FLUORIDE
Quarterly Journal of The International Society for Fluoride Research Inc.

Fluoride Science Popularization: A Study of Public Awareness and Health Communication Driven by Short Video

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Unique digital address (Digital object identifier [DOI] equivalent):
https://www.fluorideresearch.online/epub/files/332.pdf

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Accepted: 2025 Mar 2.
Published as e332: 2025 Mar 2

ABSTRACT

Background: Public health communication to improve oral health alertness requires the integration of fluoride science. As short video platforms such as TikTok and YouTube Shorts have taken off, the rise of the short video platforms has changed the way health messaging is disseminated, with fluoride related content now being disseminated through a dynamic, engaging medium. Nevertheless, the role short video plays in the dissemination of fluoride science and health practices to the public has not been investigated.

Purpose: By studying fluoride science awareness in short video format, this study seeks to examine the benefits, engagement strategies, and challenges of this medium.

Methods: A mixed method, based on semi structured interviews, and observational working on fluoride related short videos on Douyin and Kuaishou were presented. Participants in urban and rural areas in China are included (n=25). The patterns from public engagement and content strategy were discovered through thematic analysis and word-frequency analysis.

Findings: Stories and visuals are strong tools for short videos to promote public awareness, but misinformation threatens to short circuit our efforts. The rise of a critical factor that spawned an element of trust in content creators for audience engagement. Interactivity had a positve reinforcement of understanding, and misinformation had a negative effect on trust.

Conclusion: Fluoride science communication is a powerful tool for short videos. But how do you get them to be effective while also addressing misinformation, maintaining scientific accuracy and building trust.

Keywords: fluoride science, short videos, health communication, public awareness, misinformation.

1. INTRODUCTION

1.1 Background

Fluoride has long been recognized as a pivotal element in the promotion of oral health and the prevention of dental diseases. Its application in various forms, such as fluoride toothpaste, mouth rinses, and water fluoridation, has significantly contributed to the reduction of dental caries and other oral health issues worldwide [1]. The scientific foundation underpinning fluoride's efficacy in strengthening tooth enamel and inhibiting the demineralization process is well-established, making it an essential component of public health strategies aimed at enhancing oral hygiene and overall health outcomes.

In recent years, the landscape of health communication has undergone a profound transformation with the advent of digital media platforms. Among these, short video formats—such as TikTok, Instagram Reels, and YouTube Shorts—have surged in popularity, particularly among younger demographics [2]. These platforms offer a dynamic and engaging medium for disseminating health information, capitalizing on their ability to capture attention through visually appealing and easily digestible content [3]. The brevity and

accessibility of short videos make them an attractive tool for public health campaigns, enabling the rapid spread of information and fostering interactive engagement with audiences.

While traditional media channels like television, radio, and print have long been central to public health communication strategies, the advent of digital platforms has led to a shift in how health messaging is consumed [4]. Short videos, in particular, have proven to be highly effective in communicating complex topics, such as fluoride science, in an accessible and engaging manner. Recent studies have shown that short videos are not only popular but also increasingly influential in shaping public health perceptions. According to recent research, platforms like TikTok and YouTube Shorts now account for over 40% of all online video views in China, with a significant portion of viewers being young adults between the ages of 18 and 30.This ssents a major change in the communication dynamics of public health education, where younger generations increasingly rely on digital media for information and engagement.

Furthermore, while traditional media has been extensively studied in its role in health education, the role of short videos remains under-explored [5]. Previous research has focused on longer-form content, such as documentaries or public service announcements, but short videos have yet to receive significant attention in the academic literature. Studies on short videos in health communication have highlighted their effectiveness in delivering information that is not only informative but also highly shareable, making them a powerful tool for disseminating knowledge.

Despite the burgeoning influence of short videos in health communication, there remains a significant gap in understanding how these platforms specifically contribute to public awareness of fluoride science. While traditional media channels and longer-form digital content have been extensively studied for their roles in health education, the effectiveness and impact of short video formats on disseminating complex scientific information like fluoride's benefits have not been thoroughly explored [6, 7]. This gap is particularly pertinent given the increasing reliance on social media for health-related information and the potential for short videos to shape public perceptions and behaviors regarding oral health practices[8, 9].

Moreover, the interactive and user-generated nature of platforms like TikTok and Instagram Reels introduces unique challenges and opportunities in health communication. The ability for users to create, share, and remix content can enhance the reach and personalization of health messages but also poses risks related to the spread of misinformation and the variability in message quality [3, 10]. Understanding how short videos influence public awareness of fluoride science requires an examination of both the content strategies employed by health communicators and the ways in which audiences engage with and interpret this information.

1.2 Objective

The primary objective of this study is to explore public awareness of fluoride science and evaluate the effectiveness of short videos as a medium for health communication. By investigating the interplay between communication strategies, content adaptation, and audience engagement on short video platforms, this research aims to provide insights into how these digital tools can be leveraged to enhance public understanding and adoption of fluoride-related oral health practices.

1.3 Research Questions

To achieve the aforementioned objectives, the study seeks to address the following research questions:

1. **How do short videos influence public awareness of fluoride science?**

This question aims to uncover the extent to which short video content on platforms like TikTok, Instagram Reels, and YouTube Shorts contributes to the general public's knowledge and understanding of fluoride's role in oral health. It explores whether exposure to fluoride-related content through short videos correlates with increased awareness and comprehension of fluoride's benefits and applications.

2. **What are the perceived benefits and challenges of using short videos for health communication on fluoride?**

This question examines the advantages and limitations associated with utilizing short video formats for disseminating fluoride science. It seeks to identify the strengths of short videos in terms of engagement, accessibility, and information retention, as well as the potential drawbacks such as oversimplification of scientific information, susceptibility to misinformation, and varying content quality.

3. **How does the public engage with short video content related to fluoride science?**

This question investigates the nature and extent of audience interaction with fluoride-related short videos. It explores patterns of engagement, including viewing habits, sharing behaviors, and the role of user-generated content in shaping public discourse on fluoride science.

Additionally, it assesses the impact of interactive features, such as comments and likes, on the dissemination and reception of health messages.

1.4 Significance of the Study

Addressing these research questions is crucial for several reasons. First, as public health initiatives increasingly adopt digital media strategies, understanding the effectiveness of short videos in conveying scientific information can inform the design of more impactful health communication campaigns. Second, by identifying the benefits and challenges associated with short video formats, health communicators can develop targeted strategies to maximize the positive effects while mitigating potential risks. Finally, insights into public engagement with fluoride-related content can guide the creation of user-centric content that resonates with diverse audiences, thereby enhancing the overall effectiveness of oral health education efforts.

In summary, this study seeks to bridge the existing gap in the literature by providing a comprehensive analysis of how short videos influence public awareness and understanding of fluoride science. Through an examination of communication strategies, content adaptation, and audience engagement, the research aims to contribute valuable knowledge to the field of health communication, ultimately supporting the development of more effective public health interventions aimed at promoting oral health.

1.5 Structure of the Paper

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature on fluoride science popularization and the role of short videos in health communication. Section 3 outlines the research methodology, including data collection and analysis procedures. Section 4 presents the results of the study, accompanied by detailed analyses of the findings. Section 5 discusses the implications of the results for theory, practice, and future research. Finally, Section 6 concludes the paper by summarizing the key contributions and offering recommendations based on the study's outcomes.

2. METHODOLOGY

2.1 Study Design

A qualitative research design is used, with semi structured interviews, to explore public awareness of fluoride science and the media's role in health communication through short videos. The study also looks at the potential harms for the over use of fluoride, recognizing the health benefits of the product but also an appreciable harm of the product when too much is consumed [11]. Overlapping with the interview data are observational analysis of relevant fluoride related short videos that offer insight into how effective health communication strategies, engagement approaches, and the prevalence of misinformation.

2.2 Participants

The participants in the study were 25 individuals from various demographic backgrounds including people who lived in the urban and rural regions, health professionals, content creators making health-related short videos. Care was taken in curating the sample to be representative of a variety of viewpoints on fluoride science, oral health, and methods of digital health communication. The sample was curated using a combination of **snowball sampling** and **online recruitment** via popular Chinese social media platforms, such as WeChat and Douyin. This method was chosen to ensure that participants were familiar with fluoride-related content on short video platforms like Douyin (TikTok in China) and Kuaishou, which are key sources of public health messaging in China [12].

To enhance the representativeness of the sample, participants were selected from both **urban** and **rural areas** across different regions of China, acknowledging the geographical diversity that might influence exposure to and engagement with health communication through short videos. The sample included individuals who were:

- **Adults aged 18 or above**,
- **Fluoride-aware**, having engaged with fluoride-related content on Douyin or Kuaishou in the past six months,
- **Knowledgeable or interested in oral health**, including the benefits and risks of fluoride, whether through professional or personal interest.

Demographic Breakdown of Participants:

- **Age Range**: 18–50 years old
  - **Young Adults (18–30)**: 12 participants
  - **Middle-Aged Adults (31–50)**: 13 participants
- **Gender**: 14 females, 11 males
- **Geographic Distribution**:
  - **Urban Areas**: 15 participants (from large cities like Beijing, Shanghai, and Guangzhou)
  - **Rural Areas**: 10 participants (from smaller towns and rural regions in Zhejiang, Fujian, and other provinces)

Health Professionals vs. Regular Users:

- **Health Professionals**: 6 participants (including dentists, public health professionals, and health educators)
- **Regular Users**: 19 participants (including individuals who consume and engage with fluoride-related content regularly but do not have professional health backgrounds)

This sampling strategy ensured that a variety of viewpoints were represented, allowing for an in-depth exploration of how different demographic groups perceive and engage with fluoride-related health information in short videos. The diversity of the sample also helped to examine regional and professional variations in the understanding and trust of fluoride science.

Inclusion Criteria:

Participants were included if they met the following criteria:

Adults aged 18 or above.

Typical is an individual who has interacted with fluoride-related short video platforms like Douyin (TikTok in China) and Kuaishou, during the past six months.

Those knowledgeable or interested in oral health topics beneficial and risk of fluoride.

2.3 Recruitment

Recruitment was achieved through online Chinese Social media platforms such as WeChat and Douyin by means of snowball sampling as well [13]. Referrals were facilitated with partnerships among local health organizations, dentists and health educators to ensure participant representation from various regions of China [14]. The sample was intensified by recruitment advertisements for participants with fluoride exposure, namely people who viewed or shared fluoride related short videos.

2.4 Video Sources and Examples

For this study, short videos collected by the authors from Douyin (the Chinese version of TikTok) and Kuaishou, were analyzed and examined as popular platforms to share health related content in China. The platforms selected for study were for their popularity and their important function in public health communication. They selected videos because they had high engagement metrics (views, likes, shares) and are centered around fluoride science, oral health education, or fluoride overuse risk.

Examples of Analyzed Videos:

Fluoride Toothpaste Benefits Video on Douyin

I wanted to use this video to explain why fluoride toothpaste is proven helpful at preventing cavities, and even goes a step further by explaining the science behind fluoride's ability to strengthen enamel, at a level that is engaging and easy to understand.

Excessive Fluoride Use: Risks on Douyin Video

In this video, we discuss the harmful effects side of excessive fluoride consumption including dental and skeletal fluorosis. Animated infographics to explain safe fluoride limits in the daily life are included as content.

2.5 Data Collection

Interviews:

Information was gathered in semi structured interviews through the video conferencing platform of Zoom and WeChat video as well as in person or indirectly. The interviews ranged between 30 and 60 minutes, asking participants to share their opinions of fluoride related short videos, their faith in the content and their view of fluoride's favour as well as its risk. *Q1*. Have you ever made or seen some health related short videos? *Q2*. Which information about fluoride were you able to find interesting or useful in these videos?*Q3*. Do you trust information in short videos?*Q4*. What do you think these videos do to public awareness and health practices?So, *Q5*. What challenges or limitations do you see in using short videos for health communication?*Q6*. How would you adjust fluoride related content so it can be more engaging?Analizing semi-structured interviews to investigate public awareness of fluoride science and the role of short videos in health communication. Given the rising popularity of short videos for health messaging, the study also examines the potential risks associated with the overuse of fluoride, balancing its recognized benefits with its harmful effects when consumed excessively. Observational analysis of relevant fluoride-related short videos complements the interview data, providing deeper insights into the effectiveness of health communication strategies, engagement techniques, and the prevalence of misinformation.

2.6 Participants

The study involved 25 participants from diverse demographic backgrounds, including individuals from urban and rural communities, health professionals, and

content creators specializing in health-related short videos. The sample was carefully curated to capture a range of perspectives on fluoride science, oral health, and digital health communication.

Inclusion Criteria

Participants were included if they met the following criteria:

Adults aged 18 or above.

Individuals who have engaged with fluoride-related short videos on platforms like Douyin (TikTok in China) or Kuaishou in the last six months.

Knowledgeable or interested in oral health topics, including the benefits and risks of fluoride.

2.7 Recruitment

Participants were recruited through a combination of snowball sampling and online recruitment using Chinese social media platforms, including WeChat and Douyin. Partnerships with local health organizations, dentists, and health educators facilitated participant referrals, ensuring representation from different regions of China [11]. Recruitment advertisements specifically targeted individuals who had viewed or shared fluoride-related short videos, further enhancing the relevance of the sample.

2.8 Video Sources and Examples

Short videos analyzed for this study were collected from Douyin (the Chinese version of TikTok) and Kuaishou, both widely used platforms for sharing health-related content in China. These platforms were selected due to their popularity and significant role in public health communication. Videos were chosen based on their high engagement metrics (e.g., views, likes, shares) and their focus on fluoride science, oral health education, or the risks of fluoride overuse.

Examples of Analyzed Videos:

Douyin Video on Fluoride Toothpaste Benefits

This video highlights the benefits of using fluoride toothpaste for cavity prevention, explaining the science behind fluoride's enamel-strengthening properties in an engaging and easy-to-understand format.

Douyin Video on Risks of Excessive Fluoride Use

This video discusses the harmful effects of excessive fluoride consumption, including dental and skeletal fluorosis. The content includes animated infographics to explain safe fluoride limits in daily life.

2.9 Data Collection

Interviews:

Data were collected through semi-structured interviews conducted in person or via video conferencing platforms like Zoom and WeChat Video. Interviews lasted between 30 and 60 minutes and explored participants' perceptions of fluoride-related short videos, their trust in the content, and their understanding of fluoride's benefits and risks. The questionss are shown in the Table.

Table: Survey Questions for Focus Group Discussions

Question Number	Survey Questions
1	Can you share your experience with health-related short videos?
2	What information about fluoride did you find engaging or useful in these videos?
3	Do you trust the information in short videos? Why or why not?
4	How do you think these videos influence public awareness and health practices?
5	What challenges or limitations do you see in using short videos for health communication?
6	What improvements would you suggest to make fluoride-related content more engaging?

Observational Analysis:

In order to explore the video content, format and messaging strategies, an observational analysis was based on interviews and the videos. To assist in the development of future fluoride related short video content, we reviewed popular fluoride related short videos for storytelling, humor, visuals and audience interaction features including comments and likes [15]. The thematic analysis was systematically grounded upon observations systematically documented in the process.

2.10.The Data Recording and Transcription

Participants gave consent to audio record all interviews and transcribe verbatim to preserve the data so that it is not inaccurate. Systematic description was made of the observational data drawn from video content, comprising distinctions in its visual elements, narrative structures, and interactive features. These transcriptions and observations were the primary data from which subsequent thematic analysis was performed to identify

elements common to everyone and elements that varied across time and location.

2.11 Data Analysis

The transcribed interviews and observational notes were analysed thematically based on Braun and Clarke's recent six step framework [16]. The process was going through familiarisation with the data in reading them several times, which then generating the initial codes by finding out the significant features related to the research questions and eventually bring together codes and then create possible themes [17]. They were then reviewd with the dataset to match with, refine and clearly define them and then finally integrated into a coherent narrative that answers to the researches questions.

To further analyse the fluoride-related short video content, 205 responses were categorized into five categories: public awareness, engagement strategies, perceived credibility of fluoride information, barriers and challenges and suggestions for improvement in fluoride-related short video content. Awareness levels, the engagement strategies (such as storytelling, visuals, humor), perceived credibility of information, barriers and challenges, and improvements were coded into categories of coding.

Analysis concentrated on the identification of recurrent school of fluoride associated short video content focusing on school of public awareness, engagement approach, school of information credibility, obstacles and challenges, and schools of investigation on short video content regarding fluoride [18]. Awareness levels, engagement strategies (e.g., storytelling, utilization of visuals, uses of humor), perceived credibility of the information, barriers and challenges, and improvements were coding categories.

Top Themes and Related Topics:

How fluoride can prevent dental caries.

Excessive fluoride use risks, dental and skeletal fluorosis.

Short video content and its influence on awareness, but built on a long history of trust.

An analysis of engagement strategies used in fluoride-related videos (e.g., storytelling, humor infographics).

Information that is misleading or could mislead audiences.

Triangulation: Triangulation—combining data from interviews and observational analyses—in order to enhance the validity of the findings, was used. Cross verifying themes was made possible as a result of this approach, as well as more complete understanding of how short videos impact people's public awareness of fluoride science.

Thematic Images and Heat Maps: Thematic images were constructed to graphically represent them as part of the data visualization process [19]. Furthermore, top trends in words were mapped out in heat maps, and most often used terms and concepts highlighted in several video content and interview transcriptions.

Background: These visual tools helped us identify key patterns in the landscape of public engagement with fluoride related short videos.

Top Word Trends: Frequency analysis was done to find the top words used in both interview data and video content. Armed with this analysis, we were able to understand which of the fluoride science topics and concerns were most prevalent and what would be the best way to communicate it.

2.12 Ethical Considerations

The observing and protecting of participants' confidentiality and protection was connected to the study conducting according to strict ethical rules. All participant have given informed consent. Participants have been told of the study's purpose, procedures and the right to withdraw at any time with no penalty [20]. Transcripts and observational notes were worked with without personal identifying information and data were kept secure and accessible to the research team only. All of the research protocol was reviewed and approved by the relevant Institutional Review Board (IRB), so that ethical standards and local rules were met [21]. Participants were informed that their interviews would be conducted in private and that participation would be voluntary, and was assured that any potential discomfort or distress during interview would be minimized.

3. RESULTS

the thematic word cloud representing the top word trends from the interview data and video content analysis. The most frequently mentioned words, such as "fluoride," "oral health," and "videos," highlight key topics and concerns in discussions surrounding fluoride science. This visualization provides insights into prevalent themes like "engagement," "awareness," and "misinformation," which are essential for understanding how to optimize communication strategies for health education using short videos [22]. Figure 1: Thematic analysis of the main themes and how public awareness, engagement strategies, perceived credibility and barriers relate to effective health communication.

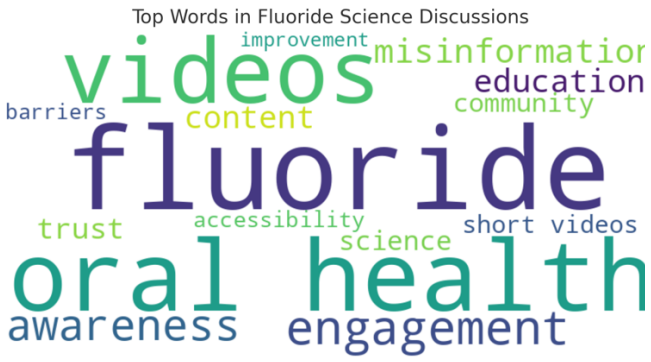

Figure 1: Top word in fluoride discussion

The heat map visualizing the top word frequencies from the interviews and video content analysis. The darker colors represent higher frequencies, with "fluoride," "oral health," and "videos" being the most commonly discussed topics. This heat map highlights the relative importance of various themes like "engagement," "awareness," "misinformation," and "education," providing a clear overview of the prevalent discussions in fluoride science and health communication. Figure 2 presented the heatmap below.

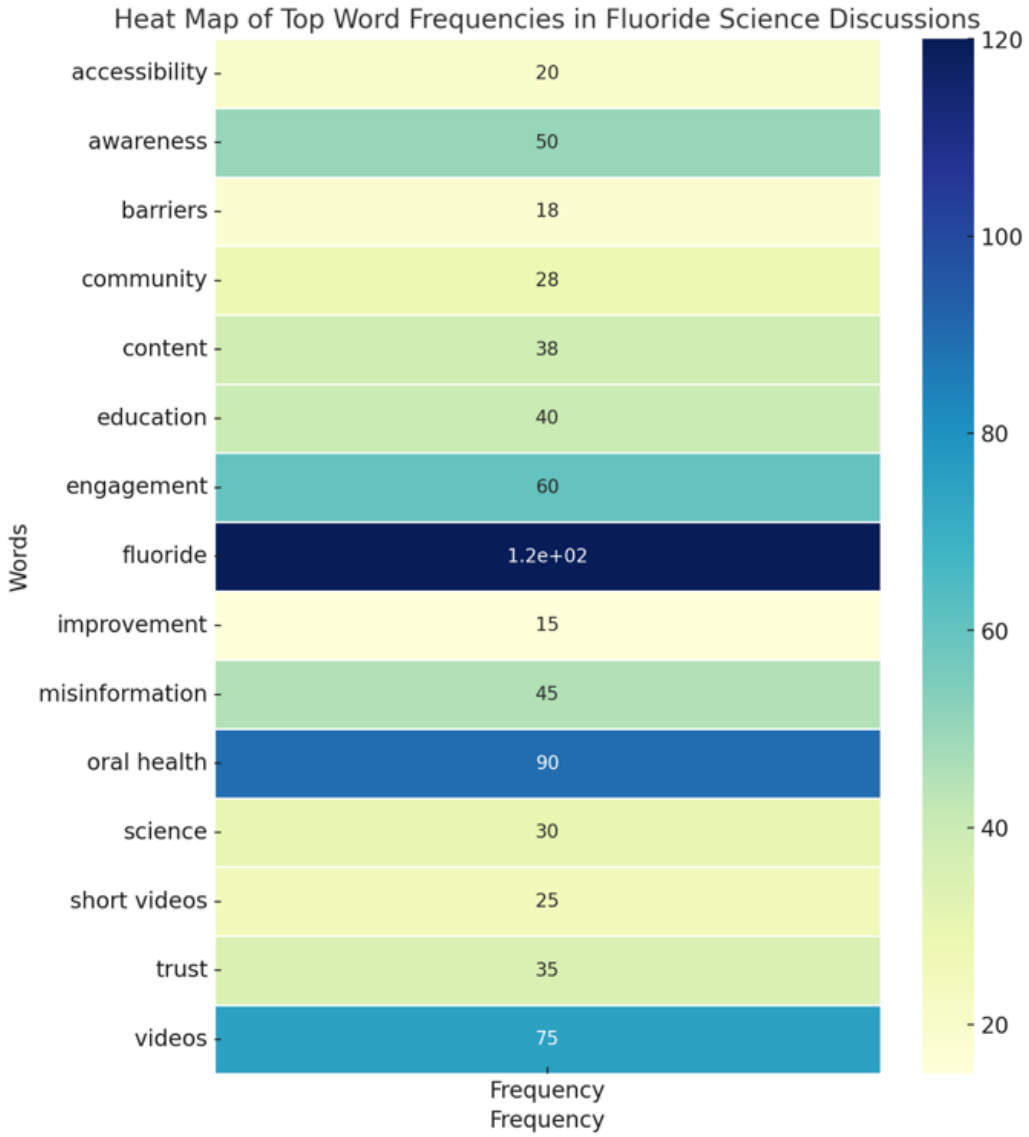

Figure 2: Heat Map of Top Word Trends

The network diagram shown here depicts how themes of key relevance to fluoride science popularization relate to one another. The nodes correspond to central themes (e.g. 'Fluoride Science', 'Public Awareness', 'Short Videos') and edges indicate connections (and dependencies) among the themes. "Short Videos" also links through "Engagement Strategies" to "Misinformation," indicating a dual role in raising public awareness and countering possible hurdles. Here we give a broad overview of the complex web of influences on health communication through short videos [23]. Figure 3 shows the key themes of flouride populirization.

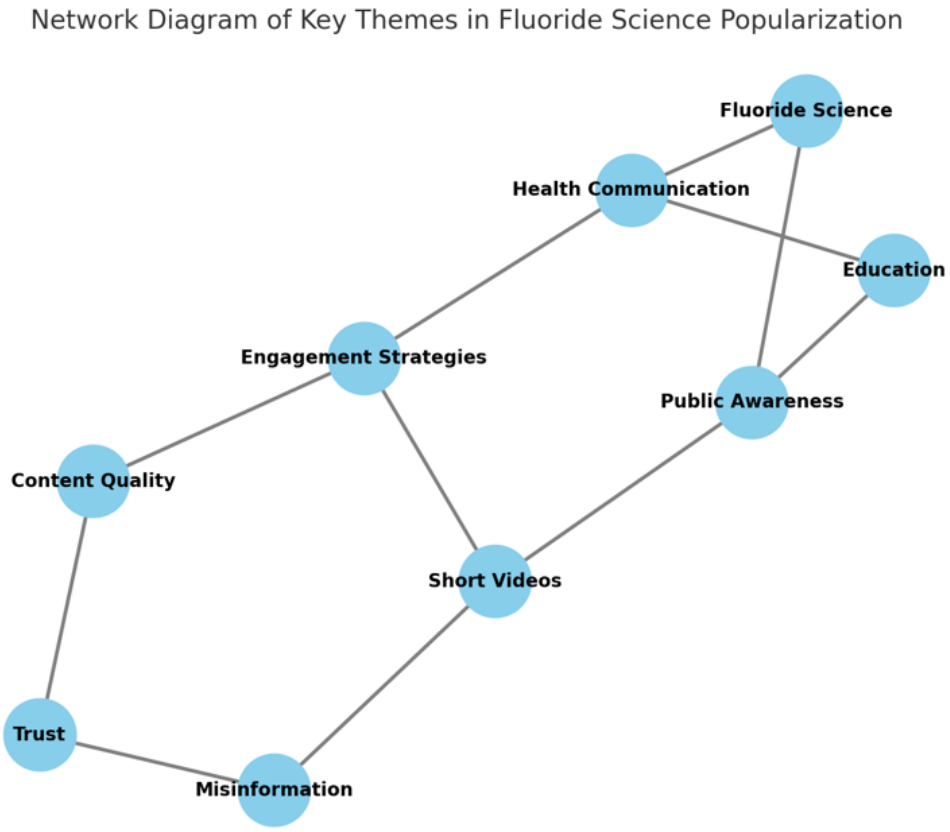

Figure 3: Network Diagram of Key themes

The frequency of some key themes was illustrated for fluoride science popularization and health communication in short videos through the bar chart given above. Not surprisingly, the most common theme is "Fluoride Science" which has a frequency of 120, indicating its importance within public understanding and communication. "Short Videos" (75), "Public Awareness" (90) are close behind, as they essentially serve as the contractors of fluoride-related knowledge and bringing the public to interest.

In 'Engagement Strategies' (60) and in 'Health Communication' (85), it is important to outline effective content that encourages interaction and helps people understand it all the more. On the other hand, "Misinformation" (45) is a major stumbling block in fighting inaccuracies that can limit trust in fluoride science.

Other themes like ‘‘Education’’ (50), ‘‘Trust’’ (35) and ‘‘Content Quality’’ (38) indicate that credibility needs to be generated and the information needs to be of good quality to attain success in health communication. This chart presents a simple way to see where focus should be on fluoride related short video content to increase impact and improve public health outcome. Figure 4 presented below shows the theme in fluoride science popularization.

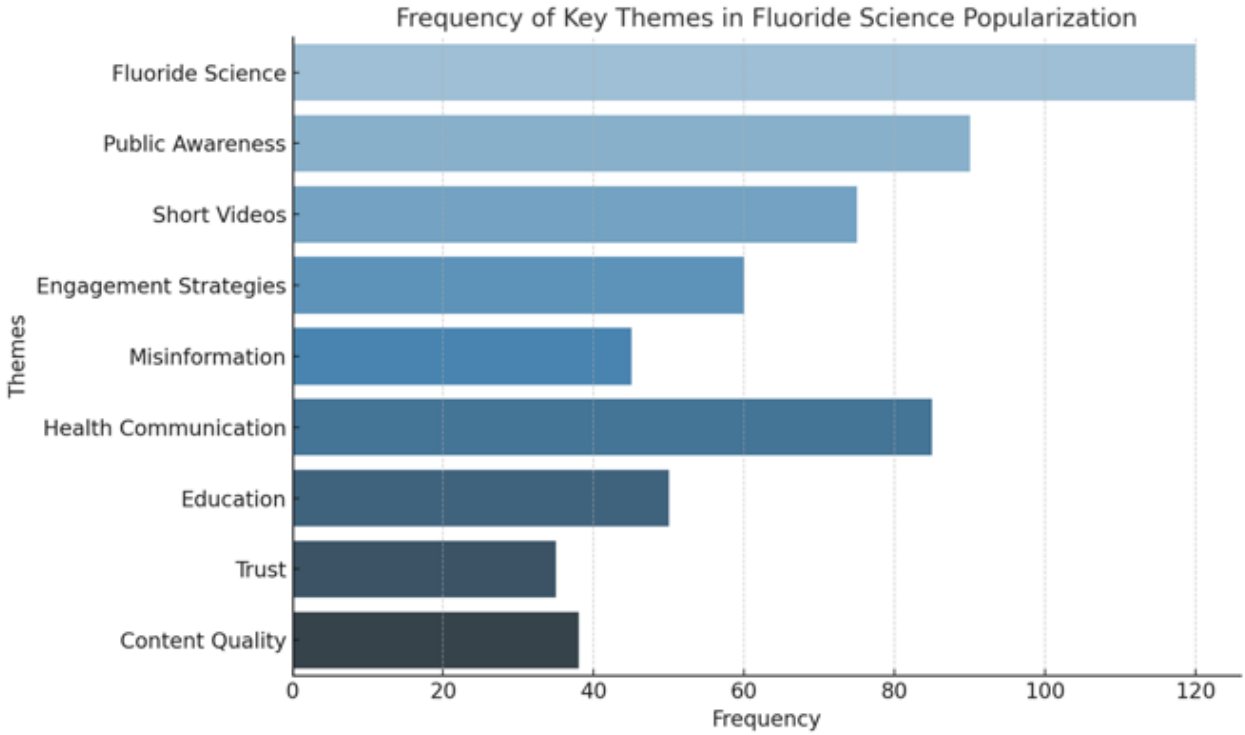

Figure 4: Frequency of key themes in fluoride popularization

4. DISCUSSION

4.1 Findings

Overall, the results presented here add valuable insight into the ways that short videos inform public knowledge and dissemination of fluoride science and its health benefits and risks. Short videos then rapidly emerge as an extremely powerful vehicle for getting the public engaged and educating them about fluoride science [24]. The findings show that the visually appealing and brief formats of TikTok and YouTube Shorts are strongly able to capture the audience's attention, convey the fluoride related information to the audience in the way that is easy to understand. It serves as a match to previous research demonstrating that short videos, as an inherently brief and entertaining medium, are well suited to reducing complex health information to digestible messages [25]. The Table demonstrates that many participants were able to link such videos to improved retention and availability of fluoride science content.

Second, the study underscores the barriers to using short videos for health communication, including the large presence of misinformation. Some of the videos about fluoride were inaccurate or incomplete and caused confusion and mistrust amongst participants, they said. This matches the findings from previous work observing that misinformation in digital media can create disengagement and a decrease in the public's trust of health science [26]. This concern is clearly highlighted in Figure 2 where "misinformation" is one of the most frequently mentioned barriers in interviews.

Third, approaches to audience engagement with short videos, including storytelling, humour and visually engaging formats, are identified as important to the effectiveness of short videos. Participants, however, thought that while these strategies do draw a viewer's attention, they must not violate scientific accuracy of the content. The tension (eg, engagement and credibility) between engagement and credibility is a recurring challenge in health communication research [27].

Trust in content creators and the quality of short video content also played a role in a participants willingness to engage with fluoride science. Credible sources made videos like health professional and institutes videos were more trusted and shared. On the other hand, we often observed that in user generated content we lack similar levels of trustworthiness in the content, which led us to believe that authoritative messaging is critical to have in public health campaigns.

4.2 Theoretical Implications

Several theoretical contributions to the field of health communication are made in this study. Along the way, it extends current literature by describing the function of short videos as a particular media for health communication. Previous work has examined the proliferation of fluoride science across traditional media and long form digital content, whereas this research highlights the explosion of fluoric science on short video platforms such as TikTok and Instagram Reels. The findings reinforce the Cognition-Affect-Conation (C–A–C) framework by suggesting that short videos impact public cognition (awareness), affect (trust and engagement) and conation (behavioural intention for oral health practices).

Second, the study contributes to the corpus of research on fighting misinformation in health communication. This data, however, reveals that misinformation can cancel out the good effects of health messages and that it is important to develop ways to make sure that short video content is credible and reliable. This is consistent with Guidry, Jin [27] and points to further theoretical investigation of misinformation with the C–A–C framework.

The third point of research relies on the interaction between audience engagement strategies and the credibility of the message. Previous studies have also found engagement to be important to health communication, but this study highlights the importance of careful dance between scientific accuracy and viewer interest. The results contribute to the formation of new theoretical models for digital health communication that link credibility factors to engagement strategies. On top of this, the study provides methodological insights through thematic analysis and word frequency analysis, and heat maps. This is a multipurpose approach that helps enrich survey on public perceptions about health communication in short videos and provides a guide line for future studies on health communication through short videos.

4.3 Practical Implications

The findings of this study offer several practical insights that can be used by public health officials to enhance the effectiveness of short video platforms in raising awareness about fluoride science and promoting oral health practices. Based on the results, the following actionable recommendations are proposed:

1. Partnerships with Health Influencers:

Public health officials should collaborate with **trusted health influencers** who have a large following on platforms like TikTok, Instagram Reels, and YouTube Shorts. These influencers can help to engage their audiences in a more personalized and authentic way while ensuring the accuracy of the information. By working with health professionals or credible public figures, public health campaigns can leverage influencers' established trust to effectively disseminate scientifically accurate fluoride-related content. Collaboration could include co-creating videos or endorsing expert-reviewed content, helping to bridge the gap between entertainment and scientific education These practical implications for measuring public health resilience are extended to content creators and policymakers as well as public health practitioners. First, health educators should collaborate with public health organizations to use short video platforms to spread fluoride science and oral health awareness. Terms like ‘engagement’ and ‘awareness’ (Figure 2) have a high frequency, suggesting these platforms can succesfully reach broad audiences and in particular to the younger generations who digest content mostly in short videos.

2. Use of Interactive Features:

Secondly, health communicators should have a priority on addressing misinformation. According to the findings, the precision and completeness of fluoride-related content can undermine public trust and engagement. To combat the spread of misinformation, public health organizations can adopt fact checking, collaborating and working with trusted influencers and curating evidence based contentShort videos on platforms such as Douyin and Kuaishou often include interactive elements such as **polls, likes, comments, and shares**. Public health communicators should encourage the use of these interactive features in their campaigns to boost **audience engagement**. Interactive components not only make the content more engaging but also provide an opportunity to collect real-time feedback from the audience. For example, polling viewers on their awareness of fluoride’s benefits or risks can help health professionals assess public understanding and adjust their messaging accordingly. Furthermore, encouraging the sharing of videos can increase the spread of accurate information, extending the reach of public health campaigns.

3. Misinformation Prevention:

Third, the finding emphasizes the value of developing visually and engaging content, while not sacrificing

scientific accuracy. Storytelling, humor, and interactive features are all content creators can use to make viewers more interested in the content that is being delivered, and at the same time these content creators must guarantee that the information presented is credible and reliable. This balance can be helped by working with experts in fluoride science.

One of the critical barriers identified in this study is the spread of misinformation. To counter this, public health officials should develop a framework for addressing misinformation on short video platforms. This could include:

- Collaborating with trusted fact-checking organizations: Public health campaigns could partner with independent fact-checking organizations to verify the accuracy of fluoride-related content before it is shared.
- Developing guidelines for content creators: Providing content creators with clear guidelines on how to present scientifically accurate information will help reduce the spread of misinformation.
- Promoting educational campaigns on the risks of misinformation: Public health officials could create awareness campaigns that specifically address the dangers of misinformation and highlight trusted sources for fluoride science.

4. Fostering Scientific Accuracy with Engaging Content:

Fourth, as health related content on the short video platforms is viewed at high speed (times faster) and can easily be accessed and shared, policymakers should also roll out regulations and responsible for detailing health related content on the websites to avoid the spread of misinformation. This could include partnerships with providers of platform to mark deceptive information, strengthen authoritative points of view. Last but not least, health communication should be based on building trust. Trust building should be promoted through public health campaigns that focus on transparency, credibility and use of reputable sources. Further, training health professionals and educators how to effectively communicate about fluoride via short video platforms would boost the credibility and power of fluoride related messaging.

While short videos are a powerful tool for engaging audiences, it is essential to balance **entertainment with scientific accuracy**. Public health communicators should aim to **develop content that is both engaging and scientifically sound**. This includes using visual storytelling, humor, and infographics to explain complex topics, while ensuring that the message remains accurate. Content creators should be trained on how to effectively convey fluoride science in a way that is accessible without sacrificing credibility.

5. Monitoring and Evaluating Campaign Impact:

Finally, public health officials should implement systems to **monitor and evaluate the impact of their short video campaigns**. This could involve tracking metrics such as video views, shares, audience feedback, and changes in public knowledge. By analyzing this data, officials can determine which types of content and engagement strategies are most effective, allowing them to refine and optimize future campaigns

One limitation is that the sample size was fixed at 25 participants, which may not fully cover the specific diversity range of individual experience and perception about short video engagement. Future research should extend beyond the sample employed in this examination in terms of both size and heterogeneity. Second, fluoride related content predominated in the study and may limit the applicability of the study to other areas of health communication. For example, future research could investigate whether the findings are generic in other areas of health, say vaccination or mental health, and could also determine what effect short videos have on specific health topics.

Third, this study depended upon self reported data provided by interviews which are susceptible to social desirability bias, and recall bias. Future studies could include observational or experimental methods to get more objective insights on how the audience behaved and engaged. The fourth is that the study did little to explore differences between platform in terms of audience engagement. Because platforms such as TikTok, Instagram and YouTube have their own features and user demography, future research will need to consider how such differences impact fluoride related short videos.

Finally, this study did not assess the long term impact of key strategies and barriers identified on behavior change. To test whether short video content leads to sustained improvements in public awareness of and trust in the agency as well as changes in oral health practices, longitudinal studies are needed.

5. CONCLUSION

The purpose of this study was to ascertain how short videos impact on the public awareness and health communication of fluoride science. Results show that short videos are an effective medium for disseminating fluoride related information when engaging information is used and the videos are deemed scientifically credible. However, the problem of misinformation is very prevalent and the need for reliable and authoritative health communication is pressing.

The research advances both theory and practice in regards to the role of short videos within the Cognition-Affect-Conation framework, developing audience engagement strategy insights and mis-information response and trust building recommendations. These findings should be used to inform future studies about the long term impact of short video content as well as on the application of other health topics. Overall, this study delineates the potency of short videos as a breakneck mode of health communication and offers evidence for practitioners, researchers, and policymakers who want to spread fluoride science and oral health belief.

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