RESEARCH ARTICLE

YouTube as a learning modality for clinical procedures among medical and dental students: A study in public sector teaching institutes

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Abstract

Objective: To evaluate the effectiveness and analyse the influence of YouTube as a learning modality for clinical procedures among medical and dental students in a public-sector setting.

Method: The cross-sectional study was conducted at the medical and dental constituent institutes of Jinnah Sindh Medical University and Jinnah Postgraduate Medical Centre between August and October 2023, and comprised undergraduate, graduate, and postgraduate students of either gender aged 18-40 years. Data was collected using a self-administered, structured, closed-ended 16-item questionnaire, which was developed in the English language and explored the usage of YouTube as a source of information about medical and dental clinical procedures. Data was coded and analysed using SPSS 26.

Results: Of the 314 participants, 153(48.7%) were medical students and 161(51.3%) were from the dental stream, 175(55.7%) were females, and 139(44.3%) were males. YouTube was a helpful tool for 143(45.5%) students who used it when needed, 172(54.8%) used it occasionally before attempting procedures, while majority of the dental students 140(44.6%) used it to study for prosthodontics. There were 154(49%) students who supported the idea that faculty should recommend watching relevant videos on YouTube, while 256(81.5%) preferred other websites.

Conclusion: YouTube was mostly used for learning clinical procedures by the students.

Keywords: Computer-assisted instruction, Deep learning, Communication, Oral surgical procedures, Education, Dental.

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Introduction

Social media is constantly emerging as an extensive and versatile online platform due to the development of online interactive applications in recent years.[1] It not only allows people in online communities to create and exchange their content related to education, marketing, business and advertisements, but has also become a source of medical and dental education, consultation and training in clinical practices.[2,3] One of these widely used applications is YouTube. The visual demonstration related to clinical examinations and surgical procedures on YouTube has provided strength to e-learning in various disciplines of medicine and dentistry.[4,5] Studies have concluded that YouTube is a frequently used online resource by health professionals.[6-9] It is available in many languages and is streamed in more than 88 countries with billions of subscribers and content establishing it as a major source of entertainment and information alike.[8]

A study in the United Kingdom found that the asynchronous availability of educational videos on YouTube facilitated deep learning and awareness among the students.[9] The introduction and widespread use of the internet has given the current generation of students tremendous chances to learn from the abundance of online electronic visual materials, including films, animations, graphics and images that depict the flow of clinical operations.[10] A cross-sectional study at Iowa University in the United States found that 90% of the participants used videos for learning about surgical cases, including medical students and residents. Furthermore, YouTube was primary source of the learning material.[11] Another survey conducted at Trakaya University in Türkiye about the usage of YouTube for surgical procedures. It included fourth-year medical students, general surgery residents, and faculty surgeons in the Department of Surgery. Out of 78 participants, 90% respondents used videos for learning about surgical preparation, with YouTube as the most common platform (86%). However, the choices of channels were different for students and residents than faculty members.[6] Similarly, a study at the Manchester University reported that the usage of YouTube among dental students for learning oral and maxillofacial surgery was 82.67%, and 41% watched videos before procedure.[12] Despite the benefits of YouTube learning, like free access, strict copyright policies, asynchronous study aid, high-definition (HD) quality of visual demonstration for clinical procedures, availability of comment section for discussion on the

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video's content, premiers and live videos for engaging students in learning clinical treatments at a common online platform, the video content's legitimacy and regulation are yet uncertain.

Literature has shown discussion of YouTube videos with respect to quality, usefulness, correctness and dependability to evaluate the quality of content. Examples included discussion of controversial topics, like vaccination and unauthorised treatment by mentors, showing commercial interests while highlighting the positive and negative of the medical and dental treatment, the correlation between the quality and popularity of the video's content because it creates a potential for videos that feature poor technique or critical safety violations to become the most viewed for a given procedure, misleading thumbnails on the videos in relation to topic, and the comprehensiveness of the videos to see if the relevant aspects of the clinical procedures are addressed or not. This shows the potential risk of misinformation hidden in the videos. Hence, YouTube can be only a supplementary source of information.[13,14]

There is a severe lack of literature in Pakistan about using YouTube in learning clinical procedures for medicine and dentistry. The current study was planned to fill the gap by evaluating the effectiveness and analysing the influence of YouTube as a learning modality for clinical procedures among Pakistani medical and dental students in a public-sector setting.

Subjects and Methods

The cross-sectional study was conducted at the medical and dental constituent institutes of Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Centre (JPMC) between August and October 2023.

After approval from the institutional ethics review board of JSMU, the sample size was calculated using OpenEpi calculator by taking the prevalence of medical and dental students using YouTube as a learning modality for clinical procedures to be 50%, with margin of error of 5% and confidence level 95%.[7] The total target population of clinical medical students, house officers (HOs) and residents was 1,692. The sample was raised from among them using convenience sampling technique. Individuals were approached in their classrooms or in their assigned outpatient department (OPD). Those included were undergraduate medical and dental students from their clinical training years of study, HOs, post-graduate trainee (PGT) residents of Sindh Medical College (SMC), JPMC and the Sindh Institute of Oral Health Sciences (SIOHS). Individuals from both genders aged 18-40 years regardless of religion, cast, creed and socio-economic status (SES) were included. Participants not willing to participate and students from the pre-clinical years were excluded. Bachelor of Dental Surgery (BDS) is a 4-year programme and the Bachelor of Medicine and Bachelor of Surgery (MBBS) is a 5-year programme. After taking informed consent from the participants, data was collected using a self-administered, structured, closed-ended 16-item questionnaire. The questionnaire had two sections. The first section included 5 questions about the participant's demographic details, while the second section included 11 screening questions related to the usage of YouTube as a source of information about medical and dental clinical procedures. The questionnaire was only distributed in person, and online distribution was avoided.

Initially, a pilot study was conducted on approximately 10% of the sample to validate the questionnaire. Students of SIOHS clinical department and SMC 4th and final year students were included to check for face validity and reliability of the questionnaire, and it was found to have good face validity and Cronbach's alpha was 0.7, which was good as well. As there were no changes required, the same questionnaire was used unchanged. Data of the pilot study was not used in the final analyses.

Data was analysed using SPSS 26. Association between responses and gender was explored using chi-square test. $P<0.05$ was considered significant.

Results

Of the 314 participants, 153(48.7%) were medical students and 161(51.3%) were from the dental stream, 175(55.7%) were females, and 139(44.3%) were males. The largest group was that of 4th year students 84(26.8%), followed by 3rd year 77(24.5%), HOs 75(23.9%), residents 45(14.3%), and 5th year 33(10.5%) (Table 1).

Among the respondents, 143(45.5%) strongly agreed with the statement "*I find videos of clinical procedures on YouTube helpful as a learning tool*"; 132(42%) said they always

Table-1: Demographic data of the respondents.

Questions	n (%)
Gender	
Male	139 (44.3)
Female	175 (54.7)
Degree programme	
MBBS	153 (48.7)
BDS	161 (51.3)
Year of study	
3rd	77 (24.5)
4th	84 (26.8)
5th	33 (10.5)
House Officer	75 (23.9)
Resident	45 (14.3)

MBBS: Bachelor of Medicine and Bachelor of Surgery, BDS: Bachelor of Dental Surgery.

Table-2: Responses given by the students about the usage of YouTube..

Questions	Response	n (%)
Q1: How strongly do you agree or disagree with the following statement: "I find videos on clinical procedures in YouTube as a helpful learning tool"?	Strongly Agree	143 (45.5)
	Agree	136 (43.3)
	Neutral	27 (8.6)
	Disagree	4 (1.3)
	Strongly Disagree	4 (1.3)
Q2: How frequently did you use YouTube for medical/dental information in the last semester?	Once a day	54 (17.2)
	Once a week	57 (18.2)
	Twice a week	55 (17.5)
	Once every two weeks	11 (3.5)
	Once every three weeks	5 (1.6)
	Once every month	13 (4.1)
	Once every new procedure	16 (5.1)
	When needed	103 (32.8)
Q3: How do you consider YouTube as a learning tool when it comes to clinical procedures?	Adjunctive to lectures in labs	28 (8.9)
	As a main resource	61 (19.4)
	For revision	70 (22.3)
	Sometimes as a main source and sometimes adjunctive to labs and lectures	117 (37.3)
	All the above	38 (12.1)
Q4: Do you refer to YouTube videos to prepare for clinical procedures that you have never done before in the clinics?	Always	132 (42.0)
	Sometimes	140 (44.6)
	Rarely	29 (9.2)
	Never	13 (4.1)
Q5: Do you refer to YouTube videos before attempting clinical procedures you are already familiar with?	Always	83 (26.4)
	Sometimes	172 (54.8)
	Rarely	42 (13.4)
	Never	17 (5.4)
Q6: For which type of medical/dental procedures do you prefer to watch videos on YouTube?	Prosthodontics	72 (22.9)
	Restorative Dentistry	27 (8.6)
	Periodontics	11 (3.5)
	Endodontics	14 (4.5)
	Orthodontics	10 (3.2)
	Surgery	60 (19.1)
	General/Oral Medicine	36 (11.5)
	Paediatric Medicine/Dentistry	19 (6.1)
	Radiology	6 (1.9)
	Psychiatry	1 (0.3)
	Obstetrics and Gynaecology	19 (6.1)
	Dermatology	9 (2.9)
	Ophthalmology	7 (2.2)
	Anaesthesiology	3 (1.0)
	ENT	11 (3.5)
	Orthopaedics	9 (2.9)
Q7: How strongly do you agree or disagree with the following statement "YouTube videos are helpful in relating theoretical knowledge with clinical knowledge"?	Strongly Agree	102 (32.5)
	Agree	161 (51.3)
	Neutral	35 (11.1)
	Disagree	10 (3.2)
Q8: How strongly do you agree or disagree with the following statement "it is important to have faculty guidance on referring YouTube videos on medical/dental procedures"?	Strongly Disagree	6 (1.9)
	Strongly Agree	69 (22.0)
	Agree	154 (49.0)
	Neutral	74 (23.6)
	Disagree	12 (3.8)
	Strongly Disagree	5 (1.6)
Q9: Do you feel that YouTube videos on clinical procedure that have been suggested by teaching facility are more valuable than the videos found in your keyword-based web search?	Strongly Agree	56 (17.8)
	Agree	133 (42.4)
	Neutral	101 (32.2)
	Disagree	19 (6.1)
	Strongly Disagree	5 (1.6)
Q10: Would you prefer your medical/dental school to post tutorials or videos on clinical procedures on YouTube?	Yes, but as adjunct material	101 (32.2)
	But that doesn't mean there won't be doctor's tutorial, YouTube is never enough	59 (18.8)
	Depends on the quality of the tutorials and videos	134 (42.7)
	I benefit from the lab more	12 (3.8)
	No	8 (2.5)
Q10: Would you prefer your medical/dental school to post tutorials or videos on clinical procedures on YouTube?	Yes	256 (81.5)
	No	58 (18.5)

Table-3: In Medical and dental specialties of the YouTube videos most watched by the respondents.

Specialities	Degree	
	MBBS n (%)	**BDS** n (%)
Prosthodontics	0(0)	72(44.7)
Restorative Dentistry	0(0)	27(16.7)
Periodontics	0(0)	11(6.8)
Endodontics	0(0)	14(8.69)
Orthodontics	0(0)	10(6.21)
Surgery	45(29.4)	15(9.31)
General/Oral Medicine	25(16.3)	11(6.83)
Paediatric Medicine/Dentistry	19(12.4)	0(0)
Radiology	5(3.26)	1(0.62)
Psychiatry	1(0.65)	0(0)
Obstetrics and Gynaecology	19(12.41)	0(0)
Dermatology	9(5.88)	0(0)
Ophthalmology	7(4.57)	0(0)
Anaesthesiology	3(1.96)	0(0)
Ear-Node-Throat (ENT)	11(7.1)	0(0)
Orthopaedics	**9(5.88)**	**0(0)**
Total	**153**	**161**

Table-4: Association of responses with gender.

Question	Response	**Male** n (%)	**Female** n (%)	***p*-value**
Q2	Once a day	26 (18.70)	28 (16)	0.007*
	Once a week	30 (21.58)	27 (15.42)	
	Twice a week	33 (23.74)	22 (12.57)	
	Once every two weeks	4 (2.87)	7 (4)	
	Once every three weeks	1 (0.71)	4 (2.28)	
	Once every month	6 (4.31)	7 (4)	
	Once every new procedure	9 (6.47)	7 (4)	
	When needed	30 (21.58)	73 (41.71)	
Q3	Adjunctive to lectures in labs	10 (7.19)	18 (10.28)	0.014*
	As a main resource	33 (23.74)	28 (16)	
	For revision	40 (28.77)	30 (17.14)	
	Sometimes as a main source and sometimes adjunctive to labs and lectures	44 (31.65)	73 (41.71)	
	All the above	12 (8.63)	26 (14.85)	
Q6	Prosthodontics	23 (16.54)	49 (28)	0.037*
	Restorative Dentistry	14 (10.07)	13 (7.42)	
	Periodontics	6 (4.31)	5 (2.85)	
	Endodontics	5 (3.59)	9 (5.14)	
	Orthodontics	7 (5.03)	3 (1.71)	
	Surgery	30 (21.58)	30 (17.14)	
	General/Oral Medicine	16 (11.51)	20 (11.42)	
	Paediatric Medicine/Dentistry	7 (5.03)	12 (6.85)	
	Radiology	3 (2.15)	3 (1.71)	
	Psychiatry	1 (0.71)	0 (0)	
	Obstetrics and Gynaecology	4 (2.87)	15 (8.57)	
	Dermatology	6 (4.31)	3 (1.71)	
	Ophthalmology	6 (4.31)	1 (0.57)	
	Anaesthesiology	0 (0)	3 (1.71)	
	ENT	7 (5.03)	4 (2.28)	
	Orthopaedics	4 (2.87)	5 (2.85)	
Q10	Yes, but as adjunct material	34 (24.46)	67 (38.29)	0.050*
	But that doesn't mean there won't be doctor's tutorial, YouTube is never enough	26 (18.71)	33 (18.86)	
	Depends on the quality of the tutorials and videos	68 (48.92)	66(37.71)	
	I benefit from the lab more	8 (5.76)	4 (2.29)	
	No	3 (2.16)	5 (2.86)	

*Correlation was significant at the level of 0.05.

referred to YouTube videos for learning clinical procedures that they have never done before; 172(54.8%) said they sometimes referred to YouTube videos before attempting clinical procedures that they are already familiar with;161(51.3%) agreed that YouTube videos were helpful in relating their theoretical knowledge with clinical knowledge; 154(49%) stated that faculty guidance was important while referring to YouTube videos for clinical procedures; 133 (42.4%) agreed that YouTube videos suggested by the teaching faculty were more valuable than the videos found in their keyword-based web search; 101(32.2%) said they would like their university to post tutorials for clinical procedures on YouTube as adjunct material, while 134(42.7%) stated that it depended on the quality of the videos uploaded. Furthermore, 256(81.5%) subjects answered that they referred to websites other than YouTube to obtain knowledge on clinical procedures (Table 2).

Among the subjects belonging to the dental stream, 72(44.72%) mostly watched clinical procedures related to prosthodontics, while among those from the medical stream, 45(29.41%) searched for videos related to surgery (Table 3).

A significant difference between genders was noted for only 4(36.4%) questions (Table 4).

Discussion

Over the last few years in Pakistan, YouTube has become a learning tool in medical education. Medical and dental students frequently watch and share visual resources with their colleagues.[8] The coronavirus disease-2019 (COVID-19) pandemic ingrained the importance of e-learning in the overall learning of clinical skills during the lockdown phases when face-to-face skill sessions were impossible.[14]

This phenomenon of change has been studied from different aspects. In the United States, a multicentre survey on YouTube usage among 3rd- and 4th-year dental students for clinical procedures found that most of the participants (89.6%) had been using YouTube for over 5 years, were visiting the website daily (51.8%), and were using it primarily for entertainment purposes (74.3%). When asked regarding YouTube videos, the participants responded that they found them helpful (52.3%), used them as adjuncts to lectures and labs (73.6%), for studying fixed prosthodontics (17.4%), and found them helpful specially for clinical procedures (58%). When asked if the videos were evidence-based, 46% answered 'somewhat', though 95% of the respondents considered YouTube videos on clinical procedures to be a helpful learning tool, and 89% would like for their dental school to post tutorials to YouTube/social media. No significant differences were

found between dental institutions, but a significant difference between 3rd- and 4th year students did exist regarding the frequency of YouTube use.[15] The current study reported similar findings about the majority (44.7%) of dental students streaming videos related to prosthodontics. On comparing the results from an earlier study, majority of the questions in the current study received similar responses except for Q4, Q6, Q10 and Q11(Table 2).[10]

A study discussing the role of social media during the pandemic reported 99% of the participants claimed that they used social media, with majority being males (51%) aged <30 years (45%), having a postgraduate degree 71%), using Facebook (87%) for communicating with friends sand other professionals, using it for uploading and downloading of scientific papers, movies, presentations and e-books (56%), and communicating with professionals and searching orthodontic products (52%).[8] In the current study, the majority of the sample`s population was of females (54.7%).

A study at Qassim University concluded that 37.2% subjects used YouTube weekly, with 70% of the students using videos for relating basic and clinical sciences. Furthermore, 93% of the participants agreed that the videos helped them understand the physical examination and techniques though 60% said they did not take YouTube as the main source. Overall, only 20% of the content they watched on YouTube was related to medical.[5] In the current study, majority of the participants used YouTube when needed, and 37.3% using it as the main sources or as an adjunct to lectures and labs.

A recent study in Turkiye explored the reliability and validity of videos on paediatric dentistry available on YouTube, and concluded that the videos available on the platform were of low quality and reliability.[16] The current study supported the findings and the narrative that there was uncertainty concerning the correctness and quality of the content of most of the available videos. Therefore, vast majority of the students agreed that faculty guidance was compulsory while referring and uploading clinical tutorials on YouTube adjunctive to their curriculum to have authentic information along with better quality. The significance of faculty recommendations was also reported by an earlier study.[17]

In the light of such findings, medical and dental educators need to consider modifying their teaching styles by incorporating e-learning for teaching clinical procedures. The educators must adopt the statement made by one author that the ultimate goal "is to bridge the generations (millennials and centennials) that are participating in the educational process and support the mission of medical and dental schools to educate competent oral healthcare professionals".[18]

A study which found that using YouTube encourages conversation and critical thinking among the students and helps them bridge the gap between theory and practise.[19] Hence, YouTube can be a powerful tool if harnessed correctly. Institutions should provide students with useful authentic and reliable resources to explore in addition to the textbooks.

Limitations: The current study has several limitations and the chief among them the were a small sample size owing to the number of students who responded, and the lack of multiple participating institutions as data was collected from a single centre.

Conclusion

Most medical and dental clinical students, HOs and residents considered YouTube to be a powerful helping modality in learning clinical procedures. With the growing popularity in the utilisation of YouTube as an important resource in education, students and faculty members have a greater interest in newer and better learning and teaching methods. Many of the participants felt that YouTube videos suggested by the faculty were more valuable than the videos identified from normal keyword-based searches. As such, it is essential that medical and dental faculty members assess and review the YouTube videos before suggesting them to their students to ensure reliability.

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HS: Concept, data acquisition, collection, interpretation, statistical analysis and writing.
SA: Study design, data collection and writing.
SA: Questionnaire design and data interpretation.
AG: Questionnaire design, reviewed and final approval.
UF, MTA: Data collection, statistical analysis and editing.