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Is YouTube™ a useful source of information on home parenteral nutrition?

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Abstract

Background YouTube™ (http://www.youtube.com), the most widely used video website worldwide, is becoming a competitive platform for patients to gain health information and knowledge. This study aims to evaluate if YouTube™ is a useful source of information on home parenteral nutrition (HPN) for the public.

Methods According to MeSH (Medical Subject Headings), the combinations of search terms related to parenteral (intravenous) and nutrition (feeding) were searched through YouTube™. In total 131 videos were evaluated, which were cataloged into three categories *Education*, *News & Politics*, and *People & Blogs*. Then a usefulness score was devised to assess video quality and to classify all videos into Slightly useful, Useful, and Very useful.

Results The majority of videos included are under the *Education* category ($n=92$, 70.23%). 6 videos were identified as Very useful, which were all under the *Education* category, 27 videos were identified as Useful, while the rest 98 videos were identified as Slightly useful. The number of likes, the number of views, views per day, and the duration of the Very useful videos are significantly higher than those of Slightly useful videos.

Conclusion YouTube™ is a good source of information on home parenteral nutrition. In this study, videos categorized under *Education* were rated as the highest in usefulness. Due to the highly technical content of HPN, and the existence of a lot of low-credibility information on the internet, patients and professional staff are supposed to view other reliable videos in the field of healthcare information.

Keywords YouTube, Home parenteral nutrition, Parenteral feeding, Intravenous feeding

Introduction

Medical nutrition therapy includes oral nutritional supplements (ONS), enteral nutrition (EN), and parenteral nutrition (PN) [1, 2]. PN is designed to provide essential nutrients directly into the bloodstream when oral or enteral routes of nutrition are not feasible or effective [3–5]. The main objective of PN, which is the intravenous administration of nutrition outside of the gastrointestinal tract, is to fulfill the patient's nutritional needs by administering a meticulously balanced blend of macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins, minerals) directly into the circulatory system [6]. PN has several indications including: [7] chronic intestinal obstruction as in intestinal cancer [8], bowel

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pseudo-obstruction with food intolerance, gastrointestinal fistulas with high flow [9], infants with a congenital gastrointestinal malformation, post-operative bowel anastomosis leak, patients who are unable to maintain nutritional status due to severe diarrhea or vomiting, small bowel obstruction, hypercatabolic states due to sepsis, polytrauma, and major fractures [10], and inflammatory bowel disease [11].

Introduced in the early 1970s as a treatment modality for chronic intestinal failure in patients with benign diseases, home parenteral nutrition (HPN) is an extension of parenteral nutrition. It enables individuals to receive long-term nutritional support within the convenience of their homes [5, 12]. Now HPN has been a common therapy method, and the population of patients with HPN worldwide is growing [12, 13]. HPN is particularly feasible for patients with chronic intestinal failure [14], short bowel syndrome [15, 16], motility disorders [17], and malignant bowel obstruction [18, 19]. However, HPN still faces a series of challenges such as the continued financial burdens associated with PN therapy [20], access and transitions of care [21], shortages of medication and ingredients [22], and the main problem, the education of patients and healthcare teams [23, 24].

Therefore, there is a need for resources that can provide useful information to the public, particularly for patients and families without professional backgrounds. These resources should be filtered and summarized by healthcare professionals to ensure accuracy and reliability. Compared to traditional paper-based materials like books and posters, videos offer a more innovative and efficient means of disseminating information. As a visual method, videos can easily raise patients' and their families' awareness [25]. YouTube™, one of the most popular video sites, is being used for the public to search for and learn popular medical knowledge [26, 27]. However, as a website that allows registered users to freely upload videos, the quality of the video content on it varies [28]. This study aims to assess the quality and systematically evaluate the usefulness of videos on YouTube™ regarding HPN, thereby contributing to the improvement of content quality and reliability available on the platform. To our knowledge, there are no previous reports that have explored the use of YouTube™ as a resource on HPN for education.

Methods

Search strategy

The search method in this study was a systematic search for videos about HPN on YouTube™ (http://www.youtube.com) on June 25, 2023. The search terms used were related to home parenteral nutrition based on MeSH (Medical Subject Headings), including home parenteral nutrition, and home parenteral feeding. The initial 100 videos, sorted by default under the "relevance" option in YouTube™'s sorting algorithm (which includes parameters such as relevance, upload date, number of views, and rating), were included for each term [29]. The selection was based on the understanding that patients and their family members with specific needs were less likely to explore and learn from highly specialized medical information found in videos ranked lower in relevance [27]. All advertisements within the search results and at the start of the videos were disregarded.

Inclusion and exclusion conditions are as follows. The inclusion criteria included: (1) the language of the video is in English, (2) the video is available when searching, and (3) the content of the video is related to HPN or its equivalent terms based on MeSH. The exclusion criteria included: (1) the language of the video is not in English, (2) the video has no sound, (3) the video is an advertisement, (4) the content of the video is associated with games or music, and (5) the video is not original. Additionally, video series will be considered as one research subject.

Two professional and certified clinical pharmacists (X. Wang and J. Deng) independently screened the videos based on the inclusion and exclusion conditions above. Only videos that were unanimously recognized by both pharmacists as meeting the inclusion criteria were included in the subjects of this study. This independent dual-screening process contributed to enhancing the reliability and objectivity of the research.

All videos included were recorded as a file with Uniform Resource Locators (URLs), and the titles and links of the videos were saved into a Microsoft® Excel document and available for the public when required.

Video evaluation

The information for inclusion videos, including title, duration (minutes), views, likes, and posted days, was systematically recorded and summarized. Additionally, the views per day for each video were calculated and documented. Videos were categorized based on their sources into three categories: (1) *Education*, (2) *News & Politics*, and (3) *People & Blogs* [30, 31]. Specifically, videos from professional medical and academic institutions were classified under the *Education* category, those from government agencies and news reports were placed in the *News & Politics* category, and videos featuring individuals describing personal experiences and views were categorized under the *People & Blogs*.

The inclusion videos were evaluated from two aspects, the quality and specific content. The overall quality of the videos was evaluated by the Global Quality Scale (GQS), the evaluation criteria are shown in Table 1 [32, 33]. The GQS employs a subjective assessment of overall quality, utilizing a five-point Likert scale. A score of 1 indicates

Table 1 GQS criteria used to score videos containing information on HPN

Score	GQS description
1	Poor quality, poor flow of the site, most information missing, not at all useful for patients
2	Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients
3	Moderate quality, suboptimal flow, some important information is adequately discussed but others poorly discussed, somewhat useful for patients
4	Good quality and generally good flow, most of the relevant information is listed, but some topics not covered, useful for patients
5	Excellent quality and excellent flow, very useful for patients

poor quality, while a score of 5 signifies excellent quality [34]. Meanwhile, six additional professional items were raised to evaluate whether these videos included the indications, organizational management, formulation, operation, follow-up & monitoring, and prevention & treatment of complications of HPN. According to the content of every item in the video, it was given a score ranging from 0 (not mentioned) to 2 (detailed introduced), the total of all six individual item scores is calculated as the content score of the video. The sum of the GQS score and the content score was the total score of the video.

Each video underwent evaluation by two professional clinical pharmacists (X. Wang and J. Deng) with expertise in nutrition, who are well knowledgeable in HPN, independently. In cases where the difference between the GQS or content scores assigned by the two pharmacists exceeded 3, the video would be referred to an arbitrator (Y. Song) for the final scores. Except for the scoring from the arbitrator, the averaged scores from the two pharmacists were considered as the final score for statistical analysis. Videos were then categorized based on their final total score into slightly useful (0–6.5), useful (7–12.5), and very useful (13–17).

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 24.0 (IBM, Armonk, NY, the U.S.) was used for data entry and statistical analysis. The interclass correlation coefficient (ICC) was computed using the Two-Way Mixed Model with Type set to Consistency to assess the level of agreement between the raters. Cohen's kappa coefficient (κ) was computed to assess the level of inter-rater agreement for the scores provided by the raters [35, 36]. Categorical variables were presented in terms of frequencies and percentages. Non-normally distributed continuous variables were described using quartiles (25th percentile, 50th percentile, and 75th percentile). The Wilcoxon signed-ranks test was employed to examine the disparity between the two scores provided by the two pharmacists. The Kruskal-Wallis test was utilized to assess differences between the total score and category. A two-tailed p-value < 0.05 was considered as a statistically significant difference [37, 38].

Results

Figure 1 detailed the number of videos included in the study under the two search terms, a total of 131 videos met the inclusion conditions (total views of 6,518,031, total duration of 2351.03 min). The included videos focus more on discussions of HPN operational procedures and safety and the mixing of multi-chamber bags (MCB). However, there are few discussions on epidemiology, pharmaceutical monitoring, nursing care, and proper medication preparation. Based on the category principle, the most common category was *Education* (92/131, 70.23%), while 36 out of 131 videos were under the *People & Blogs* category (27.48%), which was the second common category, and the video number under the *News & Politics* category was 3 (2.29%). A general view of the included videos is shown in Table 2.

The median duration of the included videos was 5.78 min, while the mean GQS and content scores of the 131 videos were 2.19 ± 1.06, and 3.48 ± 2.22, respectively. The mean total score of these videos was 5.67 ± 3.12.

The ICC and κ of GQS, content, and final scores between the two pharmacists are shown in Table 3, respectively, which indicates good reliability of the final score using the customized scoring scheme.

The detailed characteristics of the videos according to different categories are shown in Table 4, while no statistically significant difference was shown between category and likes, dislikes, views, and views/day ($P = 0.564$, 0.307,0.884, and 0.374). Videos under the *People & Blogs* category had a greater of posted days than those under the *Education* and *News & Politics* categories ($P = 0.002$), while videos under the *Education* category had a significantly longer duration compared with those under the two other categories ($P = 0.005$). As few videos had a positive count of dislikes, likes per dislike of each video were not calculated. Additionally, videos under the *Education* category shared the majority of total duration (87.98%) and total views (96.78%). The Kruskal-Wallis test results indicated that all GQS scores, content scores, and total scores assessed by the professionals statistically significantly correlated with categories ($P = 0.002$, < 0.001, and < 0.001), while the videos under *News & Politics* had the highest scores compared with the two other categories.

All videos included were further classified into three categories according to their total score, slightly useful

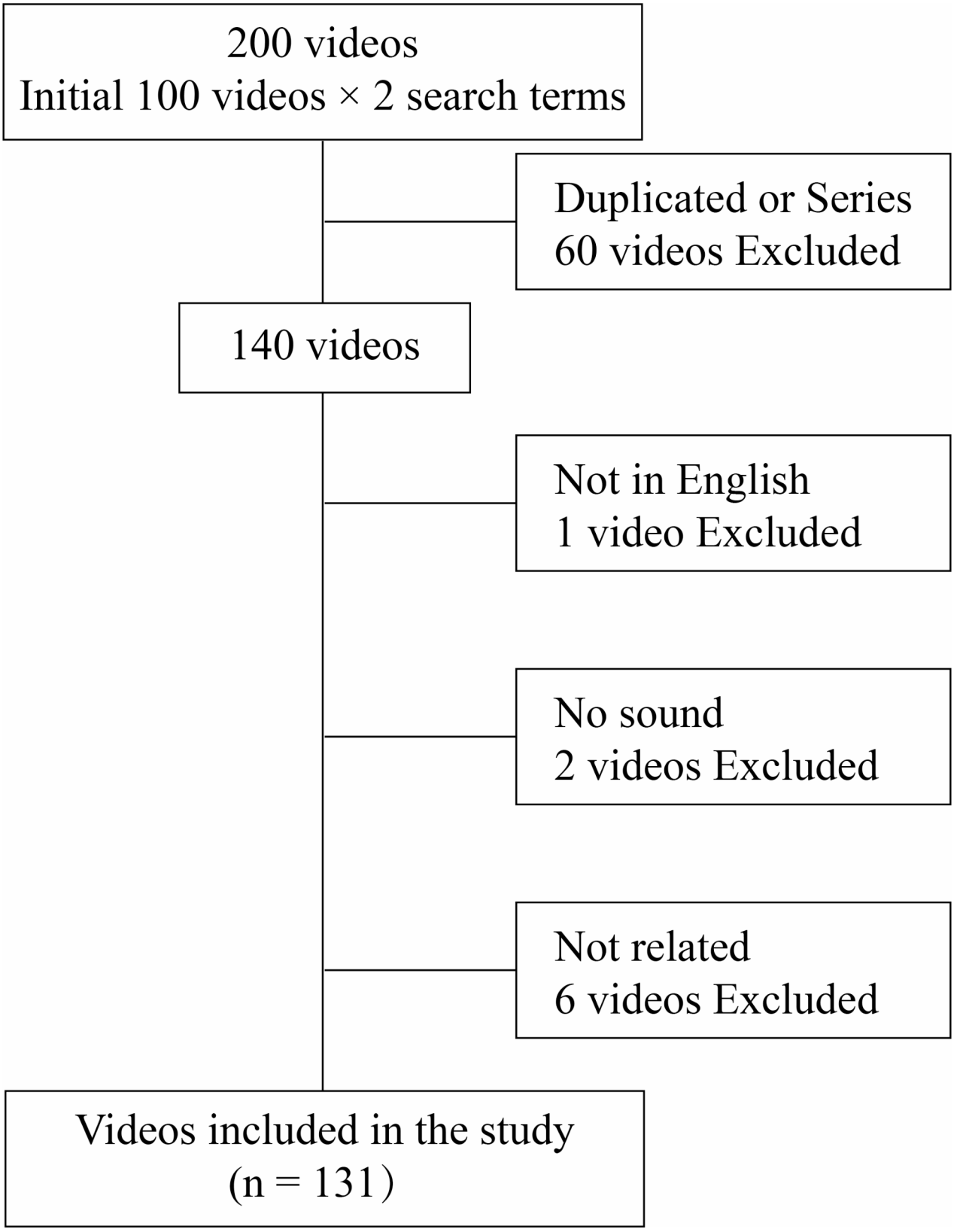


Fig. 1 Details of the number of videos included in the study

Table 2 Summary of included videos about HPN on YouTube™ (median [quartile range])

Characteristics	Total ($n=131$)
Category n (%)	
Education	92 (70.23%)
People & Blogs	36 (27.48%)
News & Politics	3 (2.29%)
Posted days	988 (524, 1720)
Duration (mins)	5.78 (3.58, 14.51)
Views	821 (161, 7003)
Views/Day	0.98 (0.20, 5.27)
Likes	6 (1, 50)
GQS score	2.0 (1.5, 2.5)
Content score	3.0 (2, 4.5)
Total score	4.5 (3.5, 6.75)

(0–6.5), useful (7–12.5), and very useful (13–17). In total of 6 videos were classified into the very useful category (4.58%) and identified as the most useful for the public on HPN (Table S1.). Detailed characteristics were shown in Tables 5 and 98 videos were identified as slightly useful (74.81%), while 27 videos were under the useful category (20.61%). Notably, all 6 videos under the very useful category were under the *Education* category as well.

No statistically significant differences were observed between categories regarding dislikes, posted days, views, and views/day. The likes in the very useful category were statistically significantly higher than other categories ($P=0.018$), while the duration of the videos under the very useful group was significantly longer than other videos ($P=0.002$).

Discussion

This study is the first to evaluate the information available on YouTube™ regarding home parenteral nutrition (HPN). A total of 131 videos were included, the total cumulative duration is 39.2 h, and the total viewership is over 6 million. This study provided a detailed and reliable analysis of videos on YouTube™ as a source of information on HPN. Overall, the included videos cover various aspects of managing HPN in specific content.

Out of the 131 videos included, approximately three-quarters were slightly useful ($n=98$), approximately one-fifth were useful ($n=27$), and only a minority were very useful ($n=6$). The percentage of useful videos is lower than in previous studies assessing video content on other medical topics [26, 27, 30–32, 34, 36]. In comparison with previous studies on YouTube™ health information, the percentage of useful videos in this study is lower. Li et al. found that 60.6% of 160 videos on food poisoning were useful [36], and Qu et al. reported 59.1% of 154 videos on valproic acid use during pregnancy as useful [27]. In contrast, only 20.6% of the HPN videos in our study were useful, while 74.8% were slightly useful. This lower percentage may be due to the highly technical nature of HPN, making it less accessible to the general public. This may be due to the highly technical content of HPN, as well as the small population undergoing HPN, leading to less attention from the public. This indicated that as a crucial tool for information broadcasting, YouTube™ is supposed to optimize the topic of HPN.

Among the 131 videos, 27.5% of them were classified into *People & Blogs* category. These videos are all about personal experiences or perspectives on HPN, which suggests that while the public uses the internet to search for

Table 3 Inter-rater reliability for customized usefulness scoring scheme

Reliability Parameter	GQS score	Content score	Total score
ICC	0.794	0.843	0.863
κ	0.885	0.915	0.926

Table 4 Detailed characteristics of the included videos based on categories (median [quartile range])

	Education ($n=92$)	News & Politics ($n=3$)	People & Blogs ($n=36$)	H	*P*
Likes	6 (1, 94.5)	10 (9.5, 34.5)	6 (1.5, 23)	1.146	0.564
Dislikes	0 (0, 0)	0 (0, 0)	0 (0, 0)	2.362	0.307
Posted days	723 (326.5, 1441)	1491 (1137, 2597)	1623.5 (836.25, 2010)	12.47	0.002*
Duration	7.02 (3.94, 22.68)	5.47 (3.73, 38.57)	4.10 (2.03, 7.15)	10.493	0.005*
Views	617.5 (138.75, 98840.25)	587 (528, 10060)	1087 (341.5, 3806.5)	0.247	0.884
Views/day	1.36 (0.19, 10.92)	0.75 (0.53, 3.01)	0.75 (0.22, 1.75)	1.967	0.374
Total duration	2068.35 (87.98%)	79.12 (3.37%)	203.57 (8.66%)	-	-
Total views	6,307,952 (96.78%)	20,589 (0.32%)	189,490 (2.91%)	-	-
GQS	2 (1.5, 2.5)	2.5 (2, 3)	1.5 (1.38, 2)	12.489	0.002*
Content	3.25 (2.5, 4.5)	4.5 (3.75, 5)	2.0 (1.5, 2.13)	26.936	< 0.001*
Total	5.5 (4, 7.63)	7.0 (6.75, 7.0)	3.5 (2.88, 4.5)	25.303	< 0.001*

Statistical tests: Kruskal-Wallis test for differences between categories; Wilcoxon signed-rank test for differences between two scores. * Statistically significant difference

Table 5 Detailed characteristics of videos based on usefulness (median [quartile range])

	Slightly Useful (*n* = 98)	Useful (*n* = 27)	Very Useful (*n* = 6)	H	*P*
Likes	4.5 (0, 29.5)	7 (2, 189.5)	134.5 (121, 173.5)	7.984	0.018*
Dislikes	0 (0,0)	0 (0, 0)	0 (0, 0)	0.406	0.816
Posted days	1090 (508.25, 1849.75)	729 (532, 1344)	675 (634.5, 1328.25)	1.051	0.591
Duration (mins)	5.41 (3.05, 12.03)	7.13 (4.95, 32.56)	21.38 (12.97, 39.94)	12.754	0.002*
Views	819.5 (0.19, 3.20)	513 (180, 15986.5)	9597 (5717, 13276.25)	2.4	0.301
Views/day	0.90 (0.19, 3.20)	0.75 (0.24, 30.55)	10.4 (5.82, 12.97)	2.964	0.227
Total Duration (mins [%])	1447.22 (61.56%)	744.73 (31.68%)	159.08 (6.77%)	-	-
Total views (n [%])	780,640 (11.98%)	5,680,045 (87.14%)	57,346 (0.88%)	-	-
Category				-	-
Education	64	22	6		
People & Blogs	33	3	0		
News & Politics	1	2	0		

Statistical tests: Kruskal-Wallis test for differences between categories; Wilcoxon signed-rank test for differences between two scores. * Statistically significant difference

medical knowledge, they disseminate medical and health information on the internet as a platform as well.

Surprisingly, videos under the *Education* category did not score higher than those under *People & Blogs* category. Part of the videos under the *Education* category included in the study were recordings of classroom lectures or presentations, whose picture and sound quality are not clear enough, while videos under *the People & Blogs* category typically shared their own stories and experiences. In both prior studies, *Education* videos were generally the most valuable. Li et al. found that educational videos had the highest usefulness [36], and Qu et al. also noted that although *People & Blogs* videos attracted more engagement, *Education* videos provided more comprehensive information [27]. Similarly, in our study, *Education* videos offered the most reliable content, but poor production quality reduced their effectiveness, while *People & Blogs* videos garnered more views but lacked depth. This highlights the need to enhance both the quality and accessibility of *Education* videos to better convey complex topics like HPN. In addition, these personal videos earned more views than the educational videos, which may be due to the viewers finding them more interesting and relatable.

According to the total score, all 131 videos were classified into three categories: slightly useful, useful, and very useful. The very useful videos were not only the longest-lasting but also the most recently uploaded. The results indicated significant differences in "likes" and "duration" among videos of varying usefulness levels. Specifically, for very useful videos, both "likes" and "duration" were statistically significantly higher than those in the other two categories, suggesting that viewers are discerning about the quality of information presented on YouTube™. Therefore, "likes" and "duration" can be valuable indicators of video usefulness regarding HPN. Additionally, all very useful videos fell under the *Education* category, consistent with previous studies [36, 39].

In our analysis, the top three most useful videos identified had relatively low view counts. These videos provided comprehensive coverage of critical topics such as the indications for HPN, organizational management, formulation, operational procedures, follow-up and monitoring, and prevention and treatment of complications. The low number of views for these valuable resources may be attributed to their highly technical content and longer duration, which could deter viewers from seeking more accessible information. This highlights a significant challenge in effectively disseminating health information: the need for appropriate video length and increased viewer engagement. Enhancing the relatability and accessibility of educational content on HPN could lead to improved viewership and better inform patients and caregivers about this essential treatment.

Limitations and future directions

One limitation of this study is the relatively small sample sizes in certain categories, particularly within the *News & Politics* and *People & Blogs* sections. The limited number of relevant videos in these areas resulted in smaller datasets for analysis, which may affect the generalizability of our findings. Although we utilized non-parametric tests (e.g., Kruskal-Wallis test, Wilcoxon signed-rank test) that are robust to small sample sizes, this remains a potential limitation. Future research with larger sample sizes in these categories would help to validate and strengthen the conclusions of this study.

Additionally, the quality of video content on YouTube™ can vary significantly, and some videos may not provide accurate or comprehensive information on HPN. While

our evaluation focused on the educational value of the videos, other factors such as production quality, speaker expertise, and viewer engagement could also influence the perceived usefulness of the content. Future studies could investigate how these factors affect the effectiveness and reliability of health-related videos on YouTube™.

Finally, future research could explore ways to enhance the accessibility and engagement of educational videos on complex topics like HPN. Investigating optimal video length, the use of visual aids, and the level of technical detail could make such content more accessible to a broader audience, including patients, caregivers, and individuals with varying levels of health literacy.

Conclusion

In conclusion, a large amount of information on HPN is available on YouTube™. Some of the videos are useful for the public in understanding the basic aspects of HPN, including its indications, formulation, operational procedures, and complications. Overall, educational videos were found to be more valuable in providing comprehensive information about HPN. However, due to the highly technical content of HPN and the prevalence of low-credibility content on the internet, it is essential that both patients and healthcare professionals prioritize viewing videos from verified, reputable sources. This includes content produced by recognized medical institutions, healthcare organizations, or professionals with verified credentials to ensure the accuracy and reliability of the information provided.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-21929-8.

Supplementary Material 1

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Author contributions
X.W.: Conceptualization, Methodology, Formal analysis, Writing - Original Draft. Y.S.: Conceptualization, Writing - Original Draft, Writing - Review & Editing. X.Q.: Conceptualization. T.L.: Conceptualization. Y.S.: Conceptualization, Methodology, Writing - Review & Editing. J.D.: Conceptualization, Methodology, Formal analysis, Writing - Review & Editing, Supervision, Project administration.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The current study does not involve and human/animal subjects, human/animal materials, or human/animal data. Ethics Committee of the First Hospital of Jilin University ruled that there is no requirement of ethics approval in the current study. All methods were carried out in accordance with relevant guidelines and regulations of Jilin University. All experimental protocols were approved by the First Hospital of Jilin University.

Consent for publication
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Competing interests
The authors declare no competing interests.

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