion program that encourages a healthy lifestyle. This research might bring attention to the matter. Unfortunately, oral health remains undervalued, despite recorded cases of several oral cancer patients.
5	Local government #7	Nearly every market in the area sells the necessary items for betel quid preparation. If we were to suddenly enforce a complete stop, it would have a significant impact. Hence, repeated announcements are necessary.
6	Local government #8	Persuading people to stop chewing betel nut is extremely challenging. As an alternative, we encourage them to rinse their mouths after chewing.
7	Dentists #9	When I suspect that a patient may have oral cancer, I discuss risk factors such as alcohol consumption and betel quid chewing. I inquire about their habits and their family history. If their parents had similar habits, I inform them about the increased family risk and advise them to stop the habits. While they used to listen to us when they were sick, social influence, especially during traditional ceremonies, makes it difficult to overcome these habits.
8	Dentists #10	The oral cancer poster is already displayed at my public health center. The words “smoke and chew betel quid until you look like this” on the poster are quite frightening.
9	Dentists #12	From my observations, the challenge lies in the cultural and individual factors here. People might perceive our advice as arrogant. To address this issue, I recommend advising them to gradually reduce the habit day by day, considering its long-standing nature. Despite not indulging in these practices myself, the social environment may make me appear conceited around others.
10	Dentists #13	In our cultural tradition, we use areca nut, betel leaf, and limestone chalk for betel quid preparation.

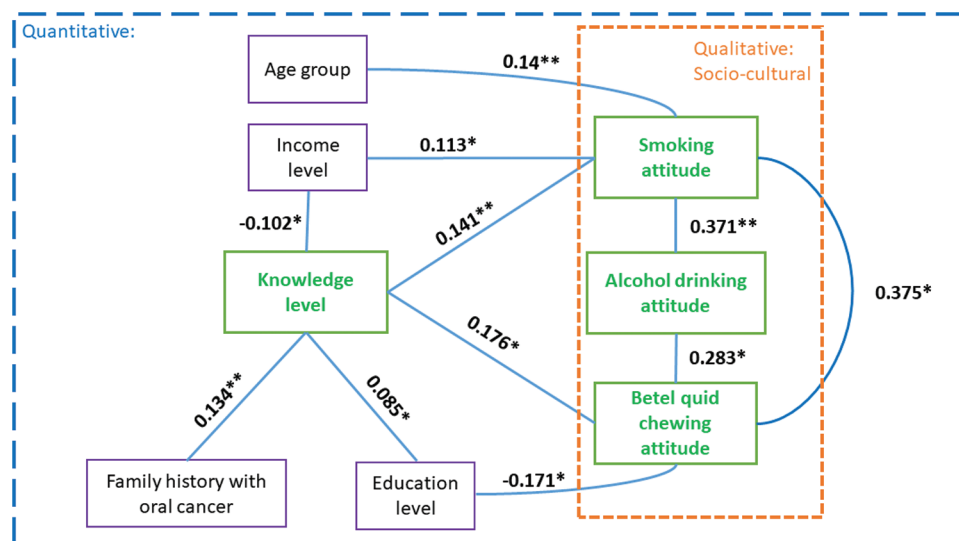


Figure 1: Model of oral cancer risk factors of knowledge and attitudes based on quantitative and qualitative approaches. The score shows the Pearson correlation coefficient *r*. **P* < 0.05 and *P* < 0.01**

study about smoking habit change intention among smokers in Shanghai by Wang *et al.*,^[12] who found that more people smoked more than 20 cigarettes

per day. Most people smoke when hanging out with friends [Table 2]. This is consistent with the study findings by Mutarak *et al.*,^[13] which showed that

most people smoke due to the influence of their peers. A study conducted by Ayuningtyas *et al.*^[14] reported that family may have exerted social control over the smoking habit.

Most people drink less than or equal to four glasses of alcohol per day [Table 2]. This finding is consistent with that of a study published by Lu *et al.*, which indicates that most people drink alcohol less than 365 times per year.^[15] The majority of individuals use alcohol when socializing with friends [Table 2]. This is in line with the study findings by Sudhinaraset *et al.*^[16] and Jafari *et al.*,^[17] which revealed that most people drink alcohol when hanging out with family, friends, or even members of groups.

The majority of individuals engaged in their BQC habit less than or equal to six times a day [Table 2], which is in line with the findings of Heck *et al.*, which reveal that the majority of people chew fewer than or equal to five times a day.^[18] Most individuals chew when socializing with friends [Table 2]. This finding is also consistent with Murphy's statement that chewing has a social implication.^[19]

Age correlates with a person's smoking attitude ($P = 0.01$), with the 25–34 age group having the highest smoking attitudes. There is a correlation between a person's degree of education and their awareness of oral cancer risk factors ($P = 0.048$) [Table 2]: 356 respondents had no more or less education than high school/equivalent, and eight subjects did not attend school. Table 2 shows that there is a correlation between a person's degree of education and betel nut use ($P = 0.013$). The majority of subjects with betel nut use (72 subjects) are elementary school graduates, as are 42 of the subjects with the highest category of betel nut use. Our study supports the idea that education and culture may impact the oral cancer risk factor.^[20] There is a correlation between a person's income and their awareness of oral cancer risk factors ($P = 0.017$) [Table 2]. As many as 385 participants with an income of less than or equal to \$5 million IDR (Indonesia Rupiah) had a moderate-to-high degree of knowledge about oral cancer risk factors. Table 2 shows that there is a correlation between income and a person's smoking attitudes ($P = 0.038$). Of the 341 respondents surveyed, the group earning less than 5 million won per month had the highest proportion of smokers (258 of a total of 358). Table 2 shows a highly significant correlation between a family history of oral cancer and awareness of risk factors for oral cancer ($P = 0.002$), with 95% of respondents with a family history of oral cancer having knowledge of risk factors for mouth cancer in the highest category. Our study supports the findings

by Fantozzi *et al.*, which indicated that a family history of cancer may be an additional risk factor for oral cancer.^[21]

In this epidemiological study, the central themes of knowledge and attitudes regarding BQC were explored. Participants discussed their knowledge about betel nut ingredients, cancer causes, and the impacts of the habit. They also shared their attitudes toward their habits, their desire to stop these habits, and the availability of oral cancer prevention programs. The main ingredients for betel quid in the locality were found to be areca nut, limestone chalk, and betel leaf, with betel leaf being the most commonly used ingredient (quotes #1 and #10). Participants expressed challenges in quitting the habit, despite being aware of its harmful effects (quotes #1, #2, #3, #6, and #9). They described feeling weak and experiencing withdrawal symptoms when attempting to stop, leading some to resume smoking and drinking (quotes #2). The absence of specific oral cancer prevention programs highlighted the undervalued status of oral health in the community, despite recorded cases of oral cancer patients (quotes #4).

Moreover, the accessibility of betel quid preparation items in local markets was noted, making sudden cessation challenging due to the habit's prevalence (quotes #5). Persuading people to stop chewing betel nut proved to be extremely difficult, necessitating alternative approaches such as encouraging mouth rinsing after chewing (quotes #6). Additionally, communicating risk factors and the importance of quitting to patients suspected of having oral cancer posed challenges due to social influences, especially during traditional ceremonies, which perpetuated the habit (quotes #7 and #9). The presence of an oral cancer poster at the public health center was aimed at raising awareness, but participants acknowledged the fear-inducing impact of its imagery (quotes #8). The cultural and individual factors surrounding BQC were identified as key challenges, with the need for gradual advice and sensitivity in communication to address perceived arrogance in advice-giving. This study underscores the importance of tailored interventions and awareness campaigns to promote oral health and combat oral cancer risks in the community.

There was a correlation between knowledge and attitudes.^[9] Based on models derived from this study [Figure 1], it was determined that various characteristics are associated with oral cancer risk factors, knowledge, and attitudes. Although income level, family history of oral cancer, and level of education influenced knowledge of oral cancer risk factors, social boundaries altered attitudes toward smoking, alcohol consumption, and

BQC. The correlation between smoking and BQC attitudes and knowledge was observed. According to several publications, there was a correlation between knowledge and smoking habits ($P < 0.05$).^[22] There was also a correlation between knowledge and BQC habits.^[23] In reverse, alcohol consumption seemed related to social and cultural factors in the population. This is consistent with the findings of a study published by Sudhinaraset *et al.*, which revealed that alcohol drinking is related to societal influence, societal pressure, cultural norms, and family and peer influence.^[16] Tate *et al.* stated that smoking intervention and policies should be sensitive to the cultural and normative context within certain areas.^[24] Our study also found that smokers tended to drink alcohol ($r = 0.371$, $P < 0.01$) and BQC ($r = 0.375$, $P < 0.05$). The study results showed that this correlation between knowledge and attitudes was more applicable to the residences in Flores in particular and to the East Indonesian community in general. This correlation was attributed to the difference in risk habits and cultural factors among West, Central, and East Indonesia. Based on the findings of Amtha *et al.*, the risk habit of tobacco smoking is more dominant than BQC and alcohol consumption.^[25] According to a study published by Michelle *et al.*, smoking increases alcohol consumption ($P < 0.01$).^[26] Regarding BQC, current smokers also chewed betel nuts ($P = 0.02$).^[27]

Our study has some limitations: we did not carry out a pilot study for the qualitative questionnaires. In future studies, collaboration with institutions and the use of mixed methods are recommended to evaluate any approach to minimizing the use of oral cancer-risk products, such as tobacco cigars, betel quid, and local alcohol.

CONCLUSION

This study showed that the Flores population has good knowledge of oral cancer risk habits but that it contradicts their attitudes based on quantitative and qualitative results. Participants shared their understanding of betel nut ingredients, cancer causes, and habit impacts. They also expressed challenges in quitting their habits despite being aware of their harmful effects, leading to a resumption of smoking and drinking. The absence of specific oral cancer prevention programs highlighted the undervalued status of oral health in the community, even with recorded oral cancer cases. The study emphasizes the need for tailored interventions and awareness campaigns to address cultural and individual factors, promote oral health, and mitigating oral cancer risks within the community. The correlation model revealed strong influences among variables and the sociocultural influence on the population's attitude toward oral cancer

risk habits. The government, healthcare professionals, and public figures should collaborate to overcome sociocultural barriers.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

AUTHOR CONTRIBUTIONS

The interviewers were RA and IG. RA is a female researcher (32 years old) and senior lecturer, as well as a professor in oral medicine. IG is a male researcher (23 years old) and senior lecturer with a PhD in oral medicine. Both RA and IG work at Universitas Trisakti. No relationships between the researcher and the study participants were established before the study's commencement. Participants were only notified about the purpose of the study. Both of the interviewers were from the same department, had an interest in the same research topic, and designed and validated the structured questionnaire for this study. The bias and unmatched assumptions that could arise from the interviews with the participants were eliminated by jointly discussing the recorded interviews. FAN was responsible for writing the draft of the manuscript and coding qualitative data. IG and FKH performed the statistical analysis and transcription recording. EFS reviewed the manuscript. All authors have confirmed all presented data and read the final manuscript.

ETHICAL POLICY AND INSTITUTIONAL REVIEW BOARD STATEMENT

Ethical clearance was obtained from the Ethics Commission, Faculty of Dentistry, Universitas Trisakti (022/S3/KEPK/FKG/7/2022).

PATIENT DECLARATION OF CONSENT

Not applicable.

DATA AVAILABILITY STATEMENT

The data for our study is subject to legal regulations in Indonesia. Data sharing availability will be provided upon request.

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Prof Rahmi Amtha,

Journal of International Society of Preventive and Community Dentistry has received your revised manuscript entitled '[ARTICLE_TITLE]'. The manuscript will be re-evaluated by concerned referees for the final decision regarding its suitability for publication. We will get back to you within four weeks.

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With warm personal regards,

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