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Orginal Article

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Impact Characteristics of Pneumothorax Videos Published on YouTube: 2020-2025

ABSTRACT

Background: Pneumothorax is a potentially life-threatening condition characterized by air accumulation in the pleural space, leading to partial or complete lung collapse. YouTube, as one of the most widely used digital platforms, has become a significant educational tool for medical learning. However, the quality and reliability of medical content on the platform remain variable. Given the limited number of studies assessing pneumothorax-related videos, this study aimed to evaluate the characteristics and engagement metrics of pneumothorax videos published on YouTube between 2020 and 2025.

Methods: A custom YouTube API-based data extraction tool was developed to collect pneumothorax-related videos and metadata. After excluding incomplete or irrelevant videos, a total of 570 videos were analyzed. Descriptive statistics were generated, and the interaction index was calculated as [(likes – dislikes) / total views] × 100. Data were analyzed using SPSS version 27. Categorical data were expressed as frequencies and percentages, while non-normally distributed numerical variables were presented as medians and interquartile ranges. Kruskal-Wallis tests were performed, with $p<0.05$ considered statistically significant.

Results: Video publication increased markedly over time, peaking in 2025 (52.5%). The largest number of videos originated from India (22.1%) and the United States (18.2%). The interaction index significantly differed by year (test statistic=16.255, $p=0.006$), with 2025 showing higher engagement compared to 2024 ($p=0.009$). Median video duration was 60 seconds, median like count was 21, and median view rate was 645.33%.

Conclusion: Despite increasing engagement, variability in video quality underscores the need for medical professionals and educators to contribute accurate and evidence-based content.

Keywords: Pneumothorax, Youtube, Video education

Introduction

Pneumothorax is a medical condition characterised by air in the pleural space, which can cause lung lobes to collapse. It can be caused by various factors, including trauma or medical procedures, or it can occur spontaneously for no apparent reason [1]. Depending on the extent of air accumulation and the patient's underlying health status, the condition can range from asymptomatic to life-threatening [2]. Management strategies vary based on the severity and type of pneumothorax, ranging from conservative monitoring to surgical intervention [3]. The classification of pneumothorax is based on its aetiology, with the condition being divided into three distinct categories. The term "spontaneous pneumothorax" is used to denote cases of the condition in which there is an accidental collapse of the lung, either as a result of a traumatic injury or iatrogenically. Primary spontaneous pneumothorax is a condition characterised by the rupture of small air sacs (blebs or bullae) on the lung surface, typically without an underlying significant lung disease. The prevalence of this condition is highest among tall, slim, young men who smoke. Secondary spontaneous pneumothorax is a complication arising from underlying lung diseases, including COPD, emphysema, cystic fibrosis and pneumonia [4,5].

YouTube has emerged as a substantial educational resource within the domain of medicine, presenting both prospects and challenges. It has been demonstrated that medical students frequently utilise [6] YouTube as a supplementary resource, particularly in domains such as physical examination and clinical skills, where visual aids have been shown to enhance comprehension and retention. Nevertheless, the quality and reliability of the content can vary considerably, necessitating careful evaluation by both students and educators [7]. Since there are not enough studies in the literature on the use of YouTube videos in patients with pneumothorax, we wanted to investigate the use of YouTube videos in patients with pneumothorax in this study.

Methods

Data Acquisition and Preparation

The study was conducted using a systematic, step-wise data acquisition and preparation process. Initially, a dedicated **Application Programming Interface (API)** was developed to access and extract the required data. Following API development, the specific **data parameters and criteria** (e.g., relevant video titles, upload dates, and platform) were precisely defined [8].

An **appropriate script** was then coded to interface with the API and automate the data collection process [9]. This procedure resulted in the **initial acquisition of 612 videos** (N=612) and their associated metadata.

Data Validation and Filtering

Following the initial acquisition, a rigorous **data quality check and filtering** process was executed to ensure the reliability and relevance of the final dataset. This filtering involved two primary steps:

1. **Exclusion of Incomplete Data:** Data entries with missing critical variables, such as unreachable like counts or disabled comments, were identified and **excluded (n=15)**.

2. **Exclusion of Irrelevant Data:** Videos determined to be outside the

defined scope or topic of the study were also systematically **excluded (n=27)**.

After this comprehensive filtering process, the **final validated dataset** was determined and prepared for subsequent analysis.

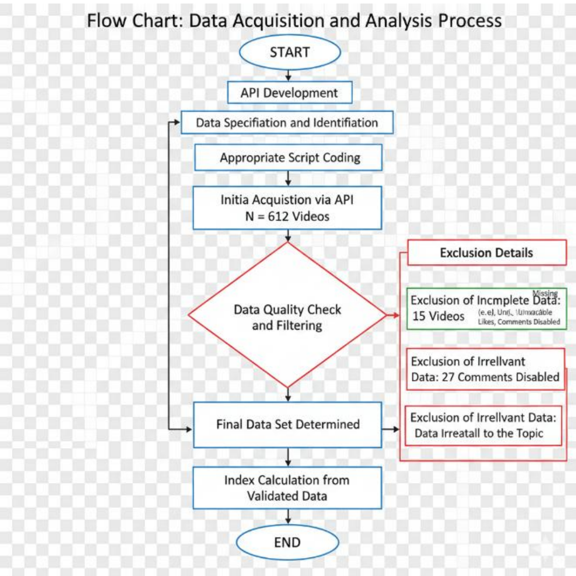
Index Calculation

Using the finalized and validated dataset, specific **quantitative indices** relevant to the study's objectives were calculated for each data entry. Finally, the processed data, including the calculated indices, underwent **statistical analysis** using appropriate methods to test the study hypotheses. Figure 1 shows the workflow.

Statistical Analysis

Data were collected via script to create a database and analysed using SPSS version 27 (USA). Data types were evaluated. Categorical data were defined as percentages and frequencies, while distribution analysis was performed for numerical data. Data that did not conform to a normal distribution were defined as medians and interquartile ranges. A Kruskall Wallis analysis was performed between numerical values, and findings with a p-value above 0.05 were considered significant.

Figure 1: Flow Chart



Results

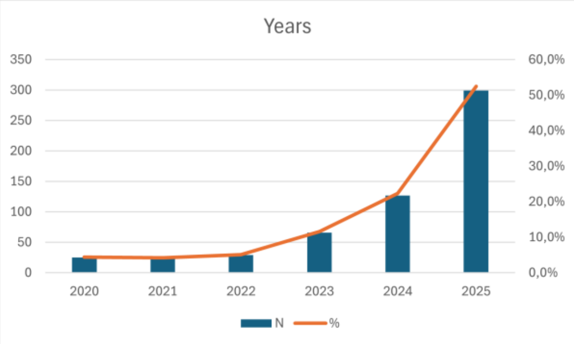
Of the videos included in the study, 4.4% were published in 2020, 4.2% in 2021, 5.1% in 2022, 11.6% in 2023, and 22.3% in 2024, while the highest number of videos shared, 52.5%, occurred in 2025. Figure 2 shows the distribution by year. When examining the geographical distribution of the videos, a significant concentration of data was observed. According to the distribution presented in Figure 3, a significant portion of the sample examined comes from only two countries: India (22.1%, n=126) and the United States (18.2%, n=104). These two countries account for more than half (40.3%) of the total known data. Other notable contributions come from countries such as Pakistan (3.7%, n=21), Canada (3.3%, n=19), France (2.8%, n=16), the United Kingdom (2.6%, n=15) and Germany (2.5%, n=14). On the other hand, the geographical origin of a significant portion of the sample is **unknown**, accounting for nearly one-third of the total sample (32.1%, n=183). This situation requires caution regarding generalisability, particularly for regions outside India and the United States. Table 1 presents the descriptive information of the videos examined.

A significant difference was detected in the comparison of the Interaction index by year (Test statistic=16.255, p=0.006). The 2025 value was found to be significantly higher than that of 2024 (p=0.009). Figure 4 shows the comparison of the Interaction index by year.

Table 1: Descriptives variables

Variables	Median (IQR)
Duration (second)	60 (269,5)
Like count	21 (147,5)
Comment count	1 (7)
Days since upload	277(635)
Interaction index (%)	1124 (2,91)
View rate (%)	645,33 (3627,07)

Figure 2: Distribution by year



Discussion

In the 21(st) century, medical education has undergone a digital revolution. Conventional didactic teaching methods are progressively being supplemented or replaced by digital resources, online platforms, and multimedia tools. Among these, YouTube is distinguished as a particularly accessible and influential platform. Established in 2005, YouTube has grown to host over 2 billion monthly users, with a vast repository of content pertaining to health, medicine and healthcare practices [10,11]. The platform's visual and interactive nature provides a unique medium for explaining complex medical concepts, demonstrating procedures, and promoting health literacy. Nevertheless, the utilisation of YouTube in educational contexts is a multifaceted issue, bearing both advantages and disadvantages. While it has been demonstrated to enhance engagement and learning flexibility, it has also been demonstrated to open doors to misinformation and inconsistent content quality [12,13]. In our study, the most common videos were **India** and **the United States**.

Medicine frequently encompasses intricate anatomical, physiological and procedural concepts that are optimised by visual representation. The capacity of YouTube videos to demonstrate surgical techniques, clinical procedures, and pathophysiological mechanisms in a manner that textbooks cannot is well-documented [14]. To illustrate this point, the utilisation of instructional videos pertaining to chest tube insertion, pneumothorax management, and cardiopulmonary resuscitation facilitates the conceptualisation of practical methodologies by learners, thereby reinforcing theoretical knowledge through observational learning [15,16]. Research suggests that visual learning improves knowledge retention and comprehension among medical students. The asynchronous format of YouTube also allows learners to pause, replay, and review content at their own pace, which is an essential feature for mastering procedural skills. YouTube has been demonstrated to foster a community-based learning environment [17]. It is an opportunity for students, physicians and educators to engage in a dynamic discourse, wherein they can share their experiential knowledge, offer constructive feedback on video presentations, and engage in deliberations concerning clinical scenarios in real time [18]. This interactive element has been demonstrated to promote critical thinking and collaborative learning. Furthermore, student-led channels and educator-curated playlists have become popular resources in medical schools, especially for exam preparation (e.g., for the USMLE or PLAB exams). This formula is utilised in academic studies and social media analytics to assess the engagement of YouTube videos with their viewership [19]. Definition: The term "engagement" is used to denote the number of likes and dislikes a video receives, which is then normalised by the total number of views the video has received. The metric is indicative of the extent of engagement or discussion that the video content has generated. The following formula is frequently employed: Engagement Index = (Likes – Dislikes)/Total Views The symbol "×100" is employed to denote a multiplication of a given quantity by a constant. The primary function of this symbol is in the context of academic papers that undertake a qualitative, quantitative, or empirical analysis of the prevalence, esteem, or repercussions of medical, scientific, or educational videos. Illustrative examples of such videos include those addressing subjects such as root resorption or anaesthesia. It is evident that a high index denotes a considerable propensity for the video to elicit a robust response from its viewers [20,21]. As demonstrated in the present study, a statistically significant discrepancy was identified in the Interaction Index when evaluated across different periods (test statistic=16,255, p=0.006). As shown in Figure 1, the 2025 value is significantly higher than the 2024 value (p = 0.009).

A significant proportion of medical students employ YouTube for educational purposes. For instance, a study conducted in Jordan revealed that 91% of students reported utilising YouTube as a learning tool, with an additional 96.4% finding it to be beneficial for their academic pursuits [22,23]. YouTube videos are frequently regarded as a more efficacious medium for learning than conventional lectures, with a study conducted at Qassim University indicating that 95.3% of students utilise them as a resource [24]. The platform facilitates self-paced learning, enabling students to review complex subjects as required, a feature that is particularly advantageous in disciplines such as internal medicine and general surgery. Notwithstanding its popularity, the quality of medical content on YouTube is inconsistent. A significant number of videos have been found to exhibit substandard quality, characterised by elevated levels of bias and diminished reliability scores, as substantiated by studies employing the DISCERN criteria [25]. A substantial proportion of health-related content has been found to be misleading. In a particular study, it was determined that 25.9% of videos contained inaccurate information. The absence of regulatory oversight and the unrestricted nature of the platform engender a situation wherein users are subjected to content of varying quality and reliability [26,27]. This underscores the necessity for enhanced information literacy among students. YouTube's global accessibility facilitates the dissemination of medical education content to a vast audience, including those in low- and middle-income countries, which constituted 42% of views on a medical education channel . The platform's capacity to disseminate information expeditiously and extensively can be advantageous; however, it also underscores the importance of ensuring the accuracy and reliability of the content shared [28].

It is important to note that the survey is not without its limitations. Initially, the focus was exclusively on videos hosted on the YouTube platform. Secondly, the evaluation process was restricted exclusively to videos that were narrated or voiced in English. Furthermore, it was not possible to search for and evaluate private or unlisted videos on YouTube. Concurrently, a qualitative analysis was not conducted to evaluate the comments posted alongside the videos. It is regrettable to note that YouTube has removed the functionality of disliking content. In conclusion, the results of this study are representative of a specific moment in time and a particular region, albeit with a limited sample size. Given the rapid growth of social media platforms, it is important to note that the findings may vary greatly over time.

Conclusion

Videos on social media platforms can help the public and medical learning about the knowledge of pneumothorax.

Figure 3: Distribution by country

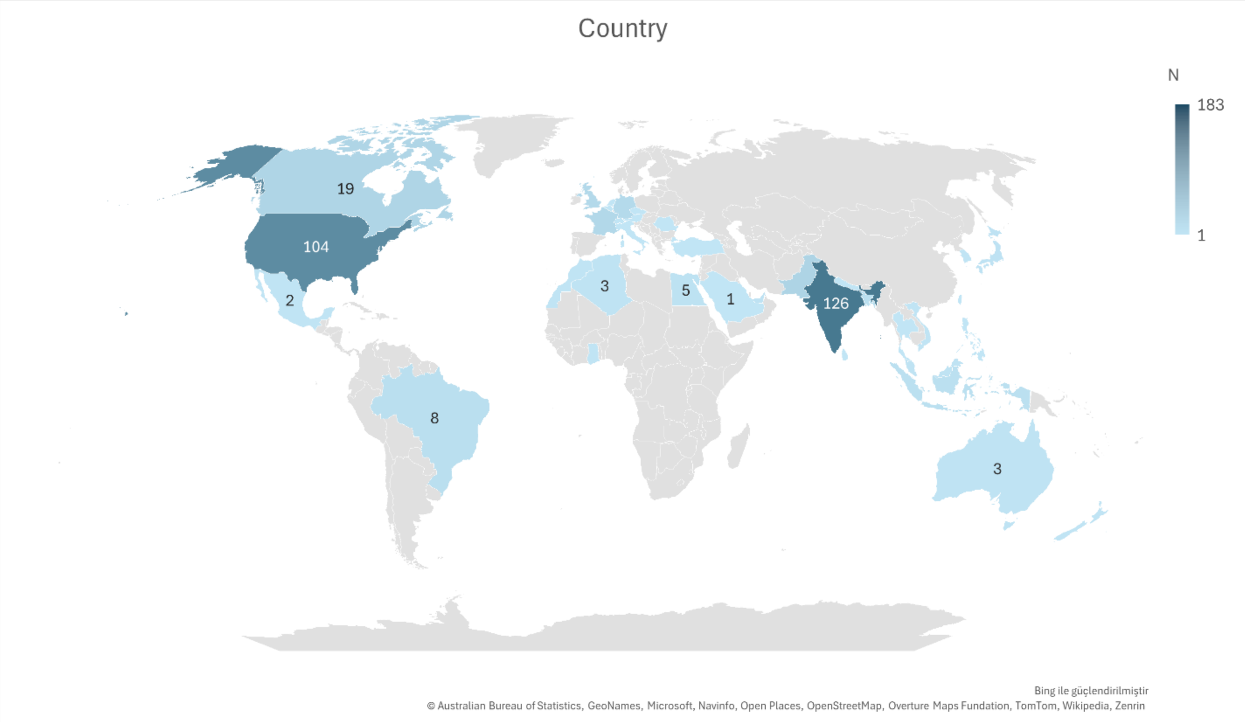
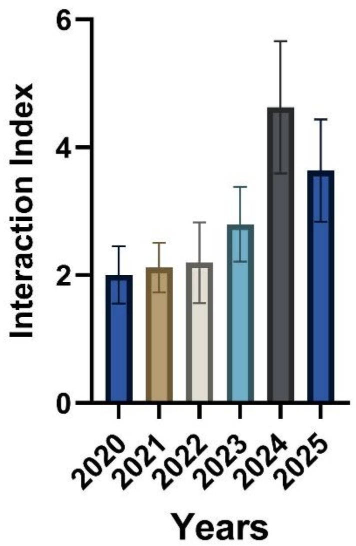


Figure 4: Comperation by years



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