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Content analysis of educational videos on hand hygiene during COVID-19 pandemic

Divya Verma, Divita Sharma, Meenakshi Khapre

Abstract:

BACKGROUND: Online platforms are the most popular mode of entertainment, simultaneously imparting knowledge and education. During COVID pandemic, there was a sudden influx of educational videos on social media/websites with a purpose of spreading the information about hand hygiene (HH) practices. The aim of this study was to explore and assess the HH videos based on its content and technical quality to promote the learning experience of videos.

MATERIALS AND METHODS: HH videos from the official sites of five international health organizations and 42 national health institutes were assessed based on their availability of the HH videos. Verified YouTube videos on HH since January 2020 were further screened and assessed using the author's designed validated checklist. Each video was systematically evaluated and scored against the seven categories, namely introduction, audio, visuals/background, speaker/demonstrator, content, timing, and appeal.

RESULTS: A total of 50 videos were assessed for analysis. Of these, 82% of videos scored >50%, i.e., 14. Among low scorer, seven videos were from YouTube channel. Majority of the videos were technically sound, 44% aroused interest, 82% had a simple, understandable message; in around 46% of the videos, the presenter was a healthcare worker; and in 24%, the information was accurate as per the World Health Organization guidelines.

CONCLUSIONS: This study concluded that most of the HH videos were found to be just above average in their content quality and technicality.

Keywords:

Content analysis, COVID-19, hand hygiene, internet, video-audio media

Introduction

Healthcare-associated infections (HAIs) occur while receiving and delivering healthcare. The World Health Organization (WHO) estimates these infections to occur among 7%–12% of the hospitalized patients all over the world, with >1.4 million people suffering from infectious complications acquired in the hospital.^[1] India revealed an overall rate of 14.7% HAIs corresponding to 22.5 infections per 1000 intensive care unit days.^[2] Of the annual 12 million deaths, 95% occur

in low–middle-income countries, where infection prevention and control (IPC) policies are nonexistent, poorly adapted, or insufficiently funded by governments.^[3,4] The WHO reports that HAIs usually receive public attention only when there are epidemics as in COVID-19 today.^[5]

After first evidence of coronavirus in China, in December 2019, it was also declared as “public health emergency of international concern (PHEIC)” in January 2020 by the WHO Director General.^[6,7] A study conducted by Paital *et al.* showed that COVID-19 affected the psychosocial status of many individuals creating fear

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Department of Community and Family Medicine, AllMS, Rishikesh, Uttarakhand, India

Address for correspondence:

Dr. Divya Verma, Department of Community and Family Medicine, AllMS, Rishikesh, Uttarakhand, India. E-mail: divyaa.verma112@gmail.com

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and anxiety.^[8] To overcome these issues, correct information should be provided to the public through social media as stated by Yoosefi Lebni *et al.*^[9] There is a huge impact of COVID-19 on healthcare facilities worldwide. A study done by Nejhaddadgar *et al.*^[10] suggested that an electronic screening program is effective in reducing the hospital visits decreasing the burden on the healthcare industry and the same results can be achieved through online media on IPC measures. Abbas *et al.*^[11] suggested that for successful implementation of strategies such as mitigation and suppression, the use of nonpharmaceutical interventions/measures such as social distancing, hand hygiene (HH), and respiratory etiquettes is required.

HH is the most effective low-cost infection control strategy which helps prevent the spread of the disease.^[12] Despite wide dissemination of information among healthcare workers (HCWs) of the benefits of HH, a systematic review of studies conducted over the last decades indicates that compliance with HH guidelines remains poor.^[13]

Strategies to support HCW behavior change have included the use of written information, reminders, posters, and feedback on performance in line with the WHO HH Improvement Strategy. However, these strategies failed which opened great opportunities for other social media platforms such as YouTube and videos for the delivery of HH practices.^[14]

As a communication strategy, education entertainment (EE) has been used to inform, influence, and shift societal and individual behaviors.^[15] EE involved delivering an educational message through an entertainment-based mechanism, often using audio-visual media which aims to deliver an educational message compellingly and thereby produce social and behavioral change. To the best of our knowledge, three studies were found on educational videos related to various health-related subjects.^[16-18]

Considering the importance of HH in the present scenario and influencing power of media, it gave us a cause to assess the quality of medical educational videos related to HH uploaded during COVID-19 pandemic.

Objectives

1. To explore the components that promote the learning experience of videos and formulate the checklist – Phase 1 (Qualitative)
2. To assess the HH videos based on checklist derived from Phase 1 of the study – Phase 2 (Quantitative)

Materials and Methods

The present study was sequential mixed method (qual-QUAN) that includes first phase as qualitative study design followed by quantitative.

Phase 1

Brainstorming session was conducted with eight healthcare professionals (HCPs) after taking informed consent using interview guide [Annexure 1]. Each HCP was given a code name (H1,..., H8). The whole session lasted for 50 min and was audio-recorded and notes were taken by the note-taker. They were asked about their perception regarding the quality and technical attributes of the medical educational videos. The questions were mainly asked on the following thematic areas, viz., visual characteristics, audio characteristics, and content of the videos. Further, they were probed for their understanding of the characteristics of good-quality videos. The output from the session consisted of a list of the components that promote learning experiences in videos. As a wrap-up facilitator presented the final checklist [Annexure 2] and consensus was taken.

Phase 2

An observational analysis was done on selected HH videos using the following search strategy.

1. Websites of selected five international health organizations (WHO, CDC, NIH, NHS, and John Hopkins University)
2. Websites of 42 national health institutes were included among which 30 top medical colleges of India were recognized as given by the National Institutional Ranking Framework^[19]
3. YouTube: The search criteria for YouTube videos includes following terms: “hand hygiene practices,” “hand hygiene videos,” “hand hygiene methods,” “hand hygiene techniques,” and “hand hygiene for health care professionals.” Further, the condition was applied “This year” to exclude studies of earlier year, i.e., 2019.

Inclusion criteria

1. Videos related to HH.

Exclusion criteria

1. YouTube videos uploaded by channels which are not verified
2. Videos dated before January 1, 2020
3. Videos with conflicts of interest to a certain brand.

Data extraction

HH videos from the official sites of five international health organizations, viz., WHO, CDC, NIH, NHS, and John Hopkins University, were taken. Among the 42 national health institutes, seven videos from five institutes were assessed based on their availability of the HH videos.

After applying the search criteria for YouTube videos, only those HH videos were assessed which were uploaded by verified channels.

Each video was assessed as per the eligibility criteria. Accuracy of the content was determined by comparing statements in the videos with the WHO guidelines. Information that deviated from these guidelines was considered to be “inaccurate.” Two researchers were responsible for having to sort the videos, and final list of videos was prepared. Two researchers (DV and DS) analyzed half of the included videos as per checklist. After that, 20% of randomly selected videos were reshuffled between researchers and reanalyzed. A kappa agreement of 80%–100% was considered as appropriate. For some of the items in the checklist, the kappa component was <80%, so it was decided to analyze the whole set of videos independently by each researcher. Discrepancies were later solved by a third researcher (MK).

Scoring of checklist

The checklist comprised of seven categories namely introduction, audio, visuals/background, speaker/demonstrator, content, timing, and appeal. This category was further divided into 25 subcategories [Annexure 2]. The characteristics if present in the video were given a score of 1 and the absent were scored 0, except for some categories such as disturbing sound, unusual sound, intense, and horrifying images, which were reversed to 1 if absent.

Information was also collected on a total number of views before review, length in minutes, number of likes and dislikes, and upload source. The viewing of the video for coding was not counted in the total view count.

Data analysis

Data were entered in MS Excel 2010. Frequencies, means, and standard deviation (SD) were calculated. Differences in a score of video quality by the source of the video were examined using Chi-square statistics.

Results

Phase 1

Eight HCPs took part in the brainstorming session.

The thematic categories discussed were video characteristics, audio characteristics, and content of the videos. Each category is discussed separately.

Video characteristics

This category consisted of visual attributes which appealed to the audience while watching medical educational videos.

“... I mean I would not prefer to watch a video which is blurry or which is of low quality, you know like as if it is made using a low-quality device....” (H2)

They preferred videos of high resolution with a clear and stable background and made using professional equipment for better clarity. The pixels of the videos should be sharp; hence, it becomes appealing to watch. Moreover, there should be an appropriate use of colors with timely variations so that it is soothing for the eyes of the viewer. The transition between cuts should be smooth.

On asking about the visual effect, participants said,

“...I feel if there will be more use of signs and arrows to indicate, there will be ease in conveyance of the message...” (H3)

“...use of pictures, flowcharts and diagrams is what I look for in a video for it to be visually impressive...” (H5)

It was thus clearly evident from the above statements that the participants preferred signaling to highlight important information along with more diverse use of attractive diagrams and flowcharts.

It was further concluded from the session that none of the participants would want the presence of horrifying and threatening images in the videos.

Audio characteristics

This theme was focused on discussing what kind of audio features are needed so that it can impact the listener and imparts the intended knowledge.

“...some videos are noisy and make it difficult for me to concentrate on the content like I saw a video in which there was a background noise of children playing, so I watched another video which was better...” (H4)

Many participants pointed out the fact that unusual or disturbing sound is a major distraction for maintaining the attention span of the viewer.

On probing about presenters, they said,

“...so once I was watching this video on how to wear a face mask and I was glued to the video because I felt the presenter was very fluent and sure of what he was doing...” (H1)

After this discussion, it was seen that many participants felt that the presenter should be clear, enthusiastic, interactive, and confident in delivering the information.

Content

This category consisted of views related to how correctly the information is being delivered and how it is presented in the video in appealing manner.

“...everything in the video should be very specific, and there should not be any difficulty in understanding whatever the presenter is trying to convey...” (H4)

“...I feel the video should not deflect from its motive because then the interest is easily lost and most significant information should be told in brief in the end as it is easy to remember also...” (H7)

Participants prefer to watch video which is easy to understand, relevant, and align to standard guideline and organized logically. In addition, they would also prefer summary at the end.

Timing was considered crucial as videos with short duration help the viewers to hold the interest throughout.

The presenter should practically demonstrate rather than theoretical way.

“...learning by doing is a good approach and that’s why I feel the presenter should show the steps of HH procedure to make the videos more beneficial...” (H3)

“...I think the presenter sets a good example by showing the HH steps which motivate us to follow the procedure correctly...” (H8)

Phase 2

A checklist was prepared using the themes as derived from Phase 1. A total of 50 videos were assessed as per eligibility criteria [Supplementary File 1]. Each video was then scored using the designed checklist. The checklist was divided into seven categories, namely introduction, audio, visuals/background, speaker/demonstrator, content, timing, and appeal present.

A total of 50 videos were selected, out of which institutional videos were 14% ($n = 7$), 10% videos were from international organizations/university ($n = 5$), and 76% were YouTube videos ($n = 38$).

There were 38 YouTube videos. Mean duration of these videos came out to be 3.15 min (SD = 0.169).

The proportion of likes out of total reviews (likes + dislikes) of the videos was calculated as 98% [Table 1].

Out of 50 videos [Figure 1], in 36% ($n = 18$) of them, the demonstrator gave an introduction of self and about importance of HH practices. About 46% ($n = 23$) of the videos aroused interest, while the rest of them failed to generate interest. 82% ($n = 41$) of the videos conveyed the intended message clearly and understandably. Among the audio characteristics of the videos, 78% ($n = 39$) and 84% ($n = 42$) of videos were not having any disturbing or unusual sound effect, respectively. 62% ($n = 31$) of

the videos had a clear/understandable voice of the presenter.

92% ($n = 46$) of the videos had appropriate visual effect, while the background of all the videos was found to be stable without any unusual motion. 94% ($n = 47$) of the videos were in high resolution with appropriate use of colors in the frame. In 76% ($n = 38$) of the videos, transition between the cuts was smooth and 82% ($n = 41$) of videos had no intense or horrifying images. In 54% ($n = 27$) of the videos, the demonstrator used signaling to highlight the important information.

In 46% ($n = 23$) of videos, it was found that the demonstrator was not a HCP. However, in 70% ($n = 35$) of the videos, the speaker was confident, was fluent, and spoke enthusiastically. Only 66% ($n = 33$) of videos made the use of conversational language. In most of the videos (96%), the content was relevant and explained in a simpler understandable way (80%). A large number of videos dealt with the general information first such as the need and importance of HH practices in COVID pandemic followed by a more detailed and specific content such as demonstrating steps of HH. However, very few videos (24%) delivered accurate information, as per standard guidelines given by the WHO.

16 videos (32%) summarized content at the end. The summary generally includes the principles of the performance of five moments for HH.

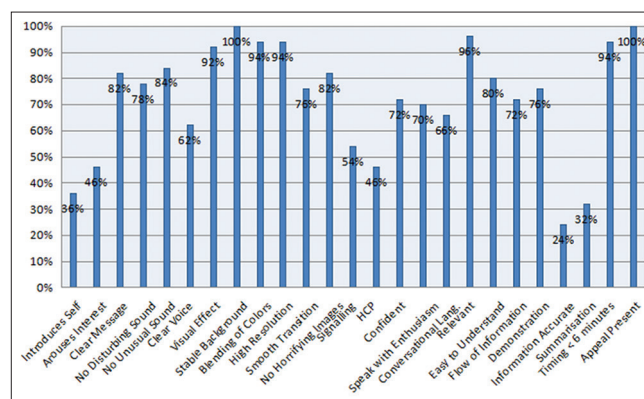


Figure 1: Presence of criterion in videos as per checklist

Table 1: Characteristics of videos

Sources ($n=50$)	n (%)
Institution	7 (14)
International organizations/university	5 (10)
YouTube	38 (76)
Total number of views	19629437
Duration mean (SD) (min)	3.15 (0.16)
Proportion of likes ($n=38$)	98%

SD=Standard deviation

Most of the videos were <6 min (94%). All the videos had an appeal, of which 88% ($n = 44$) had a social appeal and rest had humor appeal to the audience [Figure 1].

Table 2 compared the scores of videos uploaded on institutional site and YouTube. Out of 12 videos of institutional sites, only one scored below 14 as opposed to seven YouTube videos. This difference was not statistically significant. Most of the videos scored above average and mean was 17.38 (3.95).

Discussion

The internet and social media are a part of everyday life in today's times. The ease of finding information on the internet translates directly to answering health queries and concerns.^[20] In response to the popularity and promotional potential of online platforms, many HH videos were uploaded on web sites. In the present study, we tried to explore how efficient are these videos in delivering these messages. To begin answering this question, the content-analytic study was carried out to examine the characteristics of HH videos on various online media.

The strength of the present study is mixed-method approach where we first carried a qualitative analysis in the form of brainstorming to know required characteristics of an effective educational video. Based on these findings, an observational checklist was developed and scoring of the selected HH videos was done.

In the present study, most of the videos scored an average which is consistent with the findings from the study by Lim *et al.*^[16] Maximum score attained was 24 out of 30. Only half of videos presented accurate information in line with the standard guidelines.

Paek *et al.* developed theoretical concepts, message characteristics, and message strategies for effective health communication and persuasion.^[17] The study suggested that each video should have an appeal to gather the attention of the audience. In the present study, we found social appeal in most of the videos. This may be due to COVID pandemic and hand wash is one of the few effective strategies to prevent transmission. Videos with humor appeal were found to be inappropriate for the subject. There was a brand-related video as well but was excluded ($n = 1$) due to presence of a conflict of interest.

Table 2: Comparison of assessment score of videos according to source of videos

Score	Institutional site ($n=12$)	YouTube ($n=38$)	χ^2, P
<14	1 (8.3)	7 (18.4)	-0.97, <0.01
14-19	6 (50)	15 (39.5)	
20-24	5 (41.7)	15 (39.5)	
>24	0	1 (2.6)	

Other studies conducted by Basch *et al.*^[21] and Tang *et al.*^[22] also aimed at analyzing the content of YouTube videos related to prostate cancer and Alzheimer's disease, respectively. It was concluded that encouragement was the key factor for the usefulness of the videos and these YouTube videos can prove more useful if the content of the videos is aligned with the user's expectations.

In our study, although the videos had high relevance in the present scenario, the information shared was not accurate in 75% of the videos. The accuracy of content should be the prerequisite for the video. One of the videos demonstrated an innovative way to show the transmission of infection by virus under the effect of ultraviolet light.

Educational videos should ensure the credibility of the message. The videos, created by HCPs, are considered credible for health-related information. 60% of the total videos assessed were not created by HCPs. Only about one-fourth of these videos scored above 20. The remaining videos which had HCPs had higher scores as compared to other videos. Almost half of these videos scored above 20. To spread the knowledge of HH, the focus should be on "learning by doing," and it should be demonstrated accurately as found in Phase 1 of the study. Around one-third of the total videos did not demonstrate the HH procedure. Out of these videos, most of them had a range of total score of 15–19, while one of the videos had the lowest score of 9. The range of total score in the videos, which demonstrated the procedure accurately, was 11–25. Around half of these videos scored >20. Appropriate audio and visual of videos influence the number of viewers and understandability. In our study, most of the videos had at least two favorable audio characteristics, i.e., absence of disturbing sound, clear voice, and unnecessary effects. These characteristics were the main reasons to generate the viewer's interest. The videos, which were found to be appealing to a large number of audience, had smooth transition, visual effect, stable background, and good resolution. Videos should be short <5 min to hold interest of viewers. Video (anonymous), which was concerned with the promotion of a sanitizer though excluded from study scored low, was lengthy and content failed to focus on the main subject.

The results of this study highlight the opportunities to strengthen the educational material available at online platforms, such as YouTube,^[23] and the official sites of various international and national health organizations/institutes. There is also a clear need to ensure that individuals and organizations are aware of best practice guidelines.^[24] Reference to these guidelines may assist in proving credibility and copyright obligation.

However, there were some limitations as our search strategy included the videos made during COVID-19 pandemic, so the number of videos selected for the study was very less. In the era of high load of online information, it is dual responsibility of HCW and viewers. HCW should deliver videos understanding the expectation of viewer, and viewers should confirm the authenticity and credibility of videos. The checklist developed could be utilized by the HCW to make an effective educational video in the future.

Acknowledgment

All the authors contributed to all stages of the review, including conception of the review question, quality appraisal, and synthesis.

Ethical consideration

Human subjects were not included in the research, and all the videos are publically available. Videos were analyzed anonymously. Exemption was obtained from ethical committee.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Annexures

Annexure 1: Brainstorming Session Guide

Participants

Brainstorming session was conducted with eight health care professionals after taking informed consent.

Instructions: Before we start, I would like to remind you that there is no right or wrong answers in this discussion. We request you feel free; to be frank and to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions. You probably prefer that your comments not be repeated to people outside of this group. Please treat others in the group as you want to be treated by not telling anyone about what you hear in this discussion today.

1. What do you know about medical educational videos which are available on online platforms?
2. What kind of video characteristics do you prefer while watching a video?
3. What are your expectations of features of a good-quality video?
4. Do visual effects play a role in enhancing the quality of video?
5. What kind of audio features are needed for better conveyance of information through a video?
6. What kind of qualities a presenter should possess?
7. What are your views regarding the content of the videos?
8. Do timing of the videos matter to you?
9. What do you prefer more: theory or demonstration?
10. Let's summarize some of the key points from our discussion.
11. Is there anything else anyone would like to add?
12. Do you have any questions?

Thank you for taking the time to talk to us!!

Annexure 2: Observational checklist to assess the effectiveness of medical educational videos available online

1. Introduction:
 - Introduces self
 - Arouses interest
 - Clear and understandable message.
2. Audio:
 - Disturbing background sound or music
 - Unusual sound effect
 - Clear/understandable voice of presenter.
3. Visuals/Background:
 - Appropriate visual effect
 - Stable background
 - Appropriate blending of colors/no overloading of colors
 - High resolution/clarity
 - Transition between cuts are smooth
 - Intense or horrifying images
 - Use signaling to highlight important information.
4. Speaker/demonstrator:
 - Healthcare professional
 - Confident
 - Speak relatively quickly and with enthusiasm
 - Use conversational language, e.g., use of I or your
5. Content:
 - Relevant
 - Easy to understand

- Flow of information from general to specific
- Demonstrated procedure
- Information accurate
- Summarize at end.

6. Timing:

- Less than 6 min.

7. Appeal

- Present
 - Threat
 - Humor
 - Social
 - Personal
 - Brand
 - Other.

Supplementary File

Supplementary File 1: List of Assessed Videos

1. World Health Organization. The Safe Hands challenge [Internet]. YouTube. 2020 [cited 2020 June 21]. Available at: <https://www.youtube.com/results?search_query=hand+hygiene+who>.
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