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A comparison of cigarette- and hookah-related videos on YouTube

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ABSTRACT

Objective YouTube is now the second most visited site on the internet. The authors aimed to compare characteristics of and messages conveyed by cigarette- and hookah-related videos on YouTube.

Methods Systematic search procedures yielded 66 cigarette-related and 61 hookah-related videos. After three trained qualitative researchers used an iterative approach to develop and refine definitions for the coding of variables, two of them independently coded each video for content including positive and negative associations with smoking and major content type.

Results Median view counts were 606 884 for cigarettes-related videos and 102 307 for hookah-related videos ($p<0.001$). However, the number of comments per 1000 views was significantly lower for cigarette-related videos than for hookah-related videos (1.6 vs 2.5, $p=0.003$). There was no significant difference in the number of 'like' designations per 100 reactions (91 vs 87, $p=0.39$). Cigarette-related videos were less likely than hookah-related videos to portray tobacco use in a positive light (24% vs 92%, $p<0.001$). In addition, cigarette-related videos were more likely to be of high production quality (42% vs 5%, $p<0.001$), to mention short-term consequences (50% vs 18%, $p<0.001$) and long-term consequences (44% vs 2%, $p<0.001$) of tobacco use, to contain explicit antismoking messages (39% vs 0%, $p<0.001$) and to provide specific information on how to quit tobacco use (21% vs 0%, $p<0.001$).

Conclusions Although internet user-generated videos related to cigarette smoking often acknowledge harmful consequences and provide explicit antismoking messages, hookah-related videos do not. It may be valuable for public health programmes to correct common misconceptions regarding hookah use.

INTRODUCTION

The use of a hookah to smoke tobacco is an emerging trend among teenagers and young adults in the USA.[1–5] About one-third of college students and one-sixth of high school students have ever used a hookah to smoke tobacco,[1–5] making it the second most common form of tobacco use by young people.[3] Because as many as 50% of hookah users do not also smoke cigarettes, this form of tobacco use affects many individuals who may have otherwise never consumed nicotine products.[3 6]

Hookah users are exposed to large amounts of toxins.[7–11] In fact, the smoke from one hookah session may contain about 40 times the tar,[7 10] 30 times the carcinogenic polycyclic aromatic hydrocarbons,[8] 10 times the carbon monoxide[7 10] and two times the nicotine[7 10] of a single cigarette. Despite this, many believe that hookah use is less addictive, less harmful, more aesthetically appealing and more socially acceptable than cigarette use.[3 5 6 12] These beliefs, combined with permissive policies regulating hookah tobacco, may be linked to the proliferation of hookah use.[13]

Recent analyses suggest that cigarette smoking imagery on YouTube and other social networking websites is widespread and unregulated.[14–16] YouTube, an internet-based forum for posting videos, is now the second most visited site on the internet.[17] As of May 2010, YouTube exceeded 2 billion views per day, with 24 h of video uploaded per minute.[18] Because YouTube videos can reach large numbers of viewers quickly, these videos are increasingly being used for corporate marketing.[14 15 19] Public health researchers and practitioners have begun to recognise the importance of better understanding the content of YouTube exposures related to health because of the popularity of these exposures and because of the known associations between tobacco-related media messages and clinically relevant behaviours, such as initiation and maintenance of tobacco use.[20–24]

Freeman and Chapman[25] began this line of research with their 2007 analysis of tobacco images and advertising on YouTube. They examined relevant cigarette-related videos for content themes and viewer feedback and discussed the possible involvement of the tobacco industry in this form of word-of-mouth marketing.[25] In 2010, when Forsyth and Malone[16] examined 124 of the most popular YouTube videos about cigarette use, they found that these videos mentioned specific brand names of cigarettes over 40% of the time, frequently associated cigarettes with magic tricks and sexual themes and commonly portrayed cigarette smoking in a positive light. These results illuminated an important manner in which young people were receiving media exposure to smoking, and this helped public health researchers and practitioners frame new questions and interventions related to media messages about tobacco use.

To our knowledge, there has been no systematic analysis comparing videos of cigarette use and videos of hookah use. Given the recent popularity of hookah use and misconceptions about it, this type of analysis would be a valuable next step in developing interventions. With this in mind, we designed and performed a qualitative study to compare the content of YouTube videos related to cigarette use with those related to hookah use.

METHODS

Study design

We selected a qualitative approach because we believed that it would allow us to gain a more in-

depth understanding of the messages communicated by the videos than would a quantitative approach using simple checklists. We also believed that a more open-ended approach was preferable because little work has been done to date concerning analysis of YouTube videos.[16]

Video search

On 28 January 2011, we conducted an initial search of English language videos on YouTube. Following the methodology of Forsyth and Malone,[16] we searched for the terms *cigarettes* and *smoking cigarettes*. Similarly, we searched for the terms *hookah* and *smoking hookah*. We limited our study to these four terms because our search for similar terms—such as *water pipe* and *narghile*, which are used internationally by researchers and public health practitioners but are generally not used colloquially in English language videos on YouTube—did not yield further videos about tobacco use that met our selection criteria.

There are two different methods of prioritising searches on YouTube: by view count (preferentially selecting videos that are the most commonly viewed) and by relevance (preferentially selecting videos that most exactly match a search term). We searched for the four terms by each of these two methods and collected the first two pages (20 'hits') of results for each search. Selection of the first 20 hits is supported in the public health and information science literature.[26–28] The selection processes yielded 80 videos for cigarette smoking and 80 for hookah smoking.

On 28 March 2011, we used the same methods to capture a second sample of 160 videos, for a total of 320 videos. There is precedent for sampling twice in 2-month increments because it helps broaden the pool of possible videos.[16]

To obtain the final sample, we eliminated duplicate videos, defined as those in which more than half of the content or footage was identical, as occurs, for example, when someone copies previously posted material and adds a negligible amount of new material. We also eliminated irrelevant videos, defined as those in which there was no audio or visual reference to tobacco consumption via cigarettes or hookahs. Videos that dealt solely with marijuana cigarettes or e-cigarettes and did not mention traditional cigarettes or hookah were excluded. When videos contained both e-cigarettes and traditional cigarettes, our coding reflected how traditional cigarettes were portrayed.

The final sample consisted of 127 videos, with cigarette- and hookah-related videos being almost equal. This occurred naturally, as there were similar numbers of videos for both categories that did not meet inclusion criteria. To ensure integrity of the data and facilitate analysis, we saved each video on the day of the search as a digital video file. We also prepared written transcripts of the audio portion of the videos.

Codebook development

Two researchers with training in qualitative methods developed a preliminary codebook (manual) based on a grounded theory approach adapted for medical qualitative research by Crabtree and Miller.[29 30] Using in vivo coding and focusing on the audio, visual images and text provided, the researchers assessed 20% of the sample of videos. After independently finding emerging key themes, they discussed the themes with each other and combined similar coding for themes. Together with a third researcher, they recoded a subsequent set of videos and then met again to address further questions and refinements of coding.

After the three researchers clarified the definition of each code, they developed a final codebook that outlined specific inclusion and exclusion criteria for each code and included examples of imagery that met these criteria. Then, two trained coders worked independently to review and code each of the 127 videos in its entirety. For the variables coded, statistical analysis showed that inter-rater reliability, expressed in terms of Cohen's κ, ranged from 0.82 to 1.00 ($p<0.001$ for each code). In the rare cases of disagreement, the coders and other research team members worked together to achieve consensus.

Data collection and coding

General characteristics of the sample

For each video, we recorded the title, date of posting on YouTube, user name of the poster, length of the video in minutes and seconds, number of times the video was viewed on YouTube, number of comments from viewers and number of times viewers recorded 'like' or 'dislike' after seeing the video. We also recorded the gender (male vs female or mixed), approximate age (≤30 vs >30 years) and race (Caucasian vs non-Caucasian) of the video's primary actor or narrator if this information was discernible.

Production quality

We noted the production quality of each video and categorised it as follows: low if it was homemade and paid little or no attention to production values such as lighting, camera angles, sound quality and titles; moderate if it was homemade but paid at least some attention to production values; or high if it was produced with considerable attention to these production values. We coded this variable because production factors may influence a viewer's interpretation of and response to a video; for example, a viewer may be more likely to believe a message featuring high production values.[31 32]

Video portrayal of smoking

We coded the overall portrayal of smoking as positive if the smoking was largely portrayed as attractive, fun, powerful, pleasurable, relaxing or sexy. We coded it as negative if it was largely portrayed as undesirable, unattractive or harmful. And we coded it as neutral if smoking was not portrayed in either a highly positive or highly negative light or there were contradictory or unclear messages about smoking.

We coded for numerous dichotomous variables. First, we coded for whether the depiction of smoking in the video was associated with specific characteristics that are often considered desirable, including humour, attractiveness, power, sexuality, sociability and exoticness. Second, we coded for whether tobacco use in the videos was associated with short- or long-term health consequences, whether the video depicted smoking by children and whether the video contained a specific anti-smoking message or included information about how to quit smoking. Third, we coded for whether a video did the following: claimed that particular products, such as electronic cigarettes (e-cigarettes), could minimise potential harm related to smoking; served as a product review; showed tricks involving smoking; provided information about how to smoke or how to set up a smoking device; encouraged smoking fetishism (capnolagnia or sexual fantasies based on the sight of a person smoking); included music; served as a music video; included historical or documentary footage or included poetry.

Analysis

To assess the frequencies of codes, we used quasi-statistical qualitative methodology[29 30] that involved summing the number of counts for each code and computing the proportion of all sites that contained the code. For continuous variables in

non-normal distributions (such as view counts and rate of commentary), we used non-parametric two-tailed Mann–Whitney U tests to compare sample medians. To compare the frequency for codes in cigarette-related videos with those in hookah-related videos, we used χ^2 tests with two-tailed α of 0.05.

The complete research team then met again to explore examples of each code and probe for deeper meanings. Our synthesis of the findings and selection of exemplary quotations were guided by the principles of thematic synthesis, in which codes are organised into descriptive and then analytic themes.[33] We selected this approach because it allows for in-depth and open-ended consideration of the themes and their relevance to public health and the ultimate need for intervention.

RESULTS

General characteristics of the sample

Of the sample of 127 videos, 66 (52%) were related to cigarette smoking and 61 (48%) were related to hookah smoking (figure 1). Median video length was 150 s for cigarettes and 92 s for hookahs (table 1). Median view counts were 606 884 for cigarette-related videos and 102 307 for hookah-related videos ($p<0.001$). However, the number of comments per 1000 views was significantly lower for cigarette-related videos than for hookah-related videos (1.6 vs 2.5, $p=0.003$). There was no significant difference in the number of 'like' designations per 100 reactions (91 vs 87, $p=0.39$).

Narrators and production quality

In both types of videos, the narrators or main characters were most commonly men, 30 years or younger and Caucasian (online table 1). High production quality was more frequently found in cigarette-related videos compared with hookah-related videos (42% vs 5%, $p<0.001$).

Video portrayal of smoking

Of the 127 videos, 72 (57%) were coded as positive in their overall portrayal of smoking, 28 (22%) were coded as negative and 27 (21%) were coded as neutral.

The portrayal was positive in far fewer cigarette-related videos than hookah-related videos (24% vs 92%, $p<0.001$), and while 28 of the cigarette-related videos were coded as negative, none of the hookah-related videos were coded as negative (42% vs 0%, $p<0.001$).

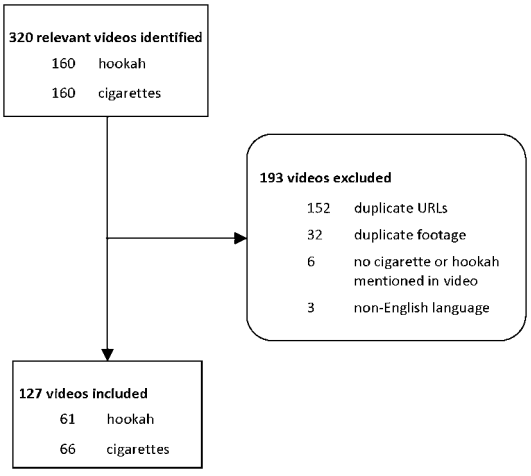

Figure 1 Flow chart demonstrating reasons for exclusion.

Although the two types of videos were similar in terms of portraying attractiveness, power, sexuality, sociability and exoticness of tobacco use, the cigarette-related videos more commonly contained humour (26% vs 11%, $p=0.04$).

Of the two types of videos, the cigarette-related ones more commonly contained descriptions of short-term health consequences (50% vs 18%, $p<0.001$) and long-term health consequences (44% vs 2%, $p<0.001$), portrayed children smoking (24% vs 2%, $p<0.001$), contained explicit antismoking messages (39% vs 0%, $p<0.001$) and described how to quit (21% vs 0%, $p<0.001$).

About a third of cigarette-related videos (33%) and hookah-related videos (28%) contained product brand references. Cigarette-related videos less commonly described smoking tricks (15% vs 52%, $p<0.001$) and how to smoke (6% vs 41%, $p<0.001$) and more commonly contained fetish content (9% vs 0%, $p=0.02$). Nine (75%) of the 12 cigarette videos in the minimisation of health risk category mentioned e-cigarettes. About half of all videos contained music. Of the 66 cigarette-related videos, 18 (27%) were coded as music videos. Few videos in either category contained historical or documentary footage or poetry.

DISCUSSION

Our analyses of 127 YouTube videos showed that hookah-related videos were more likely than cigarette-related videos to portray tobacco use in a positive light. In addition, while hookah-related videos were less likely to mention short- and long-term potential effects of tobacco use, to contain explicit antismoking messages and to provide specific information on how to quit tobacco use, they were more likely to describe smoking tricks and provide practical information on how to smoke.

Our findings regarding the overall portrayal and health consequences of hookah use are consistent with previous research demonstrating that many individuals perceive hookah use to be safer than cigarette use.[34–37] On the one hand, this misperception may stem from the kinaesthetic aspects of the hookah experience, including the fruity aroma of the tobacco, lightness of the smoke and coolness of the water.[36–38] It is possible that internet videos and similar media messages such as the ones we studied have played a role in enhancing or propagating popular myths associated with hookah use. This would be in keeping with cultivation theory, which posits that messages and imagery in popular media may subsequently alter viewers' perceptions.[39] However, it may also be simply that the newness and ceremony related to hookah encourage people to show how to use it.

Our study was similar to Forsyth and Malone's[16] study in terms of sample size and several of the content categories. However, our study found 42% of cigarette-related videos to be negative, whereas their study found only 16% to be negative. This could be because our study was performed more recently. Over the past few years, factors such as the passage of multiple clean air laws may have shifted the types of videos posted. In addition, an increasing number of products (eg, e-cigarettes) are being marketed to help people stop smoking regular cigarettes, and videos related to these 'harm reduction' products often vilify traditional tobacco use. Our sample included a slightly higher number of e-cigarette videos than that mentioned in Forsyth and Malone's article (nine vs five). As described in our methods, when both e-cigarettes and traditional cigarettes were present in a video, we focused on coding the portrayal of traditional cigarettes. Because videos containing e-cigarettes tended to vilify traditional cigarettes, they were often coded as 'negative' overall portrayal.

Table 1 General information of the sample of 66 cigarette-related videos and 61 hookah-related videos

General information	Cigarette-related videos Median (IQR)	Hookah-related videos Median (IQR)	p Value*
Length of video in seconds	150 (83–224)	92 (62–325)	0.47
Number of views	606 884 (63 726–1 408 240)	102 307 (48 452–255 222)	<0.001
Number of comments per 1000 views	1.6 (0.6–3.2)	2.5 (1.4–3.6)	0.003
Number of 'like' designations per 100 reactions†	91 (73–96)	87 (73–93)	0.39

*The Mann–Whitney U non-parametric rank-sum significance test was used.
†Reactions in this context include 'like' and 'dislike'. Thus, the median cigarette-related video had 91 'like' for every nine 'dislike' designations, while the median hookah-related video had 87 'like' for every 13 'dislike' designations.

Although people watched cigarette-related videos more frequently than hookah-related videos, they were more likely to comment on the hookah-related videos. This pattern is consistent with the view that cigarette smoking is a more established mainstream behaviour and that hookah users are part of an emerging subculture. It is also consistent with the tendency we found for hookah-related videos to be homemade and poorly produced. Interestingly, many creators of hookah-related videos mentioned receiving, or specifically asked to receive, free hookah tobacco products from popular hookah tobacco companies in exchange for doing YouTube reviews of these products. This new form of word-of-mouth advertising is becoming a popular and effective way for companies to reach a target audience and gain loyal customers.[40] Internet user-generated advertising such as this has the potential to reach millions of viewers without the cost of traditional advertising while also circumventing policies about tobacco advertising.

In our study, we found that while cigarette-related videos had a tendency to be associated with positive individual characteristics such as a sense of humour, both cigarette- and hookah-related videos were most commonly associated with social aspects of the experience of smoking (27% and 36%, respectively). This is consistent with findings in previous qualitative studies of cigarette and hookah smoking, which suggest that the social aspect is important.[34–36] Given that hookah use did not originate in the USA, it might seem that it would be more likely to be associated with exoticness than cigarette use, but we did not find this to be the case in our study. This may indicate that hookah use is rapidly becoming accepted as part of the US culture.

Hookah-related videos were more likely than cigarette-related videos to focus on how to smoke, probably because there are more steps necessary to prepare a hookah, including filling it with water, loading the tobacco, covering the tobacco in aluminium foil and punching holes in it and lighting a piece of charcoal to place atop the tobacco. Some videos framed hookah preparation as an art form or hobby that requires patience and experience to cultivate and perfect. The presentation of hookah use as a complex social ritual that creates and entrains unique social structures within its bounds may add to the compelling nature of hookah tobacco smoking.[41] Videos such as the ones we assessed may help individuals display expert status in the hookah smoking community and receive reinforcement through viewer comments and feedback.

There was a greater than expected number of cigarette-related videos that involved children smoking. The vast majority of these involved the same child, a 2-year-old Indonesian toddler who had become a tourist attraction.[42] The presence of videos involving this individual may have skewed our results by increasing, for example, the percentage of cigarette-related videos coded for negative overall portrayal of tobacco and 'dislike'. However, we included these videos in our sample in order to consistently apply our selection criteria.

Public health practitioners and educators may benefit from recognising the potential importance of YouTube videos as a source of information about tobacco use. They may also find it valuable for their educational programmes to emphasise that the product used in hookahs is in fact tobacco and that the smoke from hookahs contains combustion products similar to the smoke from cigarettes. However, they should recognise that the aesthetic appeal of hookah use—including the sweet-smelling smoke, the attractive apparatus, the mildness of the experience relative to cigarette smoking and the belief that the water somehow filters toxins—makes it challenging to persuade people of its potential harm and addictiveness. It may also be valuable for public health practitioners to consider using the medium of internet user-generated videos (social marketing) to improve public health. Although this may provide an opportunity to reach many individuals at a relatively low cost, we did not find any hookah-related videos produced by public health practitioners.

Limitations

Studies of internet user-generated content sites are inherently limited because access to them represents only one point in time, and search term returns are dependent on self-labelling of video descriptions, tags and category by their creators. We tried to minimise this limitation by sampling from the most popular video-sharing site (YouTube), using two different methods to sample (by popularity and relevance), sampling on two occasions and using two different search terms. Nevertheless, our results may not be generalisable to other samples of user-generated and posted videos, especially over time. Another limitation is that subjectivity is inherent in the coding of variables such as production quality and association with humour. To minimise subjectivity, we developed a comprehensive codebook with detailed criteria for codes, we had two people code each video and we adjudicated the coding in cases of coding disagreement. When we computed inter-rater reliability, we found it to be high. Finally, our coding of the gender, age and race of video narrators was based on assumptions about their appearance and may not correspond to how they self-identify.

What this study adds

Young people forming attitudes and perceptions regarding tobacco use are heavily exposed to internet videos. Compared with cigarette-related videos, hookah-related videos are substantially more likely to portray tobacco use in a positive light, less likely to mention short- and long-term consequences of tobacco use, to contain explicit antismoking messages and to provide specific information on how to quit tobacco use.

CONCLUSIONS

Our study of a sample of popular YouTube videos regarding cigarette smoking and hookah tobacco smoking shows that hookah-related videos are more likely to portray tobacco use as positive, less likely to describe short- and long-term harms of tobacco use and more likely to offer practical information on how to prepare and smoke tobacco. It may be valuable for public health practitioners and educators to emphasise the similarities rather than the differences between cigarette and hookah use. It may also be valuable for them to use video websites such as YouTube to reach the public.

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