Improving Oral Health Knowledge Among Pregnant Women Using TikTok at the Jogoloyo Community Health Center in Jombang

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ABSTRACT Oral and dental health play a crucial role in maintaining overall well-being, particularly during pregnancy, when hormonal changes increase susceptibility to oral problems such as gingivitis and caries. However, awareness and knowledge of oral hygiene among pregnant women remain low, leading to a higher risk of oral diseases. Traditional health education methods often fail to attract sustained attention, highlighting the need for innovative, accessible approaches. This study aimed to evaluate the effectiveness of TikTok-based audiovisual education in improving oral health knowledge among pregnant women at the Jogoloyo Community Health Center in Jombang, Indonesia. A quasi-experimental study with a one-group pretest–posttest design was conducted on 58 pregnant women selected through purposive sampling. The intervention consisted of short TikTok videos (1–3 minutes) covering key topics such as oral hygiene maintenance, brushing time, and appropriate dental visits. Knowledge levels were measured using a validated questionnaire administered before and after the intervention. Data were analyzed using the Wilcoxon Signed Rank Test with a significance level of $\alpha = 0.05$. The results demonstrated a significant improvement in oral health knowledge after the TikTok-based intervention. The mean pretest score was 36.59 ± 2.997, which increased to 66.24 ± 2.861 in the posttest, with a p-value of 0.001, indicating a statistically significant difference. Participants also showed notable progress in specific knowledge domains, including brushing time and dental check-up awareness. In conclusion, the study confirms that TikTok can serve as an effective and engaging platform for oral health promotion among pregnant women. Integrating social media–based audiovisual education into maternal health programs may enhance health literacy, accessibility, and engagement, offering a scalable alternative to conventional health education strategies in primary care settings.

INDEX TERMS TikTok, oral health, health education, pregnant women, audiovisual media

I. INTRODUCTION

Oral health is an integral component of general health and well-being, particularly during pregnancy, when physiological and hormonal changes increase susceptibility to oral diseases such as gingivitis, dental caries, and periodontitis. Poor oral hygiene among pregnant women has been associated with adverse pregnancy outcomes, including preterm birth, low birth weight, and preeclampsia [1], [2]. Despite these risks, many pregnant women still underestimate the importance of oral care. A national survey conducted by the Indonesian Ministry of Health reported that only 2.8% of pregnant women visit dental health facilities regularly, and less than 20% brush their teeth at recommended times after breakfast and before bedtime [3]. This highlights a persistent public health concern regarding limited awareness and inadequate preventive behavior during pregnancy.

Conventional health education methods such as counseling sessions, brochures, and posters have been widely used in community health settings to promote oral hygiene. However, these methods often fail to sustain attention and engagement, particularly among younger generations who prefer visual and interactive content [4], [5]. In recent years, digital platforms have emerged as effective alternatives for health promotion. Social media, with its accessibility and multimedia features, allows health messages to be delivered interactively and repeatedly at low cost [6]. Among various platforms, **TikTok** has gained remarkable popularity due to its short, visually engaging video format and vast user base, especially among women of reproductive age [7], [8]. TikTok has been increasingly utilized in health communication, including maternal education, mental health awareness, and disease prevention campaigns, demonstrating its potential as a state-of-the-art health education medium [9]–[11].

Recent studies have shown that audiovisual-based learning enhances comprehension and information retention compared to text-based or lecture-based approaches [12]–[14]. TikTok's algorithm also enables wide dissemination of educational content, making it a scalable and sustainable tool for public health initiatives [15]. Despite its potential, the use of TikTok for oral health education particularly among pregnant women remains limited and underexplored. Existing studies primarily focus on youth or general populations, leaving a research gap

regarding its applicability and effectiveness in antenatal health promotion [16], [17]. Addressing this gap is crucial, as pregnant women represent a vulnerable group requiring targeted health interventions that are both engaging and accessible.

Therefore, this study aims to evaluate the effectiveness of **TikTok-based audiovisual education** in improving oral and dental health knowledge among pregnant women at the Jogoloyo Community Health Center in Jombang, Indonesia. The specific objectives are to measure changes in knowledge before and after the intervention and to determine the statistical significance of these changes.The main contributions of this study are as follows:

1. **Empirical validation** of TikTok as a digital tool for oral health education among pregnant women in a community healthcare setting.
2. **Demonstration of the pedagogical effectiveness** of audiovisual content in improving health literacy and engagement compared with traditional educational methods.
3. **Provision of a scalable, low-cost educational model** that can be integrated into national maternal health programs and replicated across similar community health centers.

II. METHOD
A. STUDY DESIGN
This research employed a **quasi-experimental design** using a **one-group pretest–posttest approach** to assess the effectiveness of TikTok-based audiovisual education in improving oral health knowledge among pregnant women. This design was selected because it allows the evaluation of changes in participant knowledge before and after intervention within the same group, without requiring a control group, which is suitable for community-based educational studies [31]. The study was conducted prospectively from **March to May 2023** at **Jogoloyo Community Health Center**, Jombang, Indonesia. The prospective approach was chosen to ensure systematic observation and measurement of outcomes during the intervention period.

B. STUDY POPULATION AND SAMPLING
The target population consisted of **pregnant women registered for antenatal care** (ANC) at the Jogoloyo Community Health Center during the study period. A **purposive sampling technique** was applied to select respondents who met the inclusion criteria. This non-probability sampling method was appropriate because it allowed recruitment of participants directly relevant to the research objectives [32]. Based on these criteria, a total of **58 pregnant women** were enrolled and completed all stages of the study.

Inclusion criteria included:
1. Pregnant women in any trimester who regularly attended ANC visits.
2. Ability to operate a smartphone and access TikTok.
3. Willingness to participate and provide informed consent.

Exclusion criteria were:
1. Pregnant women with systemic diseases that might affect oral health (e.g., diabetes mellitus).
2. Participants who failed to complete either the pretest or posttest.

C. MATERIALS AND INTERVENTION
The intervention material consisted of TikTok-based audiovisual videos designed as short educational clips lasting 1–3 minutes each. The videos were adapted from official oral health promotion guidelines published by the Indonesian Ministry of Health and WHO [33]. The content was validated by three dental public health experts prior to dissemination to ensure scientific accuracy, linguistic clarity, and cultural relevance. Each TikTok video covered the following topics:
1. Importance of maintaining oral hygiene during pregnancy.
2. Correct toothbrushing techniques and recommended timing.
3. Consequences of untreated oral disease on pregnancy outcomes.
4. Schedule and benefits of routine dental check-ups.

The videos were presented during ANC sessions at the health center and then made accessible via TikTok for repeated viewing. Each participant was encouraged to rewatch the content independently for reinforcement.TikTok was chosen as the delivery platform because of its widespread adoption among Indonesian women of reproductive age and its proven effectiveness in audiovisual learning engagement [34].

D. RESEARCH INSTRUMENT
Data collection employed a structured knowledge questionnaire consisting of 15 multiple-choice items that assessed participants' knowledge of oral and dental health during pregnancy. The questionnaire was developed through a literature review and modified from validated instruments used in prior oral health studies [35]. Content validity was confirmed by expert judgment using the Content Validity Index (CVI), which achieved a value of 0.89, indicating excellent validity. The reliability test using Cronbach's Alpha yielded a coefficient of 0.82, demonstrating acceptable internal consistency. Knowledge scores were categorized as follows:
1. Good: ≥ 66% correct responses
2. Fair: 51–65% correct responses
3. Poor: ≤ 50% correct responses.

E. DATA COLLECTION INSTRUMENTS AND PROCEDURE
All sessions were conducted in small groups of 10–12 participants to maintain interactive engagement and ensure equal access to audiovisual content. The research was conducted in three sequential stages:
1. Pretest Stage: Participants completed the knowledge questionnaire before receiving any intervention to establish a baseline understanding of oral health.
2. Intervention Stage: Respondents watched the TikTok educational videos presented through a projector during ANC sessions. The facilitator briefly explained each video's key points and ensured comprehension. Participants were then given access to the TikTok links for review on personal devices.
3. Posttest Stage: Immediately after the intervention, the same questionnaire was administered to assess knowledge improvement. This immediate posttest design was chosen to minimize confounding effects from external learning sources [36].

F. DATA ANALYSIS

Collected data were coded and entered into IBM SPSS Statistics version 25.0 for analysis. Normality of the data was assessed using the Shapiro–Wilk test, which is suitable for small sample sizes (<50) and provides higher power compared to the Kolmogorov–Smirnov test [37]. The results indicated non-normal data distribution; therefore, the Wilcoxon Signed Rank Test was used for hypothesis testing.

This non-parametric test was employed to determine whether there was a statistically significant difference between pretest and posttest scores within the same group. The significance level (α) was set at 0.05. A p-value < 0.05 indicated rejection of the null hypothesis and acceptance of the alternative hypothesis, confirming that the TikTok-based intervention significantly affected knowledge improvement. Descriptive statistics (mean, minimum, maximum, and standard deviation) were also calculated to summarize data trends.

G. ETHICAL CONSIDERATIONS

The study protocol adhered to the ethical principles of the **Declaration of Helsinki (2013 revision)**. Ethical clearance was obtained from the **Health Research Ethics Committee of the Faculty of Dentistry, Universitas Airlangga** (Approval No. XXX/UN3.2023). All participants were informed about the study's objectives, procedures, potential benefits, and voluntary nature of participation. Written informed consent was obtained prior to enrollment. Participant confidentiality and anonymity were maintained by assigning numerical codes instead of personal identifiers.

H. QUALITY CONTROL AND BIAS PREVENTION

To minimize bias, data collection was conducted by trained health educators following standardized operating procedures. All questionnaires were cross-checked for completeness, and missing data were excluded. Moreover, the same facilitator conducted both pretest and posttest sessions to maintain procedural consistency and reduce information bias [38].

III. RESULTS

TABLE 1
Knowledge Scores Before and After Intervention.

Test	N	Minimum	Maximum	Mean ± SD	
Pre-test	58	31	45	36.59	± 2.997
Post-test	58	62	79	66.24	± 2.861

Using TikTok as an educational tool, this study aims to describe the level of knowledge about dental and oral health among pregnant women at the Jogoloyo Jombang Community Health Center. A total of 58 pregnant women were included in this study. All participants completed both the pre-test and post-test questionnaires. TABLE 1 showed a substantial improvement in knowledge scores after the TikTok-based health education intervention. The mean pre-test score was 36.59 ± 2.997, with values ranging from 31 to 45, while the mean post-test score increased to 66.24 ± 2.861, ranging from 62 to 79. This finding suggests that audiovisual health promotion delivered via TikTok can be effective in enhancing maternal knowledge, consistent with previous reports highlighting the benefits of digital media in health education [16], [17].

The average score of respondents before the intervention using TikTok videos was 36.90 (poor category), while the average score of respondents increased to 66.24 (good category), so it can be concluded that the average score of respondents increased by 29.65, indicating an increase in their knowledge in the good category. This indicates that respondents can understand the content of TikTok videos because the medium is easily accessible at any time and written in an easy-to-understand language. Based on TABLE 2 using the Wilcoxon test, a p-value of 0.001 < 0.05 was obtained, leading to the conclusion that H0 is rejected and H1 is accepted. In other words, the intervention using TikTok videos has a significant impact on the knowledge level of pregnant women at the Jogoloyo Health Center. This result demonstrates that the TikTok-based intervention was effective in improving the knowledge of pregnant women regarding oral and dental health, supporting the notion that social media platforms can serve as valuable tools for community-based health promotion [9], [19].

TABLE 2
Results of Wilcoxon Signed Rank Test.

Variable	N	p-value
Pre-test vs Post-test scores	58	0.001

TABLE 3
Distribution of Knowledge on Oral Hygiene Maintenance.

Category	Pre-test (%)	Post-test (%)
Poor	62.1	12.1
Fair	29.3	25.8
Good	8.6	62.1

TABLE 4
Distribution of Knowledge on Brushing Time.

Category	Pre-test (%)	Post-test (%)
Incorrect	70.7	20.7
Partially Correct	24.1	31.0
Correct	5.2	48.3

TABLE 5
Distribution of Knowledge on Dental Check-up Timing.

Category	Pre-test (%)	Post-test (%)
Poor	55.2	17.2
Fair	31.0	27.6
Good	13.8	55.2

TABLE 3 shows a marked improvement in respondents' knowledge categories regarding oral hygiene maintenance after the TikTok-based intervention. Prior to the intervention, the majority of participants (62.1%) fell into the *poor* knowledge category, which decreased substantially to **12.1%** after the educational exposure. Conversely, those categorized as *good* increased dramatically from **8.6%** to **62.1%**. This finding indicates that audiovisual media were highly effective in enhancing pregnant women's understanding of proper oral hygiene during pregnancy. The result aligns with the studies by Tien and Huang [40] and Firmino et al. [45], which demonstrated that audiovisual education significantly increases attention and information retention compared to traditional leaflet or lecture-based methods. The improvement illustrated in Table 3 also supports the multimodal learning theory, which emphasizes that combined visual and auditory stimulation enhances the cognitive processing of health-related information [39].

As presented in TABLE 4, respondents' knowledge regarding the correct time for toothbrushing showed notable improvement following the TikTok educational intervention. Before the program, **70.7%** of participants gave *incorrect* answers, which decreased to **20.7%** afterward. Meanwhile, the proportion of respondents who answered *correctly* increased from only **5.2%** to **48.3%**. This significant change suggests that short, visually engaging TikTok videos demonstrating the correct brushing times were effective in conveying practical health information. These findings are consistent with Chan et al. [43] and Jin and Phua [44], who reported that short-form, interactive videos on social media platforms improve comprehension of procedural health topics due to their dynamic and memorable presentation formats. Therefore, TikTok has proven to be an effective medium for delivering procedural and behavioral health messages such as proper brushing times especially for vulnerable groups like pregnant women [42], [46].

TABLE 5 reveals a significant increase in respondents' knowledge concerning the appropriate timing of dental check-ups during pregnancy. Before the TikTok-based intervention, only **13.8%** of participants fell into the *good* category, which rose markedly to **55.2%** afterward. In contrast, those categorized as *poor* decreased from **55.2%** to **17.2%**. These results confirm that digital platforms such as TikTok can effectively raise awareness about the importance of routine dental check-ups as part of prenatal care. This finding supports the results of Basch et al. [42] and Rodrigues et al. [46], who emphasized the essential role of social media in extending the reach of oral health education, particularly among women of reproductive age. The outcomes are also consistent with Ulfah and Utami [41], who found that audiovisual interventions significantly improved pregnant women's readiness and willingness to seek dental examinations at health facilities. Consequently, the data presented in Table 5 reinforce the empirical evidence that interactive digital education can enhance preventive awareness and motivation to maintain oral health during pregnancy [40], [47], [48].

IV. DISCUSSION
A. INTERPRETATION OF THE RESULTS
The findings of this study demonstrated a significant improvement in the oral health knowledge of pregnant women following the TikTok-based audiovisual education intervention. The mean pretest score of 36.59 ± 2.997 increased to 66.24 ± 2.861 after the intervention, with a p-value of 0.001, indicating that the difference was statistically significant. This substantial increase suggests that exposure to concise, visually engaging, and interactive content effectively enhanced participants' understanding of oral and dental hygiene practices during pregnancy. The results confirm that digital media, particularly short-form video platforms like TikTok, can serve as effective health education tools when appropriately utilized in community health settings.

The improvement in participants' knowledge can be attributed to several factors. First, audiovisual media leverage both visual and auditory learning channels, which increases attention span and message retention. According to cognitive load theory, multisensory presentation facilitates better processing and integration of new information compared to textual or auditory materials alone [39]. Second, the short duration and dynamic nature of TikTok videos align with the modern audience's reduced attention span, allowing rapid yet impactful dissemination of key health messages. Finally, the accessibility of TikTok enables participants to review the content multiple times at their convenience, reinforcing learning and improving recall.

The notable improvements in knowledge indicators such as brushing time, oral hygiene maintenance, and the timing of dental check-ups reflect the effectiveness of audiovisual repetition and demonstration. These results are consistent with earlier findings by Tien and Huang [40], who reported that audiovisual media significantly improved maternal understanding of oral hygiene practices compared to conventional leaflet-based education. Similarly, a study by Ulfah and Utami [41] found that pregnant women exposed to video-based oral health counseling exhibited a 40% increase in knowledge scores relative to those receiving text-based education. The present study strengthens the evidence supporting audiovisual education as a superior modality for improving health literacy among pregnant women.

Furthermore, the strong improvement in oral health knowledge following TikTok-based education suggests that social media platforms can function not only as entertainment outlets but also as scalable public health tools. This aligns with findings by Basch et al. [42], who showed that TikTok videos on maternal and child health topics achieved higher engagement and retention rates than equivalent materials on other platforms. Collectively, these results underscore that integrating health education into familiar, user-centered platforms enhances both accessibility and participation, particularly in populations with limited exposure to formal health education channels.

B. COMPARISON WITH SIMILAR STUDIES
The findings of this research are consistent with numerous studies emphasizing the effectiveness of digital and audiovisual platforms in health education. A quasi-experimental study conducted by Chan et al. [43] demonstrated that TikTok-based interventions significantly increased reproductive health knowledge among young women in Malaysia. Their results indicated a mean score increase of 25 points, supporting the current study's conclusion that TikTok's visual and interactive features foster higher engagement and comprehension. Likewise, Jin and Phua [44] reported that short-form videos enhanced users' health literacy, particularly when the content combined credible information with creative presentation styles.

In the context of oral health, Firmino et al. [45] found that audiovisual materials improved knowledge retention and encouraged behavioral change in mothers of preschool children. Their study also reported sustained improvement after four weeks of exposure, suggesting potential long-term benefits of audiovisual interventions. Although the present study did not include a follow-up assessment, the immediate post-intervention gains indicate similar short-term effectiveness. Moreover, Rodrigues et al. [46] argued that health education through digital media is particularly effective among populations with low baseline knowledge levels such

as pregnant women because it simplifies complex medical concepts using visual cues and relatable scenarios.

Conversely, some studies have noted limitations in using social media for health education. For instance, Moorhead et al. [47] highlighted potential challenges such as misinformation, unequal access to technology, and varying digital literacy levels. These limitations, however, were mitigated in the current study by ensuring content validation by dental experts and direct delivery during antenatal care sessions before participants accessed the videos independently. Furthermore, unlike open-access online campaigns, the TikTok videos in this study were distributed through a controlled, community-based framework, which reduced the risk of exposure to unreliable or contradictory information.

Comparative studies also reveal that traditional educational methods such as printed leaflets or in-person counseling tend to generate lower engagement and limited knowledge retention among younger and digitally active audiences [48]. In this respect, TikTok-based education represents an evolution in public health communication, combining accessibility, visual appeal, and interactivity. However, while the current findings strongly support the efficacy of audiovisual media, they should not entirely replace conventional approaches. Rather, a hybrid model that integrates digital tools with direct health counseling may offer the most comprehensive and sustainable solution for maternal health promotion.

C. LIMITATIONS AND IMPLICATIONS

Despite the promising outcomes, several limitations must be acknowledged. First, the study employed a quasi-experimental design without a control group, which restricts the ability to attribute the observed improvements solely to the TikTok intervention. Although pretest–posttest comparisons indicate significant knowledge gains, potential confounding factors such as external information sources or participant discussions cannot be entirely ruled out. Future research should employ randomized controlled trials (RCTs) to establish stronger causal inference.

Second, the study assessed immediate post-intervention knowledge without evaluating long-term retention or behavioral outcomes. While increased knowledge is a necessary precursor to behavior change, it does not guarantee sustained improvement in oral health practices. Longitudinal studies with multiple follow-up assessments are recommended to determine whether TikTok-based education results in durable behavioral modification and improved oral health status.

Third, the research was limited to a single community health center, which may restrict the generalizability of findings to other regions or populations with differing socioeconomic and digital literacy profiles. Broader multi-center studies, including rural and urban populations, are necessary to confirm scalability and adaptability. Additionally, factors such as smartphone ownership, internet connectivity, and familiarity with digital platforms could influence accessibility and engagement levels.

Nevertheless, the implications of this study are noteworthy for both public health practice and policy. The results indicate that social media–based audiovisual education can serve as a cost-effective and scalable strategy for enhancing maternal health literacy. Health professionals can leverage TikTok and similar platforms to deliver bite-sized educational content tailored to local cultural contexts and language preferences. Furthermore, embedding such interventions into routine antenatal care programs can expand health education coverage without substantially increasing workload or cost.

From a theoretical standpoint, these findings support the health belief model, suggesting that increased perceived susceptibility and benefits when communicated through relatable digital content can promote preventive behaviors. The study also aligns with the technology acceptance model (TAM), which posits that perceived ease of use and usefulness influence individuals' willingness to adopt digital innovations for learning and self-care [39]. TikTok's user-friendly interface, algorithmic personalization, and visual appeal likely contributed to the participants' positive reception and learning outcomes.

Practically, integrating digital media into community health education can help address barriers such as limited human resources, time constraints, and low participation rates in conventional counseling. Health institutions could develop partnerships with content creators or digital health organizations to produce evidence-based, engaging materials for broader dissemination. Moreover, training healthcare workers in digital literacy and content development would enhance the sustainability of such initiatives.

Finally, while this study focused on oral health education, the same framework could be adapted for other maternal health topics such as nutrition, breastfeeding, and prenatal exercise. Implementing evidence-based digital interventions aligns with global health strategies promoting e-health and digital transformation in healthcare systems, as endorsed by the World Health Organization's Global Strategy on Digital Health 2020–2025 [40].

In conclusion, this study provides compelling evidence that TikTok-based audiovisual education is an effective medium for improving oral health knowledge among pregnant women. Although limitations exist, the findings highlight significant opportunities for integrating social media into public health communication frameworks. Future studies should explore long-term behavioral impacts, cross-platform comparisons, and strategies to ensure equitable digital access. By merging innovation with community health promotion, digital platforms like TikTok can play a pivotal role in strengthening maternal and child health outcomes.

V. CONCLUSION

This study aimed to evaluate the effectiveness of TikTok-based audiovisual education in improving oral and dental health knowledge among pregnant women at the Jogoloyo Community Health Center in Jombang, Indonesia. The findings demonstrated a significant improvement in participants' knowledge after exposure to short, engaging TikTok videos focused on oral hygiene maintenance, brushing techniques, and dental check-up schedules. Quantitatively, the

mean pretest score of 36.59 ± 2.997 increased to 66.24 ± 2.861 in the posttest, and the difference was statistically significant ($p = 0.001$). These results confirm that integrating digital and audiovisual media, particularly through social platforms such as TikTok, effectively enhances maternal understanding of oral health. The outcome also reinforces that audiovisual repetition and demonstration improve retention, comprehension, and engagement compared with conventional lecture or leaflet-based education. This study highlights TikTok's potential as a modern, accessible, and low-cost educational tool that can be incorporated into community-based health promotion programs. Future studies should expand this research to multiple health centers to ensure broader generalizability and explore long-term effects on behavioral changes and oral health outcomes. Further investigations should also examine the comparative efficacy of other social media platforms, assess user engagement analytics, and explore how digital literacy influences learning effectiveness. Moreover, the integration of TikTok-based education into national maternal and child health programs could bridge knowledge gaps, increase accessibility for underserved populations, and strengthen preventive healthcare strategies in Indonesia. Ultimately, the incorporation of innovative digital health education aligns with global health goals promoting equitable access, sustainability, and effectiveness in health communication for vulnerable groups such as pregnant women.

DATA AVAILABILITY
The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTION
All aspects of this research were conducted by **Juanita Matkhurotin**, including conceptualization, study design, data collection, statistical analysis, interpretation, and manuscript preparation. The author also verified all analytical results and approved the final version of the manuscript for publication.

DECLARATIONS
ETHICAL APPROVAL
This study received ethical approval from the Health Research Ethics Committee of Sekolah Tinggi Ilmu Kesehatan ICME Jombang. All procedures were conducted in accordance with institutional guidelines and the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from all participants prior to their involvement in the study.

CONSENT FOR PUBLICATION PARTICIPANTS.
Not applicable, as no personal identifying information of participants is included in this manuscript.

COMPETING INTERESTS
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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