

YouTube as an educational resource in neurosurgery

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Abstract

Objective: The purpose of this study is to evaluate the contribution of neurosurgery videos on YouTube to the education of medical students, residents and professional medical professionals.

Methods: Members of the Turkish Neurosurgery Association (academic and clinical specialist physicians) and medical students receiving neurosurgery training were asked to respond to a questionnaire via e-mail.

Results: Anatomy (29.1%) was the most watched videos, while vascular, tumor and skull base surgery videos (56.3%) were the most watched surgical videos. While the United States of America is the first among the countries contributing to the videos, our country is the last. It was observed in our study that surgeons watched the operation videos before difficult surgeries and benefited from these videos to increase their experience. It is also undeniable that youtube videos increase the surgical experience of surgeons in underdeveloped and developing countries. has a contribution.

Conclusion: We observed that the training videos were of sufficient quality. In addition, virtual training and surgical videos are increasingly being used for education, especially during the COVID-19 pandemic. It is necessary to increase the diversity of YouTube videos, which have a high rate of viewing among neurosurgery physicians in our country. The training of neurosurgeons can make important contributions to patient care in our country. Considering that such major pandemics may occur in the future, it is certain that more diversification of training and operation videos will be required.

Key words: Neurosurgery, YouTube, virtual education, virtual surgical videos, medical education

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INTRODUCTION

Education is defined as the work of gaining, training and developing knowledge and skills in a certain field or certain subject. Neurosurgery education is the process by which an assistant who has chosen the neurosurgery profession acquires the knowledge and skills to become competent and meet the accepted neurosurgical standards. In general, this training is divided into two branches as clinical and non-clinical application. Clinical education forms the basis of neurosurgery education. In addition to the skills acquired in the operating room, preoperative and postoperative patient care on the wards is an integral part of training for every neurosurgery resident. In our age, medical education benefits greatly from e-learning opportunities. Neurosurgery education has also shifted in this direction, especially during the Covid-19 pandemic period. There are numerous online training tools available to improve residents' understanding of neurosurgery, such as anatomy resources, case illustrations, surgery videos, and various peer-reviewed publications.

Surgical training is a hands-on, experience-built process traditionally supported by textbooks, lectures, cadaver labs, and formal surgical courses. However, the rapid development of technology has led to the emergence of other educational tools such as online lectures and courses, virtual dissections and simulation trainings. The need to emphasize the importance of electronic resources has emerged as the Covid-19 pandemic requires the observance of social distancing measures for a long period of time and reduces the operative experience of surgeons (1-5).

Operative videos have been a painstaking educational tool for both residents and

neurosurgeons, especially during the pandemic. Operative videos in neurosurgery can be traced back to the early records of Gazi Yasargil's microsurgery cases; Recording, storing and transmitting videos in high definition (two-dimensional or three-dimensional (3D)) has now become easier. As Robert Spetzler aptly puts it, "Watching a video of a great surgeon will not make you a surgeon, but knowing what is possible and seeing it done will inspire you to become a better surgeon and achieve that goal." The phrase emphasizes the importance of virtual videos (6).

METHODS

In our study, a questionnaire consisting of 32 questions was sent to 102 neurosurgeons (residents, specialists and academicians). Questionnaires were sent to physicians over the internet, and our study group consisted of members of the Turkish Neurosurgery Association and our close colleagues. The answers given to the questions were evaluated statistically, and the contribution of YouTube videos to neurosurgery education and professional experience, especially during the Covid-19 pandemic were evaluated.

Ethics committee approval of the study was obtained from Lokman Hekim University Ethics Committee (# 2021/0126).

RESULTS

The participants in our study were 93.5% males and 4.5 % females between age 26-69 who were assistants, operators and academicians. Only 29% of them work in a university hospital and 57.5% of the participants are academicians working in an educational institution. 75.8% of the physicians stated that they have more than ten years of professional

experience and 73.8% stated that they spend more than 1 hour a day on the Internet. Neurosurgery operation videos accessed on YouTube were the answer to the most watched video question with 57.4% (Table 1). 96.2% of the participants stated that the videos are educational.

Table 1. Survey questions and the highest rate of answers

QUESTION	ANSWER
Most watched video?	56.3% neurosurgery operation videos
Physicians watching neurosurgery operation video?	84.6% physician
The quality of the videos?	70.9% good
Are the videos educational?	96.4% yes
Most watched operation videos?	29.1% anatomy
Contribution of videos to assistant training?	58.9% sufficient
Time spent online in the Covid-19 pandemic?	increased 87.7%
Contribution of videos to professional experience?	76.8% have

DISCUSSION

In recent years, education has undergone a radical change with the digital revolution. Curriculum has increasingly begun to adopt e-learning, which refers to an approach to teaching and training that uses electronic media to facilitate learning (7,8,9). By adding links to journal articles, virtual lectures, grand tours, 3D anatomical models and dissections, and other educational materials, these resources have been combined with traditional learning styles to create a versatile new form of learning.

Online surgery videos have become a major electronic resource within neurosurgery. These types of videos are an invaluable resource for neurosurgery trainees. As James Rutka said, “If a picture is worth a thousand words, imagine the relative value in words of an operative video!” (14). From this perspective, it is not surprising that many medical students and residents use online videos to supplement their traditional learning and prepare for patient cases (15,16).

Although primarily used by surgical residents, operative videos can also facilitate postgraduate training. Watching videos of surgery edited to continually review the technical steps performed by master neurosurgeons is key to advancing the art of neurosurgery as well as science throughout our careers (14). A survey of neurosurgeons in India (15), 88% of senior neurosurgeons used this technology.

Whether used by neurosurgery residents or neurosurgeons, web-based surgery videos seem to play an important role in education globally, particularly in low-middle-income countries where many surgeons have limited access to journals, cadaver labs, operating theatres/rooms.

A study of neurosurgery in India (15) found that online videos helped 88% of senior neurosurgeons, 91% of junior specialists, and 80% of resident physicians improve their surgical skills. The researchers concluded that e-learning platforms can help provide training opportunities to neurosurgeons in a variety of settings globally. This low-cost resource eliminates the expense associated with journals and textbooks and is readily available to neurosurgeons worldwide.

Given the theoretical usefulness of online surgery videos to facilitate global neurosurgery education, data from the Neurosurgical Atlas shows that such videos are used on a global scale. Between 2016 and 2017, the largest group of people accessing the site was from the United States (29% of viewers). The remainder were from Brazil (6%), India (4%) and various other countries (10). An updated analysis between 2018 and 2019 shows that the overall distribution is similar. 39% of audiences are from the United States, 5% from India, and 4% from Brazil, but users from an impressive 208 different countries accessed the website (17).

In a study, it was revealed that the United States of America contributed to YouTube neurosurgery videos (Table 2).

In our study, it was found that operational videos and educational videos have a high viewing rate. The contribution of our country to such educational videos was found to be low as observed in the literature. The common view is that the quality of the videos is good and their contribution to education is high. Therefore, we should aim to increase use of these videos amongst our neurosurgical trainees.

In a study conducted in India, he said that educational neurosurgery videos contributed to improving the skills of both senior and junior neurosurgeons. However, in this study, the rate of respondents who answered the questionnaire remained as low as 18.84%. This and similar online video sharing videos are very useful for countries with low neurosurgery infrastructure. Enough training equipment is provided to increase the variety of videos (19).

Table 2. Country or region of origin of videos included in the analysis (where specified or extracted)

Country or Region	Frequency	Percentage*
Africa	1	0.6
Australia	3	1.7
Azerbaijan	2	1.1
Brazil	2	1.1
Canada	7	3.9
Egypt	1	0.6
England	1	0.6
Finland	1	0.6
France	1	0.6
Germany	3	1.7
Ghana	1	0.6
India	14	7.8
Indonesia	1	0.6
Iran	1	0.6
Israel	1	0.6
Japan	1	0.6
Malaysia	1	0.6
Mexico	5	2.8
Saudi Arabia	1	0.6
Slovenia	1	0.6
South Africa	1	0.6
Turkey	2	1.1
United Kingdom	3	1.7
United States	123	68.3
Venezuela	2	1.1
Unknown	533	—
Total	713	100.0

*YouTube as a Source of Information on Neurosurgery Nardin Samuel, Naif M. Alotaibi, Andres M. Lozano

Prof. Yasargil was the first neurosurgeon who recorded and collected his microsurgical cases. Many of them were available in compact discs in those days. With the introduction of video-sharing sites like

Vimeo in 2004 and YouTube in 2005, the idea of video sharing became rampant.

In the same study, the rate of watching educational videos was found in the 4th place (Table 3).

Table 3. Cumulative Metrics by Video Category, Sorted by Highest Views

Category	Views	Likes	Dislikes	Comments	Shares
Irrelevant to clinical neurosurgery	44,073,770	549,914	16,371	69,964	6605
Surgical and procedure overview	23,241,074	127,148	3984	29,146	24,942
Patient experience	20,979,639	358,636	5141	47,948	6262
Educational video	1,870,350	8674	362	1327	4743
Promotional video	356,825	1502	63	142	547
Other	24,618	91	10	52	41

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Limitations

The limitations of our study are the limited number of neurosurgeons and residents who participated in the survey. We haven't been able to fully represent the entire universe and meet people face-to-face to discuss their answers. By participating in the study with more learners in the field of neurosurgery, the necessary validity and reliability can be ensured and the evaluation of training videos can be more reliable.

CONCLUSIONS

The YouTube training videos on brain tumors, microvascular surgery and anatomy have an undeniable contribution to education. The videos should be more diversified and our country could contribute to this. We will plan studies on this subject are prospectively. While the Covid-19 pandemic has influenced our lives, we have learned that in the coming years physicians should continue to work with online training and congresses to avoid interruptions in medical education.

This study, which we have done, is a pioneer for researching the contribution of YouTube videos to education and for studies to be done on this subject.

Ethics Committee Approval: The non-interventional clinical research titled "YouTube as an Educational resource in Neurosurgery" (Code No 2021107), of which you are the Principal Investigator, was ETHICALLY SUITABLE in accordance with the decision of our Ethics Committee dated 18.10.2021 and numbered 2021/0126.

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