

Original Article

Evaluation of the Content, Quality, Reliability and Accuracy of YouTube Videos Regarding Endotracheal Intubation Techniques

Umut OCAK

Loma Linda University
School of Medicine,
Loma Linda, CA, USA

ABSTRACT

Background: Today, the internet is widely used to obtain any type of information. The use of internet may facilitate healthcare professionals' education as well. **Objectives:** We aimed to evaluate the content, accuracy, reliability and quality of YouTube videos regarding intubation, one of the most important skills for healthcare professionals. **Materials and Methods:** Of the 54,000 videos found using the keyword 'intubation', the first 50 were included in the study. The sources were divided into three categories: academicians, healthcare professionals and medical. The view ratio, like ratio, and video power index were used to determine the popularity while Journal of American Medical Association (JAMA) benchmark criteria were used for reliability. The extent of the information was evaluated based on the scoring system provided by us. **Results:** The majority of the videos were uploaded by healthcare professionals (92%) including academicians. Twenty-seven (54%) videos had training purposes. The information point was highest in the academic group (4.6 ± 2.7); however, there was no significance between groups ($P = 0.2$). The mean JAMA score was highest in the academic group (1.9 ± 0.8), with a statistical significance ($P = 0.00055$). The JAMA score and information points were significantly higher in training videos compared to non-training videos ($p < 0.001$ and $P = 0.003$, respectively). Popularity ratios were similar between groups. **Conclusion:** Videos regarding medical skills should be accurate. Information on YouTube regarding intubation is limited and is of low quality. The establishment of an organization authorized to evaluate the content, quality, accuracy and reliability of the information on the internet regarding medical skills is warranted.

KEYWORDS: *Information, internet, intubation, video, YouTube*

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INTRODUCTION

Airway management is one of the most important skills for healthcare professionals, as failures in securing the airway properly may result in devastating consequences, including death or severe disability of the patient.^[1] Emergency endotracheal intubation is indicated in any situation whereby maintaining the airway patency is mandatory. Additionally, the airway should be secured in patients who tend to aspirate or in whom ventilation or oxygenation has failed. Oftentimes, anticipating a deteriorating course may also cause the physician to have the patient intubated before the eventual respiratory failure occurs.


At the present time, the internet is widely used to obtain any type of information regarding daily life and professions. The use of the internet may help healthcare professionals attain uninterrupted education with updated data of various clinical scenarios while providing both visual and auditory information. Similarly, online educational videos targeting patients or patient sourced videos sharing their experiences are available. Recently,

Address for correspondence: Dr. Umut OCAK,
Loma Linda University School of Medicine, Risley Hall, 11041
Campus Street, Loma Linda, CA, 92350, USA.
E-mail: uocak@llu.edu

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YouTube has been growing in popularity among internet users as visual data are considered more attractive compared to written information.^[2] However, the accuracy and reliability of these data gathered from the internet is controversial as the videos published on YouTube neither go through an editorial assessment nor are they under the surveillance of an authorized organization. Moreover, most of the videos do not mention the authors and institutions that are responsible for the provided data. Consequently, academic studies analyzing YouTube videos' contents and reliability have been increasing recently.

In the present study, we aimed to evaluate the content, accuracy, reliability and quality of YouTube videos under the heading of 'intubation'.

MATERIALS AND METHODS

The YouTube search engine (YouTube© www.youtube.com) was searched using the keyword 'intubation' on April 26, 2018. Of the 54,000 videos found, the first 50 which were in English were included in the study for evaluation after filtering the videos as 'most related'. Repetitive videos were counted only once. The videos that were not related with intubation or that were in a language other than English, and commercial videos were excluded from the study. The sources of the videos were divided into three categories as follows: academic (recorded or uploaded by an academic physician or by a person who is part of an academic institution), healthcare professionals (attending physicians, nurses, paramedics, etc.), and medical (from health-related websites). The following characteristics of the videos were recorded: target population (healthcare professionals vs. patients), subjects (human/mannequin/cadaver/animation), presence of an actual scene from clinical practice, specific issues (difficult intubation, awake intubation, retrograde intubation, use of bougie or laryngeal mask, video-assisted intubation), and intubation type (orotracheal/nasotracheal) as well as duration, number of views, publication date, number of comments, number of likes and dislikes. The following formulas were used to determine the popularity of the videos: the view ratio (number of views/number of days since upload), like ratio (number of likes X 100/number of likes + number of dislikes), and video power index (like ratio X view ratio/100). The reliability of the data provided by the videos was evaluated based on the Journal of American Medical Association (JAMA) benchmark criteria, as previously described.^[3]

The videos were also scored between 0 and 15 points according to the extent and elaboration of the information provided by them. Each theme from the information category received 0 or 1 points depending on the presence or absence of the relevant information.

The themes of the information recording system are summarized in Table 1.

IBM SPSS Statistics software, version 20.0 (IBM Corp., Armonk, NY, USA) was used for statistical evaluation. Descriptive statistics are given as number of units (n), percentage (%), and mean \pm standard deviation (STD). T-test and one-way ANOVA were used in comparison of the categorical data. $P < 0.05$ was considered statistically significant.

RESULTS

The mean duration of overall videos was 313 ± 278 seconds. The total number of views was 6,379,007 and the average number of views was 1358 ± 8698 . The mean number of days since publication was 1510 ± 1032 days, with a mean view ratio of 104.5 ± 223.9 . The number of comments, likes and dislikes was 1,146 (mean 22.9 ± 37.4), 15,749 (mean 315 ± 506.9) and 1,257 (mean 25.1 ± 33.6), respectively. The mean like ratio was 90.7 ± 9.8 and the mean video power index was 95 ± 199.2 . The mean JAMA score of overall videos was 1.46 ± 0.8 .

The majority of the videos were uploaded by healthcare professionals (n = 46, 92%) including academicians. Among these, 21 (42%) were uploaded by the academic group while 25 (50%) were uploaded by other healthcare professions including attending physicians, nurses, and paramedics. Twenty-seven (54%) of the overall videos had training purposes. Among these, 23 were aimed at physicians' training while 2 were aimed at nurses' and 2 were aimed at paramedics' training. Four (8%) of the videos were uploaded by the group named as 'medical'

Table 1: Information scoring system for the intubation videos

Themes	Information	
	Present	Absent
Indications	1	0
Contraindications	1	0
Complications	1	0
Equipment	1	0
Anatomical basis	1	0
Preintubation anesthesia/analgesia	1	0
Preintubation ventilation	1	0
Patient positioning	1	0
Tricks for success	1	0
Confirmation of correct position	1	0
What to do in wrong position	1	0
Management of failure	1	0
Mechanical ventilation	1	0
Timing/indications for extubation	1	0
Practice related visual information	1	0
Total	15	0

which refers to healthcare related websites in our study. Forty-nine (98%) of the videos targeted healthcare professionals while only (2%) one of the videos focused on patients' education. Thirty-six (72%) of the videos used humans as subjects and demonstrated an actual clinical scene from daily practices (operation room, emergency service, intensive care unit, etc.). Fifteen of the videos were presenting information about specific issues such as difficult intubation (n = 3, 6%), awake intubation (n = 2, 4%), intubation with bougie (n = 3, 6%), intubation with laryngeal mask (n = 1, 2%), video-assisted intubation (n = 4, 8%), and retrograde intubation (n = 2, 4%). The general characteristics of the intubation videos are presented in Table 2.

The average point of information of the videos was 3.9 ± 2.4 . There was no statistical difference between the average points of the videos published by the academic group (n = 21; 4.6 ± 2.7), healthcare professionals (3.3 ± 2.3 ;

n = 25) and medical group (3.75 ± 1.5 ; n = 4) ($P = 0.2$). The total number of views of videos uploaded by the academic group, healthcare professionals and medical group was 2,502,453 (mean $119,164.4 \pm 192,957.9$), 3,098,580 (mean $123,943.2 \pm 129,222.58$), and 777,974 (mean $194,493.5 \pm 131,887.2$), respectively. There was no statistical difference between the number of views ($P = 0.68$) and view ratios ($P = 0.74$) of the groups according to the source.

The mean JAMA score which was accepted as the criteria for accuracy and reliability of the medical information retrieved through the videos was 1.9 ± 0.8 , 1.1 ± 0.5 , and 1.5 ± 0.6 in the academic group, healthcare professionals group and medical group, respectively. The JAMA score was significantly higher in the academic group ($P = 0.00055$). Similarly, the information point was highest in the academic group (4.6 ± 2.7); however, there was no statistical difference between the groups in this category ($P = 0.2$). Moreover, the JAMA score and information points were significantly higher in the videos recorded and published with the purpose of healthcare professionals' training compared to non-training videos ($p < 0.001$ and $P = 0.003$, respectively). The

Table 2: General characteristics of the intubation videos

	n (%)
Target population	
Healthcare professions	49 (98)
Patients	1 (2)
Subject of the video	
Human (adult/pediatric)	34/2 (72)
Mannequin	6 (12)
Cadaver	2 (4)
Animation	4 (8)
None	2 (4)
Demonstrating a scene from clinical practice	
Yes (OR/ER/ICU/other)	36 (72)
No	14 (28)
Intubation type	
Orotracheal	44 (88)
Nasotracheal	3 (6)
Both	3 (6)
Specific issues	15 (30)

ICU=Intensive Care Unit; ER=Emergency room; OR=Operation room

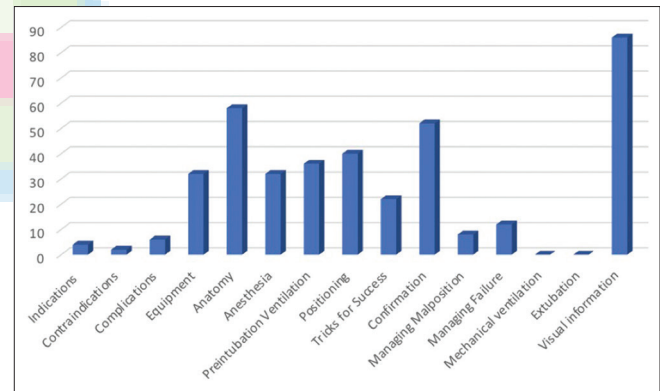


Figure 1: Distribution of the videos based on the themes of the information scoring system

Table 3: Distribution of the popularity and reliability characteristics of intubation videos according to source

	Mean±SD			P
	Academic (n=21)	Healthcare professions (n=25)	Medical (n=4)	
Number of views	2,502,453 (119,164.4±192,957.9)	3,098,580 (123,943.2±129,222.58)	777,974 (194,493.5±131,887.2)	0.68
Average view ratio	74.35±78.2	123.5±301.2	123.9±123.3	0.74
Number comments	451 (21.5±45.8)	612 (24.5±32.4)	83 (20.8±19.8)	0.95
Like ratio	92.6±7.06	89±11.9	91±7.5	0.48
VPI	68.7±73.2	114±271.6	114±118.5	0.73
JAMA score	1.9±0.8	1.1±0.5	1.5±0.6	0.00055*
Information points	4.6±2.7	3.3±2.7	3.75±1.5	0.2

* Statistically significant. SD=Standard deviation; JAMA=Journal of American Medical Association; VPI=Video power index

Table 4: Distribution of the popularity and reliability characteristics of training and nontraining intubation videos

	Training videos (n=27)	Nontraining videos (n=23)	P
Average view ratio (mean±SD)	69±72.8	149.1±319.1	0.25
Like ratio (mean±SD)	92.2±6.7	88.9±12.4	0.26
VPI (mean±SD)	63.6±67.9	131.9±282.4	0.26
JAMA score (mean±SD)	1.7±0.8	1.1±0.5	<0.001*
Information points (mean±SD)	4.7±2.5	3±1	0.003*

* Statistically significant. SD=Standard deviation; JAMA=Journal of American Medical Association; VPI=Video power index

distribution of popularity and reliability characteristics of the intubation videos according to the source and training purposes are summarized in Tables 3 and 4, respectively. The distribution of the videos based on the themes of the information scoring system is presented in Figure 1.

DISCUSSION

Today, reliable information provided by the internet that is similar to that provided by physicians at clinics might help improve patients' satisfaction and trust in their healthcare provider^[4,5] since increasing numbers of patients are 'googling' and 'youtubing' even a negligible symptom prior to doctor's visit. Similarly, educational videos targeting students including physicians, nurses or paramedics may improve their learning outcomes^[6] as well as medical skills^[7,8] as educational videos are reported to be superior to skill demonstrations.^[9] Thus, visual and auditory input provided by video education may contribute significantly to the quality of education of future healthcare providers.

YouTube, a colossal web-based video source, has access to more than a billion people worldwide since one out of every three internet users is reported to watch videos for hours every day.^[10] Despite the early intent of fun, YouTube has gained significant popularity regarding health-related topics due to the ease of access by both patients and health care professionals.^[2] As a result, studies focusing on the reliability and accuracy of health-related YouTube videos are increasing due to the lack of control by an organization authorized to examine the source and content of the videos uploaded. However, the results of these studies are inconsistent depending on the area of interest. The majority of these studies have reported the data provided by YouTube videos as poor, inadequate and unverified.^[11-13] Moreover, patient sourced videos were found to be less informative.^[14]

while videos provided by healthcare professions were found to be more informative.^[15]

Airway management and, thus, tracheal intubation, is a critical maneuver in saving lives which should be known and practiced properly. However, intubation should not be perceived as just inserting a tube. Correct knowledge regarding the necessity of the procedure, how to prepare the patient with correct positioning and adequate preintubation oxygenation as well as appropriate sedation, equipment including proper tube and laryngoscope blade, how to confirm the placement and what to do in cases of failure, how to secure the tube and when to stop is the key to successful intubation when trying to save the patient and not to harm. Despite the initial aim of this study of searching the reliability of videos on YouTube regarding intubation, we elected to proceed with assessing the educational quality of the videos after noticing that almost all the videos were targeting healthcare professionals.

In the present study, we found that 50% of the videos were uploaded by healthcare professionals including attending physicians, nurses, and paramedics while 42% of the videos were uploaded by academicians. All the videos, except the one for patient education, targeted healthcare professionals and 54% of them had obviously training purposes while the rest were only demonstrating daily practices. The JAMA score which is currently used as an indicator of reliability was significantly higher in the videos of academic sources and in the videos with training purposes compared to those of other groups. Although the information points based on the scale provided by us were very low in overall videos, thankfully, training videos received significantly higher points compared to non-training videos. However, the mean information point was as low as 4.7 in the training videos, showing that even training videos did not provide two thirds of the knowledge that a healthcare professional should have regarding intubation according to our scoring system. There was no significant difference between the videos by academic group, healthcare professionals and medical group in terms of information points. Formulas regarding the popularity of the videos such as view ratio, like ratio, and video power index were similar between groups according to the source and training purposes. We can interpret this data as videos targeting healthcare professionals are watched equally regardless of the source and aims of training. Practice related visual information was the most commonly provided information by the intubation videos in our study (n = 43, 86%). Unfortunately, crucial information such as positioning and preintubation oxygenation of the patient, relevant anatomy and equipment, tricks for success such as

external compression of the thyroid cartilage and dealing with malposition of the tube or failure of inserting the tube were the points of less than 50% of the videos.

As a result, we speculate that videos regarding specific medical skills have the responsibility to be accurate since written information which can be accessed by textbooks, blended in with visual information which can be accessed by videos may help improve the imagination, understanding, and comprehension of healthcare professionals and accelerate the learning curve. Contrarily, inappropriate, wrong or inadequate information may be hard to fix once it is assimilated by clear minds. Thus, we strongly suggest the constitution of a qualified organization authorized to review health-related videos prior to their upload similar to the editorial process applied to written scientific reports. Similarly, the establishment of a reliable site could be another option for individuals who want to view videos regarding medical skills. Healthcare professionals and patients should be informed about the presence of such an assessment criterion or an authentic site which then in turn will let them know which videos they can trust.

Limitations

There are several limitations in this study. First, the first 50 videos that met our search criteria using the keyword 'intubation' were included in the study, which might be perceived as a major limitation. However, as most internet users are reported to pay attention to the first two pages of online search results and evaluating all the information regarding intubation was not the main purpose of this study, we filtered the search results and evaluated the first 50 'most related' videos regarding intubation. Second, search results may differ according to the geographical location of the researcher. Search results may also change according to the time of search since there is continuous uploading of extremely high numbers of videos. Third, our study included only the videos which were returned upon searching the word 'intubation' and did not include other terminology such as airway management, which is also related with intubation. However, such a search would affect and direct the main purpose of our study regarding the evaluation of videos related to intubation by hitting alternative videos such as tracheostomy, ventilation, first aid procedures, etc.

CONCLUSION

YouTube videos are gaining popularity among both patients and healthcare professionals. The results of our study showed that YouTube videos are not providing adequate and qualified information about intubation despite the high number of videos provided

by academicians and videos with training purposes. Thus, we conclude that control mechanisms evaluating the videos regarding medical skills in terms of content, quality, accuracy and reliability of the information are highly warranted.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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