Effectiveness of Social Media Message Framing on Caries Risk Perception among Health Science Students: A Quasi-Experimental Study Based on the Health Belief Model

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Abstract

Despite increasing access to oral health education, the prevalence of dental caries remains high among health science students, indicating a gap between theoretical knowledge and individual risk perception. This study aimed to evaluate the effectiveness of message framing strategies delivered via social media in enhancing caries risk perception, based on the Health Belief Model (HBM). This study employed a pretest-posttest quasi-experimental design with a control group. A total of 130 students from the Faculty of Dentistry at Prima Indonesia University were selected using purposive sampling and divided into an intervention group (n = 65) and a control group (n = 65). The intervention group was exposed to gain-framed and loss-framed health messages through social media over one month, while the control group received no intervention. Risk perception was measured using six core HBM constructs and analyzed using the Wilcoxon Signed-Rank Test and Mann–Whitney U Test. The results showed statistically significant improvements ($p < 0.001$) in perceived susceptibility, severity, benefits, cues to action, and self- efficacy in the intervention group, while perceived barriers showed no significant change. These findings suggest that social media–based message framing is effective in improving caries risk perception and may help bridge the gap between knowledge and behavior among the productive-age population

Keywords: Dental Caries, Digital Health Promotion, Health Belief Model, Message Framing, Risk Perception, Social Media Intervention

INTRODUCTION

Oral and dental disease remains a major global public health concern (Marthinu & Bidjuni, 2020). In 2022, nearly 3.5 billion people worldwide were affected, with the majority of cases occurring in middle-income countries (Boer et al., 2020). Oral health significantly influences overall health and quality of life, particularly through its impact on masticatory and speech functions (Aida et al., 2024; Pudentiana et al., 2021). Dental caries, the most prevalent chronic oral disease, is characterized by the progressive destruction of tooth hard tissues caused by cariogenic bacteria that ferment sucrose and produce acids (Normansyah et al., 2022; Yusdiana, 2021; Pratiwi et al., 2020; Khulwani et al., 2021; Liasari et al., 2024). Globally, caries in permanent teeth exhibit the highest prevalence, exceeding two billion cases. In Indonesia, the prevalence reaches 28.8% with 57.6% active cases, underscoring a persistently high burden (Koch et al., 2024).

Dental caries are closely associated with behavioral factors such as habits and lifestyle (Maramis et al., 2023). Despite increasing access to dental health information, awareness and preventive practices remain limited, even among health students, whose prevalence rates are comparable to those of the general population (Abdul-Jabbar et al., 2021; Amelia et al., 2021). Although the Universitas Prima Indonesia Faculty of Medicine, Dentistry and Health Sciences (FKKGIK) provides education on cavities, many students remain uncertain about their individual risks (Wicaksono et al., 2023). Significant gaps persist between students' knowledge and their actualbehaviors, resulting in inadequate risk assessment and insufficient preventive practices (Stibe et al., 2022). This highlights the limited application of psychological and communication strategies in bridging these knowledge-behavior gaps.

Leavell & Clark (1979) identified three levels of disease prevention: primary, secondary, and tertiary (Elina Martínez-Carrillo et al., 2021; Tafal, 2021). Primary prevention focuses on health education and behavioral modification before the onset of disease (KC et al., 2024). In this context, social media has become an important and strategic platform for delivering health messages to young people, as it shapes both their perceptions and behaviors related to health (Li et al., 2021; Schillinger et al., 2020).

Message framing has emerged as an increasingly effective method for improving communication aimed at promoting healthy lifestyles. This method delivers information by emphasizing either the positive outcomes of adopting a behavior (gain-framed) or the negative consequences of failing to adopt it (loss-framed) (Hameleers & Boukes, 2021; Alsisi et al., 2020). In contrast, traditional information delivery is usually neutral and descriptive. Message framing is considered more effective because it aligns with the way individuals process information both cognitively and emotionally, thus making messages more persuasive and personally relevant. Framed messages have been shown to influence risk interpretation, consequence evaluation and health-related decision-making, ultimately increasing engagement and motivation to adopt preventive behaviors. Previous studies demonstrate that framed messages significantly improve oral health outcomes, including knowledge, attitudes, behavioral intentions, self-efficacy, oral hygiene practices, and plaque index scores, compared to unframed messages (Divdar et al., 2021; Walters et al., 2020; Mendelsohn, 2024). However, evidence regarding their effectiveness in improving caries risk perception, particularly among health sciences students, remains limited.

To better understand how such messages influence individual perceptions, this study adopts the Health Belief Model (HBM) as a theoretical framework. The HBM comprises six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers,

cues to action, and self-efficacy (Green et al., 2020; Sanaeinasab et al., 2022). Widely applied in health research, this model explains and predict preventive health behaviors based on individual beliefs and perceptions (Jose et al., 2021).

Therefore, this study aims to evaluate the effectiveness of social media–based message framing on caries risk perception among students of the Faculty of Medicine, Dentistry, and Health Sciences at Universitas Prima Indonesia, using the HBM framework. The findings are expected to contribute to the development of more effective, psychologically grounded digital health promotion strategies and to strengthen primary prevention efforts through targeted, media-based interventions.

METHODS

This study employed a quantitative approachd using a pretest-posttest quasi-experimental design with a non-equivalent control group (Wei et al., 2021). Two groups were compared: an experimental group and a control group. The experimental group received an intervention consisting of information about the potential risk of developing dental caries, delivered via social media using both gain- and loss- framed messaging, to assess how these approaches influenced students' perception of caries risk. Instagram and WhatsApp were selected as the delivery platforms due to their popularity among college students and their suitability for disseminating health information through interactive, image-based format.

The research intervention was primarily conducted via Instagram through feed posts, stories, educational posters, and short videos. Content was published consistently over four weeks at a frequency of three to four posts per week, resulting in a total of 14 main pieces of content provided to the intervention group. Repeated exposure was employed used to improve information retention, risk awareness, and participants' perceptions of dental caries. The intervention materials were designed using a message framing approach that incorporated both gain-framed messages and loss-framed messages. Gain-framed content emphasized the benefits of preventive behaviors and oral health maintenance, whereas loss-framed content highlighted the negative consequences of failing to adopt such behaviors. All materials were developed based on oral health literature and the constructs of the Health Belief Model (HBM).

In addition to Instagram, WhatsApp was used as a supporting medium to distribute supplementary materials, remind participants of the content exposure schedule, and facilitate communication throughout the study. Limited in-person sessions were also conducted on campus to provide further explanations and reinforce participants' understanding of the intervention materials. The control group did not receive any intervention during the study

period and served as a comparison group to the experimental group, which was exposed to health message framing via social media.

This study was conducted both online, through social media, and offline via participation in research discussion forums at the Faculty of Medicine, Dentistry, and Health Sciences (FKKGIK) of Prima Indonesia University. This site was selected because it is directly relevant to the research population and provides convenient access to appropriate samples. The study was carried out in April 2025, with preliminary activities beginning in March 2025 . All related ethical approvals were obtained from both the Research Ethics Committee of Prima Indonesia University (111/KEPK/UNPRI/III/2025) and the International Conference Board. All researchers adhered strictly to approved protocols for human subject research, and all participants provided informed consent prior to participation.

This study's population consisted of all active students of the Faculty of Dentistry at Prima Indonesia University. The research sample was selected using purposive sampling based on the following inclusion criteria: (1) students currently enrolled in the ongoing academic year, (2) students with active social media accounts such as Instagram and WhatsApp, and (3) students willing to participate by providing informed consent. Exclusion criteria included students on academic leave, those without active social media accounts, and those unwilling to participate.

The sample size was calculated using the Slovin formula for a large population. Based on data from the population of FKKGIK Prima Indonesia University students who met the inclusion and exclusion criteria, a total of N = 192 was obtained with an error rate (e) of 0.05 (5%). The calculation yielded a sample size of n = 130 respondents. Participants who met the inclusion criteria were divided into an intervention group and a control group in accordance with the research procedures established by the researchers. The experimental group, consisting of 65 participants, received the intervention, while the second control group, also consisting of 65 participants, did not.

Initially, the researchers prepared the instruments by developing a cariogenic risk perception questionnaire and creating social media framing materials. Next, the validity and reliability of the instruments were tested. Additionally, permission from the Indonesian Dental Association (FKKGIK) of Prima Indonesia University. As part of the implementation phase, a Pre-Test was conducted to evaluate the caries risk perception of both groups before the intervention. This Pre-Test was administered through an online form distributed to all participant, allowing them to complete the questionnaire independently within a designated time frame. For one month, the experimental group was exposed to social media framing as

part of the intervention, while the control group did not receive any treatment. After the intervention period, both groups participated in a post test to assess changes in their caries risk perceptions.

The final step of analysis involved compiling and examining the data sets, which were presented in tables containing descriptive statistics such as means and standard deviations to illustrate caries risk perception in both groups. Inferential analyses were then conducted using the Wilcoxon test to assess differences in perceptions before and after the intervention within each group, and the Mann-Whitney U test to compare differences between the experimental and control groups. The results of this analysis are expected to demonstrate the effect of social media framing on caries risk perception among students at the FKKGIK of Prima Indonesia University.

RESULT

Table 1. Respondent Characteristics

Variable	Category	n	%
Academic Program	Dentistry	130	100
Group	Experimental (1)	65	50
	Control (2)	65	50
Gender	Male	52	40
	Female	78	60
Age	19 years old	26	20
	20 years old	70	53,8
	21 years old	34	26,2
Total		**130**	**100**

Table 1 presents the characteristics of the respondents by study group. All participants were enrolled in the Dentistry Program at Prima Indonesia University, with 65 respondents in both the experimental and control groups. The majority of respondents were female (60.0%), and most were 20 years old (53.8%).

Table 2. Baseline Pretest Scores of Health Belief Model (HBM) Constructs Between Experimental and Control Groups

Baseline Scores (Pretest)	Experimental Group n (%) / Mean ± SD	Control Group n (%) / Mean ± SD
Perceived Susceptibility (Y1)	12.45 ± 2.31	12.18 ± 2.27
Perceived Barriers (Y2)	10.22 ± 1.84	10.20 ± 1.79
Perceived Severity (Y3)	13.05 ± 2.44	12.97 ± 2.39

Baseline Scores (Pretest)	Experimental Group n (%) / Mean ± SD	Control Group n (%) / Mean ± SD
Perceived Benefits (Y4)	11.76 ± 2.01	11.70 ± 1.95
Cues to Action (Y5)	10.94 ± 2.18	10.88 ± 2.11
Self-Efficacy (Y6)	12.11 ± 2.26	12.03 ± 2.20
Total	**65 (100%)**	**65 (100%)**

Table 2 presents the pretest scores across all dimensions of the Health Belief Model (HBM), showing relatively similar mean values between the experimental and control groups. This indicates that both groups had comparable baseline characteristics and conditions prior to the intervention.

Table 3. Validity Test Results of the Questionnaire

Domain	Item	r-value	r-table	Sig. (2-tailed)	Interpretation
Y1 (Perceived Susceptibility)	Y1.1	0.373	0.279	0.008	Valid
	Y1.2	0.606	0.279	<0.001	Valid
	Y1.3	0.552	0.279	<0.001	Valid
Y2 (Perceived Barriers)	Y2.1	0.838	0.279	0.003	Valid
	Y2.2	0.837	0.279	<0.001	Valid
	Y2.3	0.822	0.279	<0.001	Valid
Y3 (Perceived Severity)	Y3.1	0.444	0.279	0.001	Valid
	Y3.2	0.836	0.279	<0.001	Valid
	Y3.3	0.839	0.279	<0.001	Valid
Y4 (Perceived Benefits)	Y4.1	0.626	0.279	<0.001	Valid
	Y4.2	0.737	0.279	<0.001	Valid
	Y4.3	0.618	0.279	<0.001	Valid
Y5 (Cues to Action)	Y5.1	0.575	0.279	<0.001	Valid
	Y5.2	0.698	0.279	<0.001	Valid
	Y5.3	0.415	0.279	0.003	Valid
Y6 (Self-Efficacy)	Y6.1	0.461	0.279	0.001	Valid
	Y6.2	0.629	0.279	<0.001	Valid
	Y6.3	0.724	0.279	<0.001	Valid

Based on Table 3, the questionnaire instrument consisted of 18 items divided into six domains of the Health Belief Model (HBM): perceived susceptibility (Y1), perceived barriers

(Y2), perceived severity (Y3), perceived benefits (Y4), cues to action (Y5), and self-efficacy (Y6), with each domain comprising three items. The validity test results indicated that all questionnaire items had r-values greater than the r-table value (0.279) and significance values below 0.05, confirming that all items were valid and suitable for use in this study.

Table 4. Reliability Test Result of the Questionnaire

Cronbach's Alpha	N of Items
.919	18

Based on Table 4, the reliability test results showed that the questionnaire instrument had a Cronbach's Alpha value of 0.919 for 18 items, indicating that the instrument demonstrated excellent reliability and consistency for measuring respondents' perceptions related to caries risk.

Table 5. Descriptive of Experimental Group

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Difference between Y1 posttest	65	0	12	5.11	2.739
Difference between Y2 pretest and posttest	65	0	0	.000	.000
Difference Y3 pretest- posttest	65	0	11	5.80	2.514
Difference Y4 pretest-posttest	65	0	9	3.58	1.960
Difference Y5 pretest-posttest	65	-3	8	3.15	2.202
Difference Y6 pretest-posttest	65	-2	11	4.02	2.595

Table 5 presents the descriptive statistics summarizing the data for the six pretest – posttest difference variables (Y1 to Y6) across 65 respondents. These variables represent the six dimensions of the Health Belief Model (HBM): perceived susceptibility (Y1), perceived barriers (Y2), perceived severity (Y3), perceived benefits (Y4), cues to action (Y5), and self-efficacy (Y6). For most variables, the difference values varied but showed a positive mean, indicating an overall increase in posttest scores compared to pretest scores. Notably, for Y2, all 65 respondents had a difference of 0, reflecting no change between pretest and posttest scores. Meanwhile, Y5 and Y6 displayed negative mean difference values, suggesting that some respondents experienced a decrease in their scores.

Table 6. Descriptive of the Control Group

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Difference between Y1 posttest	65	0	0	.00	.000
Difference between Y2 pretest and posttest	65	0	0	.00	.000
Difference Y3 pretest- posttest	65	0	0	.00	.000
Difference Y4 pretest-posttest	65	0	0	.00	.000
Difference Y5 pretest-posttest	65	0	0	.00	.000

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Difference Y6 pretest-posttest	65	0	0	.00	.000

Table 6 shows that for all pretest-posttest difference variables (Y1 through Y6), there were no changes between the pretest and posttest measurements among the 65 respondents in the control group. All variables had minimum, maximum, mean, and standard deviation of 0.00, as the control group did not receive any intervention during the one-month study period. The pretest-posttest difference was calculated by subtracting the pretest score from the posttest score; therefore, the absence of an intervention resulted in no change in the respondents' perception of caries risk across all dimensions. Consequently, all respondents had a difference value of 0 for each variable, indicating neither an increase nor a decrease in scores between the pretest and posttest in the control group.

The normality test for 130 respondents, conducted using the Kolmogorov Smirnov and Shapiro Wilk tests, yielded significance values ($p < 0.001$) for both the total pre-test score and the total post-test score. Since these values were below the 0.05 threshold, the data were determined to be non-normally distributed. This non-normality is likely attributable to the use of an ordinal Likert scale to measure subjective perceptions, which often produces skewed distributions due to response bias and individual variability in interpretation (Annisak et al., 2024). Given this violation of the normality assumption, non-parametric statistical methods were deemed more appropriate for subsequent hypothesis testing.

Table 7. Wilcoxon test

Test Statistics	Posttest – Pretest
Z	-7.012[b]
Asymp. Sig. (2-tailed)	< .001

Based on the overall results of the Wilcoxon Signed Ranks Test, a Z value of -7.012 was obtained with a significance level (Asymp. Sig. 2-tailed) of $p < 0.001$. since this value is below the 0.05 threshold, it can be concluded that there was a statistically significant difference between the pretest and posttest scores following the social media framing intervention on caries risk perception. These findings indicate that the intervention significantly improved students' perceptions of caries risk.

Additionally, the effect size was calculated using the formula $r = Z / \sqrt{N}$, with a total of 130 respondents. According to Cohen's criteria (1992), an effect size of 0.10–0.29 indicates a small effect, 0.30–0.49 a medium effect, and 0.50–1.00 a large effect.

For the Wilcoxon test (pre-post experimental group), the effect size calculation yielded $r = 7{,}012 / \sqrt{130} = 7{,}012 / 11{,}402 = 0{,}615$. This value falls within the large effect category.

These results demonstrate that the social media framing intervention was not only statistically significant but also had strong practical significance in improving caries risk perception among college students.

Table 8. Mann-Whitney U Test

Variable	Experimental Group (n=65) Mean ± SD	Control Group (n=65) Mean ± SD	Mann-Whitney U	Z	p-value
Perceived Susceptibility (Y1)	5,11 ± 2,739	0,00 ± 0,000	—	—	<0,001
Perceived Barriers (Y2)	0,00 ± 0,000	0,00 ± 0,000	—	—	—
Perceived Severity (Y3)	5,80 ± 2,514	0,00 ± 0,000	—	—	<0,001
Perceived Benefits (Y4)	3,58 ± 1,960	0,00 ± 0,000	—	—	<0,001
Cues to Action (Y5)	3,15 ± 2,202	0,00 ± 0,000	—	—	<0,001
Self-Efficacy (Y6)	4,02 ± 2,595	0,00 ± 0,000	—	—	<0,001
Total Skor	**21,66**	**0,00 ± 0,000**	**0,000**	**-10,518**	**<0,001**

Based on the table, the experimental group showed increases in scores across nearly all dimensions of the Health Belief Model (HBM), namely perceived susceptibility (Y1), perceived severity (Y3), perceived benefits (Y4), cues to action (Y5), and self-efficacy (Y6) compared to the control group, where all change scores were 0.00. This indicates that the social media-based intervention administered to the experimental group influenced respondents' perception of caries risk. No change in scores was observed in the perceived barriers (Y2) dimension for either group. The results of the Mann-Whitney test yielded a p-value < 0.001 for nearly all dimensions and the total score, indicating a statistically significant difference between the experimental and control groups following the intervention.

For the Mann-Whitney test, the effect size was calculated using the formula $r = Z / \sqrt{N}$. With Z = 10.518 and N = 130, the calculation yielded $r = 10.518 / \sqrt{130} = 10.518 / 11.402 = 0.922$. This value falls within the large effect category, demonstrating that the social media framing intervention was not only statistically significant but also had strong practical significance in improving caries risk perception among college students.

DISCUSSION

Social media-based message framing successfully heightened dental caries risk awareness among students at Prima Indonesia University's Faculty of Dentistry. This positive shift was evident across five core Health Belief Model (HBM) constructs, perceived susceptibility, severity, benefits, cues to action, and self-efficacy, though perceived barriers showed no significant change. These results validate the utility of the HBM in demonstrating how cognitive perceptions drive individual health behaviors (Ghorbani-Dehbalaei et al., 2021;

Ritchie et al., 2021; Shankar & Prathap, 2020; Shmueli, 2021). Within the HBM framework, preventive health behaviors are triggered when individuals recognize their personal risk and the severity of a disease, while simultaneously believing in the efficacy of the solution and their own ability to act (Berhimpong et al., 2020). In this study, social media functioned not merely as an information channel but as a cognitive stimulus. By reinforcing both the perceived threat of dental caries and the motivation to prevent it, the platform actively shaped participants' health mindsets.

The rise in perceived susceptibility suggests that the Instagram and WhatsApp health campaigns effectively heightened participants' awareness of their own caries risk. Recognizing personal risk is a vital first step toward adopting preventive habits, as individuals are more likely to act against health threats they perceive as genuine and personally relevant (Diana et al., 2021). The findings further suggest that emphasizing real-world consequences such as pain, difficulty eating, and permanent tooth damage, makes health messages much more emotionally resonant. However, the intensity of individual responses likely varies depending on their health literacy, past dental experiences, and personal motivation (Finbråten et al., 2020). Supporting this, research by Zhang et al. (2023) and KC et al. (2024) demonstrates that higher health literacy directly correlates with stronger understanding of medical risks and greater willingness to adopt preventive behaviors.

Among all the constructs, perceived severity showed the most pronounced increase. These findings demonstrate that the messaging successfully reshaped how participants appraised the consequences of dental caries: rather than viewing it as a mere cosmetic issue, they recognized it as a serious health condition capable of impairing daily social interactions, chewing ability, mental well-being, and overall quality of life (Militi et al., 2021; Purbasari et al., 2023). This outcome aligns with the study by Younis & Naji (2021), which observed that targeted health communication significantly heightens perceptions of disease severity over time. In the present study, regular exposure to information via social media provided participants with continuous cognitive reinforcement. This consistent messaging ultimately prompted them to view dental caries not just as a minor ailment, but as a serious health concern requiring early preventive care.

A greater appreciation for the benefits of caries prevention became evident as participants increasingly associated these behaviors with improved oral health, enhanced self-confidence, and reduced future healthcare costs. This outcome highlights the effectiveness of gain-framed communication in health campaigns; by emphasizing positive outcomes, the messaging reinforced the idea that preventive actions yield meaningful health rewards. Liu & Niederdeppe

(2024) note that messages spotlighting the positive returns of healthy habits tend to maximize acceptance and strengthen the intention to act. This finding aligns with prior literature demonstrating that a strong perception of benefits is positively correlated with sustained oral self-care practices, including regular toothbrushing, dietary sugar control, and routine dental visits.

In contrast to the other constructs, perceived barriers showed no meaningful change. This static result underscores a critical limitation of digital health messaging: its inability to address systemic, real-world constraints. Even with heightened awareness, participants remained bound by practical impediments to seeking treatment, such as financial pressures, demanding schedules, limited clinical availability, and the bureaucratic complexities of health insurance frameworks like BPJS and KIS (Wirasuari et al., 2024; Juniati, 2022). These findings support the view of Liu & Niederdeppe (2024) that structural factors are inherently more resistant to communication-based interventions than individual cognitive perceptions. Furthermore, undergraduate students often face financial limitations and heavy academic workloads, which frequently relegate dental care to a lower priority. This is consistent with evidence from (Januraga et al., 2021), whose study found that prohibitive treatment costs, insurance constraints, and geographic barriers remain primary obstacles to student healthcare access. Consequently, raising public awareness alone is insufficient; it must be complemented by systemic policy support and equitable access to services.

Regarding the cues to action construct, overall scores increased despite a noticeable decline in motivation among certain participants. This divergence suggests that repetitive exposure to digital health communication produces highly individualized effects. While the messaging successfully encouraged some individuals to pursue preventive care, the sheer volume and intensity of the digital content inadvertently triggered information fatigue in others. According to the S-O-R model described by Soroya et al. (2021), excessive information exposure can provoke anxiety, cognitive saturation, or behavioral avoidance. These insights indicate that the effectiveness of social media campaigns depends not only on message content, but also on dissemination frequency, format diversity, and the audience's cognitive processing capacity. Consequently, digital health promotion strategies must be adaptively structured to minimize the risk of information overload.

A post-intervention rise in self-efficacy indicates that the messaging successfully strengthened participants' confidence in their ability to prevent dental caries. Because individuals who believe in their own capabilities are more likely to maintain positive lifestyle routines, self-efficacy remains a critical determinant in translating short-term awareness into

lifelong preventive practices (Freire et al., 2020). Conversely, a subset of participants still exhibited diminished self-efficacy, largely due to past adverse dental experiences, demanding academic workloads, or unsupportive immediate environments (Asri, 2024). This outcome suggests that online health education achieves its full potential only when complemented by supportive interventions. To transform awareness into lasting habits, digital strategies should be integrated with direct behavioral coaching, sustained motivation, and barrier-free access to professional dental consultations.

The results of the inferential analysis reinforce the descriptive findings of the study. The Wilcoxon test revealed a significant difference between pretest and posttest scores within the experimental group ($Z = -7.012$; $p < 0.001$), while the Mann–Whitney test demonstrated a significant difference between the experimental and control groups following the intervention ($U = 0.000$; $Z = -10.518$; $p < 0.001$). Beyond statistical significance, the calculated effect sizes fall within the large category, confirming that social media-based message framing exerts a robust practical influence on amplifying caries risk perceptions. These outcomes are consistent with prior research showing that social media can serve as a highly effective instrument for raising health awareness and promoting preventive behaviors through tailored communication strategies (Divdar et al., 2021; Zhang et al., 2023; Al Sisi et al., 2020).

In conclusion, this study highlights the immense potential of social media platforms in modernizing oral health outreach among youth, notably within university populations characterized by pervasive technology use. The structural advantages of Instagram and WhatsApp enable swift, engaging, and iterative message delivery, collectively enhancing cognitive awareness and strengthening preventive dental behaviors (Diana et al., 2021). Moving forward, the effectiveness of digital outreach will depend on reinforcement through healthcare policies and systems. True behavioral permanence cannot be achieved by merely optimizing personal awareness and health beliefs; rather, health promotion must be systematically linked to structural improvements, such as reducing barriers to clinical care, dismantling administrative complexities surrounding BPJS and KIS, and engaging educational institutions to champion sustainable wellness behaviors (Januraga et al., 2021).

Several limitations of this study warrant acknowledgment. First, the relatively brief intervention window precludes assessment of long-term behavioral maintenance. Second, because the study sample was drawn from a single faculty, the generalizability of these findings to broader student populations is limited. Finally, the reliance on self-report questionnaires introduces the potential for subjective response bias. Consequently, future research should incorporate more diverse and expansive samples, extend the observation period, and triangulate

psychological evaluations with objective measures of oral health behaviors to provide a more comprehensive overview.

CONCLUSION

The results of this study suggest that the way health messages are framed on social media has a substantial impact on how students perceive their risk of developing dental caries. Exposure to framed messages increased students' awareness of caries, heightened their sense of vulnerability, and underscored the value of applying effective communication strategies such as the Health Belief Model. The findings also highlight the importance of strategically designed messages in promoting healthy behaviours through caries prevention. This research supports the use of social media as a strategic platform for delivering oral health education and indicates that employing appropriate framing techniques can effectively enhance knowledge of caries risk among future oral health providers.

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