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The content quality and educational significance of early childhood caries on short video platforms

Ming-Na Huang¹⁺, Hong Lu¹⁺, Ming-Yue Huang², Cai-Yu Li¹, Yue-Mei Zheng¹, Dan Wang¹ and Shi-Jun Tang^{1*}

Abstract

Background Early clinical screening and prevention can reduce the incidence and severity of early childhood caries (ECC). With the development of social media, TikTok and Douyin were used as important tools for ECC popularization and early screening. The purpose of this study was to evaluate the educational impact from the integrity, accuracy and quality of ECC-related short videos on TikTok and Douyin.

Methods We searched for short videos related to ECC on the mobile application TikTok and Douyin on April 15, 2024. The search keywords were as follows: "Early childhood caries" on TikTok in both English and Japanese, and Chinese search on Douyin. The first 100 short videos were selected as samples for each group. we applied an instrument called DISCERN, which consisted of 3 sections and a total of 16 questions to evaluate the quality of each short video, and used a checklist to rate the content of videos. The accuracy of the content was evaluated based on the Children's Caries Risk Assessment and Management Guidelines.

Results A total of 115 short videos were assessed for the useful information quality of ECC, including 78 Chinese, 26 English, and 11 Japanese. The score for the content quality of short videos showed that each of the three groups assigned the highest scores to the sections on symptoms and treatment, with Chinese short videos achieving the top ratings. The DISCERN scores for useful short videos in each group were 33.10 ± 3.49 in Chinese, 29.54 ± 2.37 in English, and 28.27 ± 2.61 in Japanese, respectively. Compared with English and Japanese videos, Chinese videos had the highest DISCERN score with significant differences (p < 0.05). Meanwhile, in Chinese short videos, healthcare professionals or organizations uploaded videos with higher DISCERN scores, which were more comprehensive and extensive than those uploaded by private users.

Conclusions It is necessary for more healthcare professionals and institutions to join in to improve the quality of content on short video platforms and solve more health problems for patients through short videos.

Keywords Early childhood caries, Short video, Public health, Quality evaluation

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Introduction

In the past decade, early childhood caries (ECC) had been considered one of the most common diseases in children, which affected their oral health, overall health, and quality of life [1-5]. The etiology of ECC was multifactorial, which could lead to tooth pain, pulpitis, periapical periodontitis, and even final extraction of deciduous teeth [6-8]. Although these harmful consequences could be reduced through early oral preventive



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measures, most parents did not take their children to the dentist before ECC [8, 9]. We need to strengthen the awareness of parents and children's oral health to ensure that children have a complete and healthy primary dentition. Meanwhile, while the awareness and involvement of healthcare provider in preventing ECC were of paramount importance, it was noteworthy that ECC-related knowledge often remains an area of deficiency for many of them. Recent investigations have highlighted that even general pediatricians and pediatric specialists might possess insufficient knowledge and training pertaining to children's oral health and the management of ECC [10, 11]. Consequently, it was urgent to enhance the level of health education knowledge regarding ECC across the entire society.

With the diversification of artificial empowerment, various social media apps are accelerating changes in people's lifestyles. Compared with traditional media, short videos have received widespread praise from the public due to their rich and diverse content, short duration, and ability to be watched at any time. TikTok, as the world's largest short video platform, has received countless positive reviews, with over 1 billion monthly active users, including 150 million in the United States [12]. TikTok cannot be legally used in China due to internet restrictions. Douyin, as the domestic version of TikTok, has become the most successful and popular short video app in China, with monthly active users exceeding 740 million [13].

Due to the sociality, interactivity, and originality of short video platforms, young parents seeking health information on apps can have a better user experience and sense of participation [14]. Short videos can serve as the most influential tool for public health and educational dissemination due to their large user base. Health education and research on different diseases (such as diabetes, nervous system diseases and cancer) have been spread extensively on TikTok and Douyin [15–17]. However, many videos and misinformation transmission also mean that the quality of short videos may be uneven differences [18]. Misinformation can interfere with public awareness of the disease and prevent patients from continuing treatment. Therefore, it is necessary to evaluate the quality and reliability of the information they provide. The DISCERN instrument is currently an online available tool that uses publicly available substantive validation data [19]. The content coverage is significantly correlated with the accuracy among raters, so it is important for us to use appropriate evaluation tools to assess the quality and accuracy of video content.

Early clinical screening and prevention can reduce the incidence and severity of ECC because of the diagnosis of ECC is relatively clear [20, 21]. In China, children's

dental examinations are given sufficient attention, including routine oral examination for children before enrollment, free pit and fissure sealing for first permanent molars, and regular oral health education in schools. This also indicates the necessity of ECC screening and prevention education [22]. TikTok and Douyin can be applied as important tools for ECC popularization and early screening. So far, the characteristics of TikTok and Douyin videos about ECC types are still unclear. To determine whether the observed deviation from medical standards was statistically significant, we proposed a hypothesis: there is no significant difference in the integrity, accuracy, and guality of ECC-related short videos on TikTok and Douyin. The purpose of this study was to evaluate the educational role of the integrity, accuracy and quality of short videos on TikTok and Douyin in ECC.

Methods

Short video search strategy

We searched for short videos related to ECC on the mobile application TikTok and Douyin on April 15, 2024. TikTok had a very high number of downloads and usage rates in the United States and Japan. Douyin was only used in China and had a large user group. Meanwhile, the video content presented in these three languages was more popular and recognized. Therefore, the English search term on TikTok was "Early childhood caries", the Japanese search term was "小児早期虫歯", and the Chinese search term on Douyin was "儿童早期龋". We searched for keywords on the mobile app to sort the results. Based on the platform algorithm, the videos that were most likely to be watched by users reflected the actual user exposure. We selected the first 100 short videos as samples for each group for analysis in the search results.

Inclusion and exclusion criteria

Short videos that meet the following criteria were eligible for inclusion: 1) There was a correlation between video content and ECC; 2) The expression about ECC in the video were correct; 3) The language of short videos was limited to Chinese in Douyin and English and Japanese in TikTok. The exclusion criteria were as follows: 1) Repeated short videos; 2) short video without sound; 3) Not directly related to ECC.

Quality evaluation of short videos

All searched short videos were independently evaluated by two pediatric dentists, with inter-rater reliability confirmed through Cohen's kappa consistency analysis. All disagreements were discussed and resolved by a third senior expert. Each participant had over 5 years of experience in pediatric oral diagnosis and treatment. We assessed the accuracy of the content based on the Children's Caries Risk Assessment and Management Guidelines [23].

Firstly, we evaluated the effectiveness of the video content and categorized all short videos into useful and useless information. Useless referred to personal experiences and medical education without scientific evidence for ECC. Useful was defined as a scientifically based description of the development process of ECC in short videos. Then we extracted relevant information from the included short videos, including video source, video duration, the number of days online, the number of comments, the number of likes and the number of collections.

Secondly, we applied a short instrument to evaluate the quality of each short video. This instrument was called DISCERN, which helped information providers and patients to assess the quality of written information regarding treatment choices [19]. The instrument consisted of 3 sections and a total of 16 questions, with each question scoring 1–5 points. Section 1: Is this publication reliable? (question 1–8); Sect. 2: How good is the quality of information about treatment choices? (question 9–15); Sect. 3: Overall rating of the publication. Then, we counted the overall score for each video and calculated the mean and standard deviation (SD) of the DIS-CERN scores for each group.

So far, there are no comprehensive models available to analyze the content quality of short videos on dental caries. We had customized a checklist to evaluate the

 Table 1
 Short video content scorecard

content quality of ECC short videos, displayed in Table 1. We divided the development process of ECC into six categories, including epidemiology, etiology, symptoms, diagnosis, treatment, and outcome. Then we scored each part of the short video based on its completeness as mentioned in the content. The description of short video content was divided into no content, little content, partial content and comprehensive content, with scores ranging from 0 to 3 points. Finally, the scores of the video content were counted, and the average scores of each section of each group were used for analysis.

Statistical analysis

In this study, SPSS Version 27 software was applied to data analysis. Percentage and frequency of data summary were used for categorical variable analysis and means or medians (SDs or ranges) were used for continuous and ordinal variables. To compare differences between groups, we conducted the one-way ANOVA on each group with DISCERN score. Statistically significant was defined as a *P*-value < 0.05.

Results

Video selection

More than 100 short videos were found by searching for Chinese and Japanese keywords on Douyin and TikTok mobile apps, respectively. However, when searching for English keywords on TikTok, only 89 short videos were displayed. Therefore, a total of 289 short videos were

Content	Description	Score		
Epidemiology	Incidence	No content: 0 points		
	Age of onset	Little content: 1 point		
Etiology	Tissue structure of deciduous teeth	Partial content: 2 points		
	Dietary habits	Comprehensive content: 3 points		
	Oral hygiene			
Symptoms	Caries decay			
	Pulpitis			
	Periapical periodontitis			
	Premature loss of deciduous teeth			
Diagnosis	Clinical examination			
	Imaging examination			
	Caries risk assessment			
Treatment	Preventive treatment			
	Filling therapy			
	Root canal therapy			
	Surgical treatment			
Outcomes	No new caries			
	Secondary caries			

selected, and 128 short videos were excluded after watching due to unrelated subject or other languages. Finally, 161 short videos were assessed for information quality in this study (Fig. 1).

Characteristics

The consistency test produced the Cohen's kappa value of 0.943, indicating that raters exhibited strong consistency in their evaluations (Supplementary S1). Among the selected short videos, most of them were sourced from health professionals or organizations, with Chinese 78 (85.7%), English 22 (55%), and Japanese 16 (53.3%), respectively. Private users uploaded a portion of short videos, with 9 (9.9%) in Chinese, 16 (40%) in English, and 14 (46.7%) in Japanese. News media spread even less, with only 4 (4.4%) in Chinese, 2 (5%) in English, and none in Japanese. The mean duration of the video was 72 s (10–279 s) in Chinese, 29 s (4–133 s) in English and 39 s (6–112 s) in Japanese. The average number of online days for short videos were 459 days (1–1431 days) in Chinese,

383 days (15–1015 days) in English, and 340 days (8–1245 days) in Japanese. The median number of likes, comments and collections in Chinese short videos were 4454 (4–261k), 364 (0–14k), 793 (0–32k), respectively. The median of likes, comments, and collections in English short videos were 10.4 k (1–322.2k), 141(0–2863), and 304 (0–5529), respectively. For Japanese, the median of likes, comments and collections were 17.8k (30–52.6k), 52 (0–1237), and 82 (0–1771), respectively. Finally, 161 short videos were divided into useful and useless based on educational content, with useful information accounting for 85.7% in Chinese, 65% in English, and 36.7% in Japanese. The data results were shown in Table 2.

Content quality score

The radar map of the score for short videos content quality showed in Fig. 2. The mean score for epidemiology, which was the lowest, was 0.077 for English, 0.091 for Japanese and 0.154 for Chinese. For epidemiology, the mean score was 0.385 for English, 0.545



Fig. 1 Flowchart of short videos selection

Category	Description	Douyin (China) (<i>n</i> = 91)	TikTok (America) (<i>n</i> = 40)	TikTok (Japan) (<i>n</i> = 30)
Video source	Health professionals or organizations	78 (85.7%)	22 (55%)	16 (53.3%)
	Private users	9 (9.9%)	16 (40%)	14 (46.7%)
	News media	4 (4.4%)	2 (5%)	0 (0%)
Characteristics	Video duration	72 (10–279)	29 (4–133)	39 (6–112)
	Number of days online	459 (1–1431)	383 (15–1015)	340 (8–1245)
	Number of likes	4454 (4–261 k)	10.4 k (1–322.2 k)	17.8 k (30–52.6 k)
	Number of comments	364 (0–14 k)	141 (0–2863)	52 (0–1237)
	Number of collections	793 (0–32 k)	304 (0–5529)	82 (0–1771)
Content	Education	62 (68.1%)	27 (67.5%)	8 (26.7%)
	Education 62 (68.1%) 27 (67.5%) Patient experience/testimony 16 (17.6%) 5 (12.5%)	5 (12.5%)	10 (33.3%)	
	Patient support	13 (14.3%)	8 (20%)	12 (40%)
Utility	Useful	78 (85.7%)	26 (65%)	11 (36.7%)
	Useless	13 (14.3%)	14 (35%)	19 (63.3%)

Table 2 Characteristics of included short videos



Fig. 2 Radar map of content score

for Japanese and 0.577 for Chinese. The highest score was the mean score of symptoms, which was 0.885 for English, 0.909 for Japanese and 1.167 for Chinese. Meanwhile, the mean score of treatment was relatively high, with scores of 0.808, 0.818 and 1.205 in English, Japanese and Chinese, respectively. The mean score for diagnosis was 0.462 for English 0.636 for Japanese and 0.551 for Chinese. The mean score for outcomes for

English, Japanese and Chinese videos was 0.154, 0.182, and 0.256, respectively.

DISCERN score

The DISCERN scores consisted of 16 questions in total, with each question scored from 1 to 5 points. The scores for useful short videos in each group were 33.10 ± 3.49 in Chinese, 29.54 ± 2.37 in English, and 28.27 ± 2.61 in Japanese, respectively. The results showed that significant

between-group differences were identified via one-way ANOVA (F-statistic = 19.615, p < 0.05). Effect size analysis revealed partial eta squared = 0.259 and Cohen's f = 0.592, demonstrating that the observed differences account for moderate proportions of variance in the outcome variable (Supplementary S2). Subsequently, the differences between the two groups were compared through post hoc testing (Scheffe's test) (Supplementary S3). As shown in Fig. 3, compared with English and Japanese videos, Chinese videos had the highest DISCERN score with significant differences (p < 0.05). Between English and Japanese videos, there was no significant difference (p = 0.896). The short videos published by news networks had the highest DISCERN scores in both Chinese and English, but the sample size was small and there was no Japanese sample data available. Short videos uploaded by healthcare professionals or organizations had a higher DISCERN score in Chinese, which were more comprehensive and extensive than those uploaded by private users. The detailed data were presented in Table 3. Correlation analyses were performed to evaluate potential associations between DISCERN scores and video metrics (collections, likes, comments, duration). Findings indicate: (1) No significant correlations existed in English/Japanese TikTok videos (p > 0.05); (2) Chinese Douyin videos demonstrated a positive association between video duration and DISCERN scores (r = 0.493, p < 0.05), with other metrics showing no significant relationships. (Table 4).

Discussion

In this research, we selected a total of 289 short videos and 128 short videos were excluded after watching. The remaining 161 short videos were divided into useful and useless based on educational content, and finally 115 short videos were assessed for useful information quality, including 78 Chinese, 26 English, and 11 Japanese. After overall rating all short video content, we found that the DESCERN score for Chinese short videos was the highest, and there was a statistical difference between the other two groups. As for content scorecard based on classification, there was almost no description of



Table 3		score for	usoful	chort	videos
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Variables	Douyin (In Chinese)	DISCERN	TikTok (In English)	DISCERN	TikTok (In Japanese)	DISCERN
Useful short videos	78	33.10 ± 3.49	26	29.54 ± 2.37	11	28.27 ± 2.61
Health professionals or organization	67 (85.9%)	33.09 ± 3.55	17 (65.4%)	29.76 ± 2.05	9 (81.8%)	28.44 ± 2.79
Private users	7 (9.0%)	32.29 ± 3.64	7 (26.9%)	28.43 ± 1.62	2 (18.2%)	27.50 ± 2.12
News network	4 (5.1%)	34.75 ± 2.22	2 (7.7%)	31.50 ± 6.36	—	

Douyin (China)		Number of Collections	Number of likes	Number of comments	Video duration
DISCERN score	ISCERN score correlation –0.023		-0.073	-0.177	0.493**
	p -value	0.839	0.524	0.120	0.000
	sample size	78	78	78	78
TikTok (America)		Number of Collections	Number of likes	Number of comments	Video duration
DISCERN score	correlation	-0.004	0.026	0.034	0.043
	p -value	0.983	0.898	0.868	0.833
	sample size	26	26	26	26
TikTok (Japan)		Number of Collections	Number of likes	Number of comments	Video duration
DISCERN score	correlation	0.109	-0.105	0.090	0.330
	p -value	0.749	0.759	0.792	0.322
	sample size	11	11	11	11

Table 4 Correlation analysis between video metrics and DISCERN score

^{**} p < 0.01

epidemiology and outcomes in short videos. Among the three groups, the symptoms and treatment segments consistently received the highest scores, and notably, Chinese short videos emerged as the top performers. It indicated that short videos were more focused on the symptoms and treatment of ECC, while neglecting investigation on epidemiology and outcomes.

Despite recognizing the profound harmful effects of ECC on children's health and happiness, the causes of early childhood caries were multifaceted [24]. The development of ECC was related to lifestyle and some behavioral factors, such as poor oral hygiene and dietary habits. Meanwhile, breastfeeding had been proven to be related to ECC [25–27]. In addition, low economic status had also been identified as one of the risk factors for ECC [8, 28–31]. Nevertheless, young parents still had a strong interest in children's oral health care, to learn about children's oral health knowledge and methods for preventing and reducing ECC through various channels [32]. Vanka et al. [33] found that the incidence of ECC on the intervention side decreased significantly over time compared to the control side. There was evidence to suggest that children go to dentists for oral care measures from an early age as part of their daily personal hygiene, which greatly reduced the potential follow-up costs of dental treatment [34]. This indicates that the importance of ECC education and prevention is self-evident.

With the rise and development of short videos, more and more young people communicated and disseminated through short videos, and obtained the knowledge of health education and information on disease diagnosis and treatment they need [35, 36]. TikTok and Douyin, as the world's largest user base short video platforms, had great potential for health education short videos due to the participation of many professionals and institutions. In the years of COVID-19, Sun et al. [37] used big data method to review the digital communication of COVID-19 vaccine on the TikTok platform for the first time. However, not all short video education had positive effects, such as promoting anorexia as a positive and healthy lifestyle, which was misleading information [38]. Without sufficient discernment ability, viewers would find it difficult to determine whether the video content was relevant or useful [39]. At present, there was no research on the quality of ECC short video content. Therefore, our research aimed to evaluate the educational significance of ECC short videos on TikTok and Douyin platforms.

In our research, we found that almost half of English and Japanese short videos on TikTok come from private users, with very little available information uploaded. The reason for this may be due to the lower threshold for uploading health education videos on TikTok, as well as the insufficient popularity of health education videos. Although the increasing number of professionals and institutions using media software [40], some studies had also found that the quality of video content targeting certain diseases on TikTok was not satisfactory [41–43]. It was crucial for healthcare professionals in the United States and Japan to disseminate accurate and useful health education information on social media. We found that short videos about ECC on TikTok had a shorter duration and provided viewers with non-comprehensive understanding of ECC. When evaluating the quality of their content, DISCERN scores were lower.

For Chinese videos on Douyin, many professionals and institutions provide health education on the symptoms and treatment of ECC. The videos were long in duration and relatively rich in content, so the DISCERN scores were positively correlated with the duration. According to the "Management Statement of Medical Content Release" issued by TikTok Platform in March 2021, it indicated that certified institutions and doctors could publish medical contents, which need to be reviewed by a professional team [44]. The professional team needed to refer to authoritative textbooks, the latest clinical guidelines, and medical evidence-based literature to comprehensively demonstrate the scientific and logical nature of the video content. At the same time, it was necessary to judge from the perspective of ordinary users whether the video content was misunderstood by other users due to only matching some users, and judge whether the content could pass as a whole. Therefore, Chinese short videos on Douyin were more comprehensive and had more health education significance.

Most analyzed videos only included one or two categories, and our mean scores for videos integrity were not high. High scores were concentrated in the categories of symptoms and treatment, so most short videos focused more on the viewer's needs for symptoms and treatment of ECC, neglecting research from other parts. According to reports, high-quality scores seemed to be correlated with longer duration and higher video power index (including video collection, forwarding, and commenting) [45, 46]. Our data indicated that the completeness scores of videos from professionals were much higher than that of videos published by private users. Therefore, to improve the content quality of health education short videos, we should provide video production training for healthcare professionals and offer incentive policies for healthcare professional teams. Douyin and TikTok, as entertainment short video platforms, are not easy to provide health education. We should encourage professional dentists to upload high-quality and reliable short videos about ECC, balance the relevance of the content within a limited time, and encourage patients to undergo appropriate screening and guidance.

In terms of previous research, this is the first evaluation of the quality content and educational significance of ECC short videos through Douyin and TikTok. However, there are still limitations to this study. First, we only analyzed the ECC short videos in three languages, and useful short videos in other languages were not included. The selection of the first 100 short videos with a sample size and fluctuations in the sequence of video arrangement have the potential to introduce a minor degree of sampling bias. Any subsequent research should consider a robust evaluation framework grounded in platform algorithms, with a bigger dataset size to ensure a comprehensive analysis and thus reducing bias. Second, we only evaluated the video content of ECC on Douyin and TikTok platforms, while other video software might have different conclusions. In the further, we must collaborate with medical teams from diverse regions to investigate and develop global public education resources. Third, we only used content evaluations and DISCERN scores for video assessment, which was too subjective and might result in insufficient analysis. Developing a comprehensive framework for video content analysis and evaluation could minimize subjective bias, which was a key requirement for advancing future research work. Fourth, the update of short videos was too fast, which leaded to differences in conclusions between newly added short videos and deleted original short videos. There might be inconsistencies in searching for short videos with the same keyword at different times, and the number of likes, comments, and collections for the same short video might also be varied. Therefore, in the face of continuously updated short videos, we need to establish scientific, rigorous, and effective standards for further quality evaluation.

Conclusions

In terms of content comprehensiveness and health education, Chinese videos on Douyin had more advantages than English and Japanese videos on TikTok. It is best for us to choose videos disseminated by health professionals to seek useful information. It is necessary for more healthcare professionals and institutions to join in to improve the quality of content on short video platforms and solve more health problems for patients through short videos. It is imperative to motivate and support content creators in guiding the public toward evidencebased resources provided by healthcare experts and institutions. To fully harness the capabilities of video-based information dissemination while curbing the spread of misleading or ineffective content, collaborative endeavors on a multilateral scale are essential. These efforts should involve healthcare professionals, institutions, policymakers, and social media platforms working in concert. For further research, broadening the scope of platform utilization and incorporating searches conducted in diverse languages can significantly enhance our ability to accurately assess the precision of medical education content. These will enable us to conduct more comprehensive and insightful investigations in this field.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-22962-3.

Supplementary Material 1. Supplementary Material 2. Supplementary Material 3. Supplementary Material 4. Supplementary Material 5. Supplementary Material 6.

Acknowledgements

We thank Pro. Hong-Lin Wei, Department of Pediatric Dentistry, Stomatological Hospital of Guizhou Medical University, Guiyang, China and Dr. Qian Xia, at the Guizhou Medical University, Guiyang, China, for their kind assistance with the literature search.

Authors' contributions

HMN: conceptualization, supervision, methodology, writing-review and editing. LH: conceptualization, supervision, writing-review and editing. HMY: investigation, formal analysis. LCY: writing-review and editing, data administration. ZYM: formal analysis. WD: formal analysis. TSJ: conceptualization, supervision, methodology, writing-review and editing. HMN and LH are co-first authors.

Funding

No funding.

Data availability

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Declarations

Ethics approval and consent to participate

No ethical approval was required as our research involved the analysis of publicly available aggregated data with no direct involvement of human subjects. Therefore, no ethical approval process was necessary for conducting this research.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 14 October 2024 Accepted: 28 April 2025 Published online: 09 May 2025

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