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"Diet and Dental Caries: A Comprehensive Content Analysis of Youtube Videos"

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KEYWORDS

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ABSTRACT:

Background:

Dental caries, a prevalent global health issue, shares a complex relationship with nutrition. Certain foods and eating habits, such as those high in sugar, can exacerbate dental caries, while others, like proper meal spacing, can help prevent it. YouTube serves as a widely used platform for accessing information, yet as of now, there is a notable absence of content focusing on the relationship between nutrition and dental caries in easily accessible YouTube videos. This study aimed to analyze the content of Indian languages YouTube videos on nutrition and dental caries.

Methods: Researchers conducted 6 searches on YouTube using keywords related to nutrition and dental caries. From each search, they selected the first 20 videos. These videos were then scored based on their content, with a maximum of 17 points for covering various foods and eating behaviors impacting dental caries risk. Additionally, information on video characteristics such as view count, length, likes, dislikes, and age were collected for each video. The videos were divided into two groups based on their view rate (views per day), and differences in scores and types of nutrition messages between these groups were analyzed using nonparametric statistics.

Results: In total, 83 videos were included. Most videos were posted by or featured oral health professionals (68/83, 82%). The mean score was 4.2 (SD 2.3) out of 17 points. Videos with >30 views/day (high view rate; 32/83, 48% videos) had a trend toward a higher score (mean 4.4, SD 2.07) than videos with ≤30 views/day (low view rate; 51/83, 52%; mean 4.1, SD 2.4; P=.031) & the result was statistically significant. Sugar was the most consistently mentioned topic in the videos (52/83, 53%) and dental caries mechanism (57/83, 69 %) were

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mentioned in more than 50% of videos. High –view rate videos were more likely to mention messaging on candy (p=0.03), and sticky foods (p=0.4) than high–view rate videos and it was statistically significant.

Conclusions:

The study revealed that YouTube videos related to nutrition and dental caries lacked comprehensive information, highlighting a need for improvement in content quality and education on these topics for the public. The findings provide valuable insights into the messaging currently accessible to viewers regarding nutrition and dental caries.

1. Introduction

Dental caries is a prevalent global health issue, and there is a substantial interconnection between nutrition and dental caries. Globally, untreated dental caries is more common than chronic respiratory illnesses, diabetes, cancer, mental health conditions, and cardiovascular diseases [1]. Certain foods and eating behaviours, such as sugar consumption, can be detrimental, while others, like meal spacing, can be beneficial for dental health. While dental caries can be linked to various interrelated factors, many foods and dietary habits, particularly sugar, a fermentable carbohydrate, have been recognized as significant risk factors contributing to the development of dental caries [2]. The development of dental caries can also be prevented by dietary factors. Whole grains, fruits, vegetables, high-quality proteins, and dairy products like milk and cheese are among the foods that are thought to be good for teeth. Meal spacing is also thought to be advantageous [3].

YouTube is a widely used platform for the public to access information. The public's inclination to look for health information online, especially on social media and the internet, has been noted in earlier research [4]. In India, YouTube is a leading platform for online content, with millions of users accessing its vast library of videos. People in India use YouTube for various purposes, including entertainment, education, news, and more.

Video-sharing platforms such as YouTube serve as attractive interfaces for sharing medical or dental information, providing a quick and cost-free access to a wide audience. Not all YouTube videos provide accurate or comprehensive information on a specific topic, and some may even present incorrect information. Although a number of studies have examined the content of different YouTube videos about health [5], there isn't much study that particularly looks at videos about dental caries and nutrition. Information on this particular topic is needed since dental caries is a worldwide problem, nutrition has an immense impact on dental health, YouTube is quite popular, and health professionals have difficulty dealing with this problem. As far as we know, no research has assessed the contents found in YouTube videos in the Indian language on diet and dental caries.

The aim of this study was to evaluate the content of YouTube videos concerning dental caries and nutrition, focusing specifically on those readily accessible through default search settings. Additionally, the study aimed to explore nutrition messaging with respect to creator type and engagement.

2. Methods

Video selection

Our approach was to look for YouTube videos that the general public would find most useful when looking for information on dental caries and diet. Two dental caries-related keywords and three nutrition-related keywords were chosen using Google Keyword Planner [6]; these keywords were also used in earlier study [7]. Tooth decay and dental cavities were the two most common terms linked to dental caries. Food, diet, and nutrition were the top three search terms for the topic. Six searches were produced as a consequence of this: dental cavities and nutrition, dental cavities and diet, dental cavities and food, and tooth decay and nutrition. Videos that featured information about nutrition and dental caries, regardless of length, and were in the Indian language were acceptable for inclusion.

The YouTube searches were carried out on March, 2024, utilizing YouTube's default settings to best duplicate the public search technique. The searches on all official Indian languages were undertaken by interns who were divided among themselves and used Google Chrome's incognito mode to avoid bias. Each dental intern launched a fresh incognito window to conduct their

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searches. Each of the six YouTube searches was carried out in a specific sequence, with the first 20 videos from each search recorded, supervised by the first two researchers. The first 20 videos were chosen because similar numbers have been utilized in previous studies [7-10]. We also chose the first 20 videos because earlier research has shown that the majority of internet users do not browse beyond the first page of search results [11]. Each video's language, title, publisher, total number of views, date posted, URL, length in minutes, and number of likes were recorded in Microsoft Excel365 by five dental interns. Transcripts for each video were also obtained from the YouTube website and confirmed by watching the video.

Video scoring System

Because of the multiple dietary components that can influence the risk of dental caries, a score system was developed based on prior research on YouTube content analysis of diet and caries. This approach (score system or presence/absence of material in videos) has been employed in previous YouTube content analysis studies[12-16].The scoring system offers 17 possible points, with higher scores indicating that more topics were covered. Table 1 lists each topic area. The scoring tool did not take into account the presence of disinformation in videos. This method has also been applied elsewhere [17].

Table 1. Scoring system to assess messaging in the included YouTube videos (total possible score: 17 points).

Message assessed in each video	**Score, n**
Dental caries mechanism	1
Factors that increase the risk of dental caries (or poor oral health)	
Acidic foods and beverages	1
Any mention of sugar	1
Sugary drinks (eg, soda, fruit juices, energy drinks, and sweetened coffee and sweetened tea)	1
Sticky foods (eg, dried fruit)	1
Frequency of sugar intake (eg, frequent and prolonged intake of simple sugars or limiting snacking or eating sugary 1 foods with meals or eating sticky foods alone)	1
Candy (either in general or specific types of candy)	1
Snack foods high in sugar and starch (eg, cookies, cakes, and pastries)	1
Factors that reduce the risk of dental caries (or promote good oral health)	
Chewing sugar-free gum or eating sugar-free candy or xylitol	1
Vegetables and fruit (including specific vegetables and fruits)	1
Protein from high-quality sources (eg, meats, nuts, seeds, and legumes)	1
Whole grains	1
Water	1
Dairy products (both in general or mentioning specific products)	1
Drink beverages with a straw	1
Brush teeth after meals or brush teeth at least 2 times/day	1
Mention food guide or food label reading	1

(Source : Long M, Forbes LE, Papagerakis P, Lieffers JRL. YouTube Videos on Nutrition and Dental Caries: Content Analysis. JMIR Infodemiology. 2023 Aug 10;3:e40003. doi: 10.2196/40003. PMID: 37561564; PMCID: PMC10450531.)

This scoring method was partially based on the Academy of Nutrition and Dietetics' most recent position paper on Oral Health and Nutrition [18], which outlines dietary patterns and eating behaviors that are related with an increased or decreased risk of dental caries.

The scoring system used in the current study was taken from the previous research[7], in which they have made the scoring criteria by including the high evidence-based sources related to dental caries from the national health service health Scotland oral health and nutrition guidance for professionals June 2012 [19,7], the 2015 Joint Position Statement on Oral Health and Nutrition from the Dietitians Association of Australia and Dental Health Services Victoria [20,7], and a Chairside Dietary Assessment tool developed by a dietitian published by the Journal of the American Dental Association [21,7].

Data analysis:

Interns scored videos independently using a 17-point system based on information provided in the video's text or what was said audibly. Disagreements were discussed

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until a consensus was reached. Finally, it was evaluated by all researchers.

Video characteristics, including view count, length, number of likes, video age, viewing rate (views/day), and like rate (likes/view)[7,12], were summarized using descriptive statistics such as mean, standard deviation (SD), median, and range. Microsoft Excel 365 and SPSS were utilized for analysis.

Videos were categorized by presenter type: oral health professionals, non-OHP health professionals, and no health professional credentials. They were then split into two groups by view rate(low & high view rate videos) for comparison. Statistical analyses were conducted using SPSS Statistics 28, including the Fisher exact test for categorical variables and the Mann-Whitney U test and Kruskal-Wallis test for continuous variables. Spearman correlations explored relationships between continuous variables, with significance set at $p<0.05$.

3. Results

Search results:

In total, 100 films from six searches were examined for inclusion; however, seven videos were eliminated from the study because they were duplicates (n=10) and did not meet inclusion standards (n=7), i.e., the video did not address diet and dental caries. After eliminating these videos, 83 videos remained acceptable for study.

Video Characteristics:

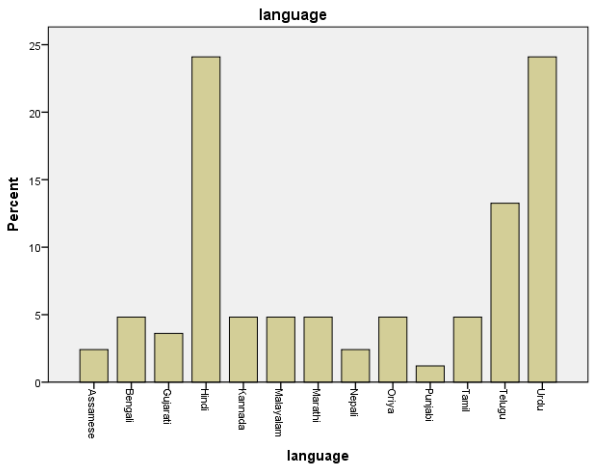
Table 2 summarizes the characteristics of the included videos:

	All videos 83	Oral Health Professionals 68 (82%)	Health Professionals 9 (11%)	No health professional credentials or unknown credentials 6 (7%)
Video age (days) Mean (SD) Median(range)	803.37(444.3) 773.0(33-2227)	790.2(450) 757.5(33-2227)	9484.4(478.4) 895(246-2021)	734.6(335.1) 764.5(233-1082)
Length Mean (SD) Median(range)	10 min 44 s (32 min 53 s) 5 min 59 sec (1 min 11 sec – 55 min 43 s)	11min 54 s (36 min 14 s 6 min 21 s (1 min 11 sec – 55 min 43 s)	5 min 19 s (4 min 0 s) 3 min 59 s (1 min 47 s- 14 min 24 s)	5 min 42 s(3 min 22 s) 5 min 3 s (2 min 7 s – 10 min 38 s)
View count Mean (SD) Median(range)	1,79,653(5,03,317) 11,421(46-24,49,497)	1,51,411(464,649) 10,388(46-24,43,711)	505,186(800691) 84,830(70-2449497)	11,426(14163) 7253(83-36166)
Viewing rate (views/number of days since posting) Mean (SD) Median(range)	285.9(863.1) 15.5(0-5693)	264.6(870.2) 12.9(0-5693)	629.5(1049.9) 78.4(0-3244)	12.4(13.6) 99.9(0-34)
Number of likes Mean (SD) Median(range)	0.03(0.31) 0.02(0)	2351.3(7239.6) 206(0-38000)	4436.7(8808) 1000(5-27000)	274(278.3) 111(0-965)
Like rate Mean (SD) Median(range)	2427.3(7154.6) 196(0-38000)	0.02(.025) 0.02(0)	0.04(.063) 0.01(0)	0.02(0.015) 0.03(0)

The majority of films were released or featured by OHPs (68/83,82%), followed by non-OHP health professionals such as complementary and alternative medicine practitioners (9/83,11%), those without health professional credentials, or those with uncertain credentials (6/83,7%).

Out of 83 videos, maximum videos were originated from Hindi and Urdu (n=20, 24.1%) followed by Telugu (n=11,13.3%), Tamil, Kannada, Malayalam, Marathi, Bengali, Oriya (n=4, 4.8%) each & Gujrati (n=3,3.6%), Nepali, Assamese (n= 2, 2.4%) and 1 (1.2%) video from Punjabi (bar chart 1). Included videos were on average 10 minutes 44 seconds in length (SD 32 minutes 53 seconds; range 1 min 11 sec – 55 min 43 s) and had been posted for a median of 773 (33-2227) days.

Figure 1: Illustration of Indian language videos



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Overall, the 83 included videos had 1,49,11,186 total views recorded. videos published by health professionals who are not OHP had the most views (median 84830, range 70-2449497 views/video); followed by videos published by OHP (median 10,388, range 46-24,43,711 views /day) & videos that were published by no health professionals or unknown credentials (median 7253, range 83-36166 views/video. The mean viewing rate (views/day) was higher for videos posted by health professionals who are not oral health professionals (629.5, SD 1049.9) followed by OHP (264.6, SD 870.2) and (mean 12.4, SD 13.6) for no health professional credentials or unknown credentials.

Nutrition messaging

The average video score for all included videos (83/83,100%) was 4.2 (SD 2.3), out of a maximum possible total of 17, with scores ranging from 0 to 13. Table 2 divides the scoring data by creator type. Videos uploaded by no health professional credentials or unknown credentials had a higher mean score (5.1, SD 1.6) than OHP (4.2, SD 2.3), while videos of non-OHP had a lower score (3.7, SD 2.7). However, there was no statistically significant variation in video scores between creator types (p =.46). None of the videos received a score of zero.

We looked at the relationship between total video scores and the general public's involvement with videos. There were no significant associations identified between the overall video score and total views (0.47; p=0.67), view rate (0.078; p=0.48), total likes (0.55, p=0.62), or like rate (-0.003; p =0.97).

To delve deeper into nutrition messaging and video engagement, all 83 videos were split into two similar-sized groups based on view rate. The high-view rate category (>30 views per day; 32/83, 39% of videos) consisted of 25 OHPs' videos, one with unknown credentials, and six from non-OHP health professionals. The low-view rate category (<30 views/day; 51/83, 61% of videos) included 43 OHPs' videos, 5 with unknown credentials, and 3 from non-OHP health professionals. Videos with more than 30 views per day had a mean score of 4.4 (SD 2.07), while those with less had a mean score of 4.1 (SD 2.4). Though there was a trend towards a score difference between groups (p =0.31), it wasn't statistically significant (table 3)

Table 3. Scores of YouTube videos on nutrition and dental caries by type of creator (n=83).

	All Videos (83)	Oral Health Professionals 68 (82%)	Health Professionals 9 (11%)	No Health Professional Credentials or Unknown Credentials 6 (7%)
Total score out of 17 Mean (SD)	4.2(2.3)	4.2(2.3)	3.7(2.7)	5.1(1.6)
Median(range)	4(1-13)	4(1-13)	4(1-9)	4.5(4-8)

Table 4 contains an in-depth description of the various nutrition messages for all videos (83/83, 100% videos). The presentation also includes a breakdown of message in low-view rate videos (<30 views/day) and high-view rate videos (>30 views/day).

	All videos (83)	Low video view rate:≤30views/day, n=51	High video view rate:>30views/day, n = 32
Total score out of 17 Mean (SD)	4.2(2.3)	4.1(2.4)	4.4(2.07)
Median(range)	4(0-13)	4(1-13)	4.5(0-9)

P=0.31 for the difference between high – view rate videos and low- view rate videos (Mann – Whitney U Test

In all, 69% (57/83) of the movies provided information on the mechanism of dental caries production. There were no significant variations in the proportion of low- and high-view-rate videos that contained this message (p =.22).

Among the 83 videos analyzed, 52% discussed the role of sugar in causing tooth decay, but none provided advice on appropriate sugar intake. Only 15% highlighted sugary drinks as a contributing factor, while 39% mentioned sugary and starchy snack foods as a risk. Additionally, candy and sticky foods were cited in 17% and 35% of the videos, respectively. Notably, these messages were more prevalent in high-view-rate videos compared to low-view-rate ones, with statistically significant differences observed (p = 0.03).

Table 5. Nutrition and dental caries messaging included in the analyzed YouTube videos by view rate (n=83).

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	All videos (83), n (%)	Low video view rate: ≤30views/day, n=51, n (%)	High video view rate: >30views/day , n=32, n (%)	P value
Inclusion of specific type of information				
Dental caries mechanism	57(69%)	38(75%)	19(60%)	.22
Any mention of sugar	52 (63%)	35 (69%)	17 (53)	.17
Sugary drinks	12(15%)	6(12%)	6(19%)	.52
Snack foods high in sugar and starch	32(39%)	18(35%)	14(44%)	.49
Candy *	14(17%)	5(10%)	9(28%)	.03*
Frequency of sugar intake	13(16%)	8(16%)	5(16%)	.10
Acidic foods and beverages	15(18%)	8(16%)	7(22%)	.56
Sticky foods*	29(35%)	14(28%)	15(47%)	.04*
Vegetables and fruits	17(21%)	9(18%)	8(25%)	.57
Brush teeth after eating or brush teeth at least 2 times/day	62(75%)	40(78%)	22(69%)	.43
Drink water	19(30%)	10(20%)	9(28%)	.42
Protein from high-quality sources	4(5%)	3(6%)	1(3%)	.10
Dairy products	11(13%)	7(14%)	4(13%)	.10
Sugar-free gum or sugar-free candy or xylitol	2(2%)	1(2%)	1 (3%)	.10
Whole grains	7(8%)	4(13%)	3(6%)	.42
Drink beverages with straw	2(2%)	1(2%)	1 (3%)	.10
Mention food guide or food label reading	5(6%)	4(8%)	1(3%)	.64

*P<.05 for difference between high–view rate videos and low–view rate videos (Fisher exact test).

Messages regarding the frequency of sugar intake were present in 16% (13/83) of all videos, with an equal proportion in both low-view-rate and high-view-rate videos. Acidic foods and beverages' harmful effects on oral health were mentioned in 18% (15/83) of videos. Interestingly, this message was slightly more common in high-view-rate videos compared to low-view-rate ones, although the difference was not statistically significant (p = 0.56).

Healthy foods and behaviors were cited less frequently than unhealthy ones. The most often cited healthy behavior was eating more fruit and vegetables, either in general or in particular; this message was included in 21% (17/83) of the videos. Merely 5% (4/83) of the videos addressed consuming high-quality protein sources, such as meat, fish, and shellfish, as well as lentils, pulses, and nuts. Furthermore, 13% (11/83) of the films discussed the health benefits of dairy products, either as a broad category or as particular products like milk, yogurt, and cheese. Out of the 83 videos, 8% suggested whole grains. The percentage of low-view-rate videos compared to high-view-rate videos that featured each of the previously mentioned healthful food messages (fruit and vegetables: p =.57; high-quality protein: p =.10; dairy products: p =.10; & whole grains: p =.42) did not show any statistically significant differences.

Thirty percent (19/83) of the videos recommended drinking water as a preventative measure against tooth caries. There were just three videos that expressly addressed drinking fluoridated water. Although it was not statistically significant, drinking water was mentioned more frequently in low view rate videos (10/51, 20% vs. 9/32, 28%; p = 0.42) than in high view rate videos. A minimum of two daily dental brushes or brushes after meals were stated in 75% (62/83) of the videos. The majority of the oral health specialists' videos highlighted the need of brushing using a toothbrush and toothpaste. There were also very few videos (2/83, 2%) that mentioned sugar-free gum, sugar-free confectionery, or xylitol. The food guide or reading food labels was brought up in the videos (6%, 5/83). This was referenced more frequently in videos with low view rates (4/51, 8% vs. 1/32, 3% ;p =.64) than in videos with high watch rates. Notably, the percentage of low-view-rate and high-view-rate videos containing messages about brushing teeth (p =.43), sugar-free gum, candy, or xylitol (p =.10), and sipping liquids with a straw (p =.10) did not differ statistically significantly.

4. Discussion

Principal findings:

To our knowledge, this is the first study that has focused on investigated the Indian content of nutrition and dental caries on YouTube. These findings hold significance due to the strong association between nutrition and dental caries risk, the widespread prevalence of dental caries, and the popularity of YouTube as a platform for accessing information. They offer valuable insights into potential avenues for future YouTube content creation in this critical area of public health.

Overall, in our research we found that the 83 included videos had a low mean score (4.2, SD 2.3 out of 17 points), indicating a limited coverage of relevant topics on nutrition and dental caries. This is consistent with the results of earlier research that looked at YouTube videos

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that were health-related. Indeed, inadequate descriptions of oral cancer risk factors have been noted in earlier studies, such as the one on YouTube videos by Hassona et al. [12]. In a comparable manner, Smyth et al. [22] discovered that none of the included videos covered every area of interest in their study on oral hygiene training using YouTube, which raised questions regarding the messaging delivered in some of the videos. Furthermore, recent research has highlighted concerns regarding the comprehensiveness of health-related YouTube videos, as noted in a review article [23]. Similar issues have been identified in pediatric oral health education leaflets, where incomplete nutrition messaging was observed [24]. These findings underscore the possibility that individuals relying on YouTube for information on nutrition and dental caries may not receive the thorough guidance required to effectively optimize their diets and prevent dental caries.

We found that, with 52 out of 83 (63%) of the included videos discussing sugar, it was the most commonly discussed issue. More than half of the videos discussed a topic on sugar. Sugar was found to be the most frequently covered issue, although the amount of topics covered varied, according to a study by Morgan et al.[25] that examined dietary information in oral health education leaflets from the United Kingdom. It's interesting to note that fewer YouTube videos discussed foods and drinks like fruit and vegetables that may lower the incidence of dental caries. This is in contrast to earlier research on oral health pamphlets, which revealed a high frequency of messaging about foods that are recommended. For instance, Morgan et al. [25] discovered that, respectively, 73% and 70% of the evaluated oral health pamphlets suggested fruit and vegetables as snacks and simply milk and water. Furthermore, Arora et al. [24] discovered that 53% and 81% of the leaflets suggested consuming milk and water, respectively. Additionally, 44% of the pamphlets advised consuming tap or fluoridated water. When people watch YouTube videos to learn about nutrition and dental caries, they are likely to come across messages concerning sugar, but they might not hear as much evidence-based information about foods that are suggested to prevent dental caries. The public may receive insufficient information from this constrained communications regarding suggested foods, which could hinder their capacity to make significant dietary adjustments.

In the course of our analysis, we noticed that several videos implied that ideas about diet and dental caries, specifically sugar consumption, were common knowledge by using expressions like "everyone knows," "most people know," and "we all know." This, however, runs counter to research showing that different populations may not have the best nutritional understanding of dental health[26–28]. It is imperative that future YouTube videos on this topic include the importance and frequency of sugar intake. It's also critical to recognize that a wide range of other dietary variables and eating practices can affect a person's risk of dental caries. It is crucial to acknowledge the intricacy of this relationship and the possibility that viewers may not be familiar with this information.

In our study, videos created by individuals with no health professional credentials or unknown credentials had a slightly higher mean score compared to those created by oral health professionals (OHPs) and other health professionals, although this difference was not statistically significant. We speculate that this could be due to influencers conducting in-depth analysis before uploading their videos, resulting in maximum points being covered. Additionally, OHPs may tend to focus more on the treatment of dental caries rather than discussing risk factors, which could affect the overall score. Furthermore, we observed that videos with longer durations tended to score higher points, while those with shorter durations scored fewer points, suggesting that more comprehensive information may be provided in longer videos.Interestingly, previous research on content analysis regarding diet and dental caries has reported contradictory findings, indicating that videos produced by non-health professionals or those with unknown credentials had lower scores compared to those created by OHPs and health professionals who are not OHPs[7]. Studies conducted on YouTube videos related to health have generally discovered that videos made by associations and health experts are of higher quality than videos made by non-health professionals, including commercials[29–31]. For example, a few of the OHP-featured videos in our study scored less , which may be related to the scant nutrition content taught in non-dietetic health profession programs, such as dental programs. This implies that OHPs might not always have received thorough training in this specific field[32].

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Small, nonsignificant negative correlations were found in our investigation between the video score and a number of engagement metrics, including total views, view rate, total likes, like rate, and total dislikes. These results are in line with earlier content analysis research on YouTube videos that discuss health. For example, it was discovered in a recent review paper by Osman et al. [23] that most research evaluating correlations between engagement and video quality indicated either no relationships at all or negative correlations for metrics like the quantity of views and likes. Nevertheless, we found that, although this tendency was not statistically significant, low-view rate movies generally had higher overall ratings than high-view rate videos when we divided our included videos into low- and high-view rate categories. Furthermore, compared to high-view rate movies, low-view rate videos were more likely to include information about sugar intake frequency, dental caries causes, and brushing teeth after eating or at least twice a day. Disseminating information regarding sugar consumption frequency is especially important since it is thought to have a greater impact on dental caries risk than sugar consumption amount[33]. The increased interaction with low-quality videos might indicate that it's difficult for the general public to discern between high-quality YouTube films about health. Therefore, medical experts are crucial in teaching the general population how to choose reputable videos about dental caries and nutrition. In addition, experts in nutrition, oral health, and related disciplines ought to make an effort to provide user-friendly, evidence-based movies. A list of tactics that content producers might use to improve the accessibility of their videos has been supplied by Haslam et al. [34].

As we reviewed and scored the videos, we noticed instances of contradictory dietary advice related to evidence-based items in our 17-item scoring tool, both within and between videos, which merits discussion. These conflicting messages, while not evidence-based, could lead to confusion among viewers. We'll delve into a few examples, including sugary foods and beverages, whole grains, and milk products.

First of all, whereas evidence-based guidelines recommended avoiding sugar-rich foods and beverages to prevent dental caries, there were contradictory advice addressing them. Juice was occasionally suggested or preferred over other sweet beverages[2,20]. Contradictory advice, for example, included promoting calcium-fortified juice, claiming that juice (even without sugar) was better for teeth because of its vitamin C content, and implying that juice was not as bad as other sugary drinks. Furthermore, because dried fruit contains phytochemicals, it was deemed healthy in a few movies despite being sticky and heavy in sugar. Dried fruit still has a high sugar content even if there is little evidence linking it to dental caries[35]. Similarly, despite conflicting clinical data on its effect on dental caries, honey (particularly manuka honey) was occasionally promoted as a better sugar option. Further research is required, even though some studies indicate honey has antimicrobial qualities[36].In conclusion, because of their high sugar content, these foods should be avoided when it comes to dental caries risk.

Second, despite evidence-based advice to consume whole grains, two videos recommended restricting or eliminating whole grains because of worries that phytic acid causes tooth caries. Watching these movies recommended consuming grain products with lower levels of phytic acid. Nuts, seeds, grains, and legumes contain phytotic acid, an antinutrient that has the ability to bind certain trace elements and perhaps alter their absorption[37, 38]. But when ingested in a varied diet, phytic acid is not harmful, and in Western nations, the advantages of eating whole grains exceed any possible hazards [39]. As of right now, there's not much proof that phytic acid causes tooth caries.Third, a few videos claimed that eating dairy products increases your chance of developing dental caries (yogurt and coffee creamers are examples of this because of their high carbohydrate content). While lactose, the primary sugar in milk products, is cariogenic, it is not as cariogenic as other sugars, and milk products also contain a variety of other helpful ingredients that help prevent dental caries, such as casein, calcium, and phosphorus. Research suggests that milk may be anticariogenic and low cariogenic as of right now [39]. Viewers may become confused by these conflicting messages on the benefits or risks of the aforementioned meals and beverages in relation to dental caries and oral health. These results align with the research conducted by Morgan et al[25]. Additionally, inconsistent and even conflicting information about oral health and nutrition was discovered by the UK study's authors in several pamphlets [25]. In addition, Arora et al. [24] found that pediatric oral health education

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pamphlets in Australia contained misleading information on milk and nutrition. This observation holds significance since it can potentially cause confusion among the public when they encounter conflicting counsel. Health professionals who wish to provide materials on this subject in the future will find it helpful to identify areas of conflicting knowledge.

Videos that discussed complementary and alternative medicine (CAM) methods to improve oral health have been viewed by us; these methods were not included in our 17-item grading system. Examples included taking probiotic supplements or eating foods high in probiotics (one video mentioned this), oil pulling (three videos mentioned this), and using various homemade remedies (four videos) like mouthwashes or mixtures applied directly to the teeth that contain ingredients like salt, coconut oil, clove oil, garlic, and mustard oil. In addition, eight videos promoted the use of vitamin K (often K2), usually in conjunction with vitamins A and D, and offered suggestions for meals or supplements that included these elements. Four videos also emphasized the use of vitamin and mineral supplements, such as vitamin D, calcium, magnesium, and vitamin K2. Many of these strategies lack strong evidence and are not supported by professional bodies, even if some, like probiotics [40–44] and vitamin D [45–47], have attracted a lot of attention from the research and clinical communities due to their possible benefits on dental caries. For example, the American Dental Association does not advise oil pulling [48], and the Canadian Pediatric Society does not currently support probiotics for preventing dental caries [49]. It's crucial for health professionals to be aware of these recommendations disseminated online and be prepared to address inquiries and provide evidence-based information on such topics to help the public make informed decisions.

One of the study's limitations was that, although our goal was to mimic the public's typical search strategies for finding easily available YouTube videos, our methodology might not have accurately represented the actual techniques used. Nevertheless, we created search queries using Google Keyword Planner and picked the videos that were highest in the search results. A further drawback of our limited sample size is that it is comparable to the sample sizes of prior research assessing YouTube material related to health[29]. Future research could benefit from using a larger sample size of videos to comprehensively evaluate content on this topic. Furthermore, our study did not incorporate misinformation as part of our scoring system. In subsequent research, it would be valuable to include misinformation in the scoring approach and consider longer videos as well.

5. Conclusion

Our study highlights that the majority of YouTube videos discussing nutrition and dental caries are created by Oral Health Professionals (OHPs), yet many of these videos cover only a narrow range of topics. Given the widespread occurrence of dental caries and the significant impact of nutrition on dental health, combined with the widespread use of YouTube as an information source, there is a clear demand for high-quality content on this platform. This content should provide evidence-based recommendations and comprehensive information to help viewers make informed decisions about their oral health.

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