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EFFECTIVENESS OF A HYBRID MOTIVATIONAL INTERVIEWING MODEL USING MOBILE APP AND FACE-TO-FACE COUNSELING ON ORAL HYGIENE AMONG ADOLESCENTS IN GORONTALO

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ABSTRACT

Oral and dental health problems among adolescents remain a global public health challenge. This study aimed to evaluate the effectiveness of hybrid motivational interviewing (MI) education on improving the Oral Hygiene Index Simplified (OHIS) among adolescents in Gorontalo. A quasi-experimental pretest–posttest control group design was conducted with 100 adolescents, divided into an intervention group (hybrid MI via Android application and face-to-face counseling) and a control group (conventional oral health education). The intervention lasted four months. Data were analyzed using the Wilcoxon Signed-Ranks Test due to non-normal distribution. The intervention group showed a significant reduction in mean OHIS scores from 3.19 (poor) to 1.37 (moderate–good) ($p<0.001$). In contrast, the control group showed a smaller decrease from 2.74 to 2.00. The mean difference indicated greater improvement in the hybrid MI group (-1.82) compared to the control group (-0.74). Hybrid MI is significantly more effective than conventional education in improving adolescent oral hygiene and is recommended as a promotive–preventive strategy in oral health programs.

Keywords: Motivational Interviewing; Adolescent; Oral Health; Hybrid Education; Mobile Application.

INTRODUCTION

Oral and dental health problems among adolescents remain a significant global public health challenge (1). Adolescence represents a critical developmental phase during which independent health behaviors are formed, yet oral hygiene practices are frequently neglected (2–4). High prevalence of dental caries and periodontal problems among adolescents has been widely associated with inadequate toothbrushing techniques, insufficient brushing frequency, and poor adherence to daily oral hygiene routines (5–8). These behaviors not only affect oral health outcomes during adolescence but also contribute to cumulative oral disease burden later in life, underscoring the importance of early preventive interventions targeting behavioral change (9–11).

Tooth brushing practice is one of the most fundamental and modifiable behaviors influencing oral health in adolescents (12–14). Evidence consistently indicates that irregular brushing, incorrect technique, and lack of routine supervision are major contributors to oral hygiene deterioration in this age group (15). Adolescents often prioritize academic, social, and digital activities over personal health maintenance, leading to inconsistent oral hygiene habits (16,17). Additionally, limited motivation and low perceived susceptibility to oral disease further reduce adherence to recommended brushing practices, highlighting the need for interventions that move beyond knowledge acquisition to address behavioral determinants (18,19).

Traditional oral health promotion strategies targeting adolescents have largely relied on one-way educational approaches, such as lectures and informational campaigns (20,21). While such methods can temporarily increase oral health knowledge, they frequently fail to produce sustained improvements in tooth brushing behavior. The limited effectiveness of didactic education is particularly evident among adolescents, who respond more strongly to approaches that support autonomy, self-reflection, and active participation. These limitations indicate that adolescent oral health promotion requires more personalized and motivational strategies capable of fostering long-term behavior change (22,23).

Motivational Interviewing (MI) is a client-centered counseling approach designed to enhance intrinsic motivation and self-efficacy through collaborative and non-judgmental dialogue. By helping individuals explore ambivalence and strengthen personal reasons for change, MI has demonstrated effectiveness in improving a range of health-related behaviors, including oral hygiene practices (24–27). However, the implementation of traditional MI is often constrained by time, cost, and limited access to trained counselors, particularly in community and school-based settings. These challenges may restrict the scalability of MI-based interventions for adolescent oral health (22,28).

Recent advances in mobile health technology offer new opportunities to address these limitations through digitally supported behavioral interventions. Mobile applications can provide continuous reinforcement of tooth brushing practices through reminders, self-monitoring features, and tailored educational content that aligns with adolescents' daily digital engagement (29–31). Nevertheless, digital interventions alone may not fully sustain behavior change without interpersonal support, as motivation may decline over time in the absence of meaningful human interaction. This suggests that hybrid approaches combining digital platforms with face-to-face counseling may offer greater potential for sustained improvement in tooth brushing behavior (32).

In response to these challenges, this study proposes a hybrid Motivational Interviewing model that integrates mobile application–based intervention with periodic face-to-face counseling. This approach is designed to combine the accessibility and continuity of digital support with the relational and motivational strengths of direct counseling. By targeting tooth brushing practice as a core behavioral outcome and evaluating its impact on oral hygiene status (OHI-S), this research aims to assess the effectiveness of a hybrid MI intervention among adolescents in Gorontalo City, thereby contributing context-specific evidence to adolescent oral health promotion strategies.

METHODS

Study design

This study employed a quantitative approach using a quasi-experimental pretest–posttest design with a control group. The design was selected to evaluate the effectiveness of a hybrid Motivational Interviewing (MI) intervention on tooth brushing practice and oral hygiene status among adolescents by comparing outcomes before and after the intervention between the intervention and control groups.

Study setting and duration

The study was conducted in the working areas of several public health centers (*Puskesmas*) in Gorontalo City, Indonesia. The research was implemented over a four-month period, encompassing preparatory activities, baseline assessment, intervention delivery, and post-intervention evaluation. Data collection and intervention activities were carried out in school and community settings coordinated with the respective public health centers.

Population and sample

The study population consisted of adolescents residing in Gorontalo City. A purposive sampling technique was used to recruit participants who met the inclusion criteria. A total of 100 adolescents were enrolled and allocated into two groups: an intervention group receiving the hybrid MI intervention and a control group receiving conventional oral health education. Group allocation was performed based on the study setting to minimize contamination between participants.

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Inclusion and exclusion criteria

Participants were included in the study if they met all of the following criteria :

1. Adolescents aged 12–18 years enrolled in junior or senior high schools within Gorontalo City.
2. Residents of Gorontalo City for at least six months prior to data collection.
3. Having fair to poor oral hygiene status at baseline, as indicated by an OHI-S score ≥1.3.
4. Able to communicate in Bahasa Indonesia or the local language and capable of following the study procedures.
5. Having access to an Android-based smartphone and willing to use the study application (for participants in the intervention group)
6. Providing written informed assent and parental or guardian consent.

Adolescents were excluded if they:

1. Were undergoing fixed orthodontic treatment during the study period.
2. Had systemic diseases or conditions that could affect oral health status.
3. Had cognitive or communication impairments that could interfere with participation.
4. Were participating in other intensive oral health intervention programs at the same time.

Intervention procedure

The hybrid MI intervention was delivered over four sequential stages, aligned with the core principles of Motivational Interviewing:

1. Engaging (Month 1): Establishment of rapport between participants and counselors, baseline assessment of oral hygiene status using OHI-S, and installation of the mobile application.
2. Focusing (Month 2): Identification of individual oral health problems and clarification of specific behavioral targets related to tooth brushing practice.
3. Evoking (Month 3): Exploration of intrinsic motivation through structured MI counseling sessions and reinforcement via daily reminders and educational content delivered through the mobile application.
4. Planning (Month 4): Strengthening commitment to behavior change, development of personalized action plans, and final evaluation.

Participants in the control group received conventional oral health education delivered through standard lectures and informational sessions without MI counseling or mobile application support.

Instruments and measurements

Oral hygiene status was assessed using the Oral Hygiene Index-Simplified (OHI-S), which measures the presence of debris and calculus on selected tooth surfaces. Tooth brushing practice, behavioral skills, and oral health knowledge were evaluated using validated questionnaires and observational checklists administered at baseline and post-intervention.

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Data analysis

Data were analyzed using SPSS software. Descriptive statistics were used to summarize participants' characteristics and study variables. Data normality was assessed using the Shapiro–Wilk test. As the data were not normally distributed, the Wilcoxon Signed-Ranks Test was applied to compare pretest and posttest outcomes within groups, while appropriate non-parametric tests were used to assess differences between the intervention and control groups. Statistical significance was set at $p < 0.05$.

Ethical Approval

Ethical approval was obtained from the Health Research Ethics Committee of the Faculty of Dentistry, Hasanuddin University (Approval No: 046/KEPK FKG-RSGMP UH/EE/XI/2024). Written informed consent was obtained from all participants' parents or legal guardians, and written informed assent was obtained from the adolescents prior to participation.

RESULTS

The intervention group demonstrated a consistent and significant improvement in toothbrushing skills and oral hygiene status across all intervention stages. Mean OHIS scores decreased significantly compared to the control group ($p<0.001$).

Table 1. Analysis of Tooth Brush Practice Variables Before and After Intervention in the Case Group (n=50).

Variable	Criteria	Pre Test		MI Stage (Q1)		MI Stage (Q2)		MI Stage (Q3)	
		n	%	n	%	n	%	n	%
Tooth Brush Practice	Implemented	12	24.0	15	30.0	32	64.0	44	88.0
	Not Implemented	38	76.0	35	70.0	18	36.0	6	12.0

Table 2. Comparison of the maximum distance measurement values between root-end filling material and dentin at the coronal and apical regions among groups (μm)

Variable		Mean ±SD	
		Cases (Given MI)	Kontrol (Without MI)
Tooth Brushing Practice	Pre Test	10.18±2.16	12.14±1.92
	MI Stage 1 (Q1)	11.20±2.05	13.40±2.82
	MI Stage 2 (Q2)	13.08±2.43	
	MI Stage 3 (Q3)	15.36±2.66	
Different Mean		5.18±0.5	1.26±0,9
Z		-6.168	-3.160
P-value		**0.000***	**0.003****

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Table 3. Analysis of knowledge and OHIS variables before and after intervention in the case group. (n=50)

Group	Variable	Pre Test		MI Stage (Q1)		MI Stage (Q2)		MI Stage (Q3)	
		n	%	n	%	n	%	n	%
Cases (Given MI) (n=50)	**Knowledge**								
	Good	7	14.0	21	42.0	35	70.0	42	84.0
	Low	43	86.0	29	58.0	15	30.0	8	16.0
	OHIS								
	Good (0.0-1.2)	3	6.0	3	6.0	16	32.0	36	72.0
	Fair (1.3-3.0)	24	48.0	34	68.0	23	46.0	12	24.0
	Poor (3.1-6.0)	23	46.0	13	26.0	11	22.0	2	4.0

Table 4. Comparison of total values (mm^2) of void areas between dentin and filling material among groups

Variabel		Mean ±SD	
		Cases (Given MI)	Control (Without MI)
OHIS	Pre Test	3.19±1.16	2.74±1.48
	MI Stage 1 (Q1)	2.62±1.00	2.00±1.19
	MI Stage 2 (Q2)	1.87±1.01	
	MI Stage 3 (Q3)	1.37±1.06	
Different Mean		-1.82±0.1	-0.74±0.29
Z		-6.038	-3.483
P-value		**0.000***	**0.000***

DISCUSSION

This study demonstrates that a hybrid Motivational Interviewing (MI) intervention integrating a mobile application with face-to-face counseling is significantly more effective in improving oral hygiene behavior and clinical oral health status among adolescents than conventional educational approaches.

The substantial improvement observed in the intervention group reflects the central mechanism of MI, which emphasizes intrinsic motivation, autonomy, and self-efficacy. Adolescents exposed to the hybrid MI model showed sustained engagement across intervention phases, indicating that behavioral change was not merely knowledge-driven but internally motivated. Previous studies have consistently shown that MI is superior to didactic education in promoting long-term health behaviors, particularly among adolescents who are more responsive to participatory and reflective communication styles.

The marked reduction in OHIS scores in the intervention group highlights an important clinical implication. Improvements in toothbrushing skills translated directly into reduced plaque

accumulation and better oral hygiene outcomes. This finding aligns with earlier research demonstrating that behavioral skill acquisition, when reinforced through motivational techniques, leads to measurable clinical benefits. In contrast, the modest improvement observed in the control group suggests that conventional education may raise awareness but lacks sufficient reinforcement mechanisms to sustain daily behavioral practice.

An important contribution of this study is the integration of mobile health (mHealth) technology into the MI framework. The mobile application functioned as a continuous reinforcement tool through reminders, visual demonstrations, and self-monitoring features. Such digital reinforcement addresses common barriers in adolescent health promotion, including forgetfulness, declining motivation, and limited access to health professionals. This result supports emerging evidence that blended or hybrid interventions combining digital tools with interpersonal counseling yield stronger and more sustainable outcomes than single-mode interventions (33,34).

Adolescence is a critical transitional phase in which health behaviors are strongly influenced by psychosocial factors, self-perception, and resilience. Evidence from population-based studies published in *Scientific African* highlights that adolescent health behaviors are closely associated with self-esteem, perceived autonomy, and socio-demographic context, reinforcing the relevance of motivational and patient-centered approaches in behavior change interventions (35).

Furthermore, recent studies emphasize that increasing health awareness and structured behavioral support significantly improve engagement and preventive practices among adolescents, especially when interventions address motivation rather than solely providing information. These findings conceptually support the use of Motivational Interviewing as an effective strategy to promote sustained oral health behaviors among adolescents (36–38).

From a public health perspective, the hybrid MI model offers a scalable and resource-efficient strategy, particularly relevant for low- and middle-income settings. The reduced dependency on frequent face-to-face sessions lowers logistical and financial burdens while maintaining intervention effectiveness. In the context of African and developing regions, where access to oral health services is often constrained, this approach aligns with the objectives of preventive and promotive health programs (39,40).

Nevertheless, this study has limitations. The quasi-experimental design limits causal inference compared to randomized controlled trials. Additionally, the study relied on a relatively short follow-up period, which may not fully capture long-term behavioral sustainability. Future studies should consider randomized designs, longer monitoring periods, and cost-effectiveness analyses to further validate the applicability of this model.

Overall, the findings reinforce the value of hybrid MI interventions in adolescent oral health promotion and support their integration into school- and community-based preventive programs.

CONCLUSIONS

Hybrid Motivational Interviewing significantly improves toothbrushing behavior and oral hygiene status among adolescents. The integration of mobile applications enhances accessibility and sustainability, making this model suitable for school-based and community oral health programs.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was re- ported.

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The authors have no financial relationships relevant to this article to disclose.

AUTHOR CONTRIBUTIONS

D.I.K: Conceptualization, Formal analysis, Investigation, Methodology, Project Administration, Resources, Visualisation, Writing – original draft, Writing – review & editing.

A.I.A: Supervision, Writing – review & editing.

I.N.A: Supervision, Writing – review & editing.

I.S: Writing – review & editing,

A.A: Writing – review & editing,

I.F.I: Writing – review & editing,

N.H: Writing – review & editing,

I: Methodology, Writing – orginal draft, Writing – review & editing.

DATA SHARING STATEMENT

All data supporting the findings of this study are available within the article and its supplementary materials.

REFERENCES

1. Setijanto D, Ramadhani A, Olivia KL, Fajrina N, Caesarandi MCC, Santoso CMA. Dental pain among children and adolescents. Systematic Reviews in Pharmacy [Internet]. 2020;11(5):616 – 618. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85090232245&doi=10.31838%2fsrp.2020.5.85&partnerID=40&md5=726c7288f118c841692fb168dacd3782
2. Santoso CMA, Bramantoro T, Nguyen MC, Nagy A. Lifestyle and psychosocial correlates of oral hygiene practice among Indonesian adolescents. Eur J Oral Sci. 2021 Feb 27;129(1).
3. Mohamad Anuar MF, Mohamed N, Awaluddin SM, Yacob H. Inadequate toothbrushing practice and associated factors among in-school adolescents in Malaysia: Findings from Global School Health Survey (GSHS) 2017. PLoS One. 2025 Jan 31;20(1):e0317484.
4. Dorota OK, Dariusz G, Elżbieta M, Urszula K. Comparison of oral health condition in Polish adolescents within 7 years. Dent Med Probl. 2018 Dec 20;55(4):399–404.
5. Ferizi L, Bimbashi V, Kelmendi K. Dental Caries Prevalence and Oral Health Status

among 15-Year- Old Adolescents in Kosovo. Acta Stomatol Croat. 2022 Mar 15;56(1):42–9.
6. Pengpid S, Peltzer K. Prevalence and associated factors of oral and hand hygiene behaviour among adolescents in six Southeast Asian countries. Int J Adolesc Med Health. 2021 Dec 7;33(6):421–7.
7. Zaborskis A, Kavaliauskienė A, Levi S, Tesler R, Dimitrova E. Adolescent Toothbrushing and Its Association with Sociodemographic Factors—Time Trends from 1994 to 2018 in Twenty Countries. Healthcare. 2023 Dec 12;11(24):3148.
8. Vats S, Gupta R, Gupta BD, Chaudhary S, Bhargava A, Sharma D. Determining the influence of oral hygiene practices and diet on dental caries among 15-year-old adolescents of Loni block, Ghaziabad- A cross-sectional study. Journal of Dental Specialities. 2024 Sep 28;12(2):131–7.
9. Sessiz R, Ayan G, Sezer B, Tosun İ. Evaluation of oral health and dental hygiene habits in adolescents with intellectual and developmental disabilities: a longitudinal pilot study. Quintessence Int. 2025 May 22;56(5):402–10.
10. Ferizi L, Bimbashi V, Kelmendi K. Dental Caries Prevalence and Oral Health Status among 15-Year- Old Adolescents in Kosovo. Acta Stomatol Croat. 2022 Mar 15;56(1):42–9.
11. Vaičiūnas T, Golambiauskas V, Abdrakhmanova S, Melkumova M, Movsesyan E, Sturua L, et al. Oral hygiene predicts lower life satisfaction and subjective health: experience of post-Soviet countries. Eur J Pediatr. 2024 Oct 19;183(12):5467–77.
12. Abe M, Mitani A, Hoshi K, Yanagimoto S. Screening for Systemic Diseases Associated with Dental Self-Care in Japanese Adolescents. J Clin Med. 2024 Oct 12;13(20):6087.
13. Pindobilowo, Ariani D, Amalia NS, Bramantoro T. Improved oral hygine as a result of successful toothbrushing intervention in a restricted community islamic boarding school. Indian Journal of Forensic Medicine and Toxicology [Internet]. 2020;14(3):2105 – 2110. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85088049729&partnerID=40&md5=2e2b17b92511634a76ffa6e083186baa
14. Santhosh VN, Shankkari S, Coutinho D, Ankola A V, Sankeshwari RM, Hampiholi V, et al. Effectiveness of a toothbrushing intervention utilizing puzzle-solving game assisted with visual aids among adolescents: A single-blind randomized controlled trial. Przegl Epidemiol. 2024 Nov 4;
15. Kaskova LF, Drozda II, Soltys OM, Kilmukhametova YH. The impact of preventive measures on oral hygiene in 15-year-old adolescents. Ukrainian Dental Almanac. 2022 Sep 30;(3):35–8.
16. Olczak-Kowalczyk D, Tomczyk J, Gozdowski D, Kaczmarek U. Cigarette smoking as an oral health risk behavior in adolescents: a cross-sectional study among Polish youths. Anthropological Review. 2020 Mar 30;83(1):53–64.
17. Lawal FB, Fagbule OF, Akinloye SJ, Lawal TA, Oke GA. Impact of oral hygiene habits on oral health-related quality of life of in-school adolescents in Ibadan, Nigeria. Frontiers in Oral Health. 2022 Sep 9;3.
18. Walker K, Jackson R. The health belief model and determinants of oral hygiene practices and beliefs in preteen children: A pilot study. Pediatr Dent [Internet]. 2015;37(1):40 – 45. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84957644858&partnerID=40&md5=1204e5689cf3ec8935cf919e536f4d0c

19. Rotella K, Bosma ML, McGuire JA, Sunkara A, Delsasso A, Gaff M, et al. Habits, Practices and Beliefs Regarding Floss and Mouthrinse among Habitual and Non-Habitual Users. Journal of Dental Hygiene [Internet]. 2022;96(3):46 – 58. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85131238184&partnerID=40&md5=bd7a3dae3492a4ea9c71a4c652607cef
20. Bhandari G, Dhital SR, Khatri D, Bhandari TR. Effectiveness of Social Media-Based Intervention in Intention Change of Adolescents for Promoting Sexual Health Behavior in Western Terai of Nepal. J Res Health Sci. 2024 Jun 1;24(2):e00613.
21. Chakraborty T, Munigala A, Kala T, Yedla R, Shankar KS, Bennadi D, et al. Assessment of Oral Health Promotion Programs in Schools and their Long-Term Effects. J Pharm Bioallied Sci. 2024 Jul;16(Suppl 3):S2543–5.
22. Wu L, Lo ECM, McGrath C, Wong MCM, Ho SMY, Gao X. Motivational interviewing for caries prevention in adolescents: a randomized controlled trial. Clin Oral Investig. 2022 Jan 13;26(1):585–94.
23. Ziari S, Gholami M, Sarmadi S. Effect of motivational interviewing on oral and dental health of adolescents with fixed orthodontic appliances. Journal of Craniomaxillofacial Research. 2023 Jan 23;
24. Gillam DG, Yusuf H. Brief Motivational Interviewing in Dental Practice. Dent J (Basel). 2019 May 1;7(2):51.
25. Rigau-Gay MM, Claver-Garrido E, Benet M, Lusilla-Palacios P, Ustrell-Torrent JM. Effectiveness of motivational interviewing to improve oral hygiene in orthodontic patients: A randomized controlled trial. J Health Psychol. 2020 Nov 10;25(13–14):2362–73.
26. Cascaes AM, Bielemann RM, Clark VL, Barros AJD. Effectiveness of motivational interviewing at improving oral health: a systematic review. Rev Saude Publica. 2014 Feb;48(1):142–53.
27. Wu L, Gao X, Lo ECM, Ho SMY, McGrath C, Wong MCM. Motivational Interviewing to Promote Oral Health in Adolescents. Journal of Adolescent Health. 2017 Sep;61(3):378–84.
28. Ihab M, El-Sherif Y, Yassin R, Nabil N, Quritum M, Balbaa N, et al. Optimizing mHealth Interventions for Children's Oral Hygiene: A Factorial Trial. J Dent Res. 2025 Feb 4;104(2):155–63.
29. Murariu A, Bobu L, Geleţu GL, Stoleriu S, Iovan G, Vasluianu RI, et al. The Impact of Mobile Applications on Improving Oral Hygiene Knowledge and Skills of Adolescents: A Scoping Review. J Clin Med. 2025 Apr 23;14(9):2907.
30. Özvarış SS, Çoğulu D. Effects of a Mobile Application to Improve Oral Hygiene in Children. The Journal of Pediatric Research. 2024 Mar 22;11(1):11–6.
31. Alfiya M, Shenoy RP, Pasha MI, Junaid J, Amanna S. Effectiveness of the Brush DJ app in improving oral hygiene among patients with fixed orthodontic appliances: a randomized controlled trial. Sci Rep. 2025 Nov 27;15(1):42492.
32. Gao X, Lo ECM, McGrath C, Ho SMY. Face-to-face individual counseling and online group motivational interviewing in improving oral health: study protocol for a randomized controlled trial. Trials. 2015 Dec 18;16(1):416.
33. Thurman TR, Skeen SJ, Luckett B, Schley A. Feasibility and acceptability of Let's Talk Digital, a blended learning family strengthening and sexual reproductive health

intervention for adolescents and their caregivers in South Africa. AIDS Care. 2025 Dec 2;37(12):2124–38.

34. Wyatt TH, Bayless AK, Krauskopf P, Gaylord N. Using mHealth Applications to Promote Self-Managed Health Behaviors Among Teens. J Pediatr Nurs. 2021 Jul;59:164–72.
35. Lee RLT, Chien WT, Ligot J, Nailes JM, Tanida K, Takeuchi S, et al. Associations Between Quality of Life, Psychosocial Well-being and Health-Related Behaviors Among Adolescents in Chinese, Japanese, Taiwanese, Thai and the Filipino Populations: A Cross-Sectional Survey. Int J Environ Res Public Health. 2020 Apr 1;17(7):2402.
36. Akca A, Ayaz-Alkaya S. Effectiveness of health literacy-based motivational interviewing and health education on adolescents' nutrition and exercise behaviors in Turkiye: A randomized controlled trial. Public Health. 2024 Dec;237:316–21.
37. Watt SB, Marshman Z. Can motivational interviewing help prevent dental caries in secondary school children? Evid Based Dent. 2022 Jun 24;23(2):56–7.
38. Uguz HN, Çiftçi V, Dogan MC. Effectiveness of motivational interviewing on oral healthcare in pediatric patients. Journal of Clinical Pediatric Dentistry. 2023;
39. Seymour B, Hackley D, Muriithi M, Burgess D, Aflatooni N, Chung D, et al. Developing a WHO African Region mOral Health Curriculum for Community Health Workers. Ann Glob Health. 2025 Aug 6;91(1):44.
40. Fuhrmann S, Kitzmann J, Isailov-Schöchlin M, Vach K, Fabry G, Schulz C, et al. Can motivational interviewing for dental settings be taught online? Results of an uncontrolled interventional trial. European Journal of Dental Education. 2022 May;26(2):254–62.