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Research paper

Handwashing videos on TikTok during the COVID-19 pandemic: Potential for disease prevention and health promotion

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Abstract *Background:* Handwashing has long been promoted to maintain health and in preventing disease transmission. One of the most valuable ways to convey messages related to handwashing is through visual display, such as video for educational purposes and to enhance learning. Social media is an important and popular way to disseminate messages to a wide audience.

Methods: In this cross-sectional, descriptive study, two hashtags, #WashYourHands and #SafeguardSplash were used to select the sample of 100 from available TikTok videos. In order to code each video, the same coding categories were used for both hashtags, including (1) wetting and rinsing hands (2) lathering soap (3) time used for scrubbing (4) drying hands (5) mentions COVID-19 (6) mentions using hand sanitizer instead of soap (7) mentions how germs spread (8) mentions key times to wash hands (9) and actual depiction of washing hands. Additional descriptive categories were coded as well. The observations recorded were tabulated and descriptive statistics were performed. Independent one-tailed t-tests ($\alpha = .05$) were calculated to determine if a video's hashtag had a significant association with its garnered views, likes, and/or comments.

Results: In total, the 100-video sample received 1,990,834,567 views, 40,355,468 likes, and 173,422 comments. Despite the fact that each hashtag made up an equal proportion (50%) of the total sample, videos with #WashYourHands accounted for 93.3% of the total views. Coverage of the important steps involved in handwashing, such as drying hands, was minimal as was relevant background information.

Conclusion: The results indicate that while this opportunity is being realized to some degree, the majority of videos did not cover topics related important concepts of hand hygiene. Given

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the high engagement of younger audiences with TikTok, this could be a powerful mechanism for demonstrating and encouraging proper handwashing, especially in a population with low rates of handwashing.

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Highlights

- Social media, which is very popular way of communicating, may influence perceptions of handwashing.
 - Despite increased popularity, handwashing is understudied on TikTok.
 - This study demonstrates that portrayal of handwashing content is prevalent on TikTok.
 - While videos associated with a challenge were more comprehensive, they were lacking in viewership.
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Introduction

Handwashing has long been promoted to maintain health and has been referred to as “public health 101” in reference to its simplicity in preventing disease transmission [1]. In 1847, Dr. Ignaz Semmelweis proved that the simple act of handwashing could reduce rates of puerperal fever caused by bacterial infection [2,3]. Despite the findings, recommendations by Semmelweis for mandatory handwashing were rejected [3]. In the ensuing decades, as other innovative thinkers confirmed the findings and germ theory evolved, this theory became more widely accepted [3]. Globally, many people do not have access to clean water and soap [4,5], but even when soap and water are accessible, handwashing is often not initiated in recommended situations or completed properly [6–9]. The United States Centers for Disease Control and Prevention (CDC) highlight five steps to follow when washing hands. “1) Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap. 2) Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails. 3) Scrub your hands for at least 20 s 4) Rinse your hands well under clean, running water. 5) Dry your hands using a clean towel or air dry them.” Yet, proper handwashing following these steps is often not achieved [10].

Flash forward to the present day, and the necessity of handwashing could not be more relevant. Messages promoting handwashing became abundant with emergence of COVID-19 [2]. The CDC and the World Health Organization (WHO) set specific guidelines for handwashing to curb COVID-19 transmission [10,11]. Hand hygiene has and continues to be one of the most important ways to prevent transmission of many important infectious diseases, including a variety of respiratory and gastrointestinal illnesses [12–14].

Children are especially vulnerable and face increased consequences of these illnesses [15,16]. Hence, many intervention efforts have been designed to increase proper handwashing with children in mind [17–21]. Handwashing is critical in improving development in children [22], but

doing so is largely dependent on access to clean water and soap [23] and the direction of caretakers, which is often low [24]. Recent studies have found that handwashing rates are low in adolescents [25] with roughly one out of three participating in appropriate hand hygiene [26,27].

One of the most valuable ways to convey messages and observe behaviors related to handwashing is through visual display [28–31]. The value of visual learning has been well established [32], for example using video for educational purposes and to enhance learning [33]. Social media is an important and popular way to disseminate messages to a wide audience, especially those in younger age brackets who are frequent users of social media.

A highly popular video sharing social media networking service is TikTok, which has increased in popularity in recent years, so much so that it was declared one of the most downloaded apps in 2020 [34]. TikTok has nearly 700 million users across the world and is most commonly used in those aged 10–19 years [35]. Several studies on TikTok examined factors related to COVID-19 [36–39], however there is a gap in the literature related to handwashing on TikTok, which is especially of importance as adolescents are frequent users and have been found to have low rates of handwashing [25]. Therefore, the purpose of this study was to describe content on TikTok related to handwashing.

Methods

In this cross-sectional, descriptive study, two hashtags were used to select the sample from available TikTok videos. Using this social media networking service, #WashYourHands and #SafeguardSplash were found using the discover feature to identify the most viewed hashtags in regards to handwashing. The purpose of choosing these two hashtags was to account for any differences that may be apparent in a hashtag challenge such as #SafeguardSplash versus a general consumer driven hashtag, #WashYourHands. A hashtag challenge is a trending activity that is widespread on TikTok and is usually accompanied by a song and/or dance with prompts. While this hashtag challenge is

promoting a brand, it is also promoting handwashing. The following are the instructions noted with the challenge, “Show us your handwashing dance moves with Safeguard Hand Soap. Invite a friend and have them watch. But wait for it. Splash them at the end (not in the eye, of course!) for a good laugh and use #SafeguardSplash to show us their reaction. Remember to wash your hands for 20 s to Safeguard your family and wash away germs [40].”

A total of 50 relevant videos were drawn from each hashtag. It’s important to note that these were the most popular hashtags in the challenge and consumer categories at the time the study was conducted. In order to code each video, the same coding categories were used for both hashtags, including (1) wetting and rinsing hands (2) lathering soap (3) time used for scrubbing (4) drying hands (5) mentions COVID-19 (6) mentions using hand sanitizer instead of soap (7) mentions how germs spread (8) mentions key times to wash hands (9) and actual depiction of washing hands. Additional data coded included number and percent of views (how many times the video was viewed), likes (a simply click of a button to indicate approval and/or enjoyment of a video), comments (a space where viewers can add text-based commentary), and whether or not music, dance, and humor were involved. The observations recorded were tabulated and descriptive statistics were performed. Independent one-tailed t-tests ($\alpha = .05$) were calculated to determine if a video’s hashtag had a significant association with its garnered views, likes, and/or comments. A single reviewer (AP) coded all 100 videos and a second coder (CHB) then coded a 10% random sample to demonstrate inter-rater reliability. The two reviewers differed in only 3 out of 320 data points resulting in high agreement ($\kappa = 0.9593$). Since human subjects were not involved in this study, it was not reviewed by the Institutional Review Board (IRB) at William Paterson University; the study was deemed exempt by the IRB at Teachers College, Columbia University.

Results

In total, the 100-video sample received 1,990,834,567 views, 40,355,468 likes, and 173,422 comments. The respective averages (SDs) of views, likes, and comments for these videos were as follows: 19,908,345.67 (91,376,575.39), 403,554.68 (690,110.4), 1734.22 (3076.12). The 50-video sample with #WashYourHands had a combined 1,857,280,100 views, 33,274,800 likes, and 141,256 comments. The averages (SDs) of these videos were 37,145,602 (129,183,248.98), 665,496 (816,995.59), and 2825.12 (3645.22), respectively. The 50-video sample with #SafeGuardSplash has a total of 133,554,467 views, 7,080,668 likes, and 32,166 comments. The respective averages (SDs) of views, likes, and comments, for these videos were: 2,671,089 (14,535,026.85), 141,613 (423,398.11), and 643 (1980.16), respectively. The mean number of days that videos at #WashYourHands were posted at the time the study was conducted was 374.74 and the median was 390, while the mean (and median) for #SafeguardSplash challenge was 314.22 (and 315). While videos at #washyourhands were posted for, on average, 60.52 days longer, this

would be unlikely to account for the very large difference in number of cumulative views. All videos with the exception of one (posted in November of 2019) were posted after the discovery of COVID-19.

Table 1 shows 16 different content characteristics. The data indicate how many of the videos sampled included the respective content overall and separated by hashtag (#WashYourHands vs. #SafeguardSplash). Table 1 also includes a breakdown of video views by content present. Relative percentages are included for comparison.

Despite the fact that each hashtag made up an equal proportion (50%) of the total sample, videos with #WashYourHands accounted for 93.3% of the total views while #SafeguardSplash videos accounted for only about 6.7% of the total views. A one-tailed t-test ($\alpha = .05$) showed this difference to be statistically significant with $p = .03$; that is, a video’s hashtag had a statistical association with a video’s number of views. There was a similar discrepancy in the percentages of likes and comments garnered by the two different hashtags. Videos with #WashYourHands received 82.45% of the total likes and 81.45% of the total comments as compared to #SafeguardSplash videos which received only 17.55% of the total likes and 18.55% of the total comments. Independent one-tailed t-tests ($\alpha = .05$) indicated that these findings too were statistically significant with approximate p values of 0 for each. Thus, a video’s hashtag also had a statistical association with its number of likes and comments.

Interestingly, all 50 of the #SafeguardSplash videos used music, showed the lathering of soap between hands, and used a song to determine handwashing length. These same content characteristics were present in only 27, 22, and 5 #WashYourHand videos, respectively. None of the #SafeguardSplash videos used sanitizer instead of soap, mentioned how germs spread, or mentioned key times to wash your hands. These same content characteristics were present in 6, 2 and 5 #WashYourHand videos, respectively.

There were 6 different content characteristics present in a majority (>50%) of the total videos. These characteristics were: uses music (77%), uses humor (60%), showed lathering soap between hands (72%), uses a song to determine handwashing length (55%), shows rinsing hands under clean running water (68%), and shows actual handwashing (76%). Table 2 shows the number of likes and comments for videos exhibiting these six characteristics. The table includes the information for all 100 videos, a breakdown by hashtag, and relative percentages for comparison.

Discussion

The findings of this study indicate that handwashing videos are being widely viewed on TikTok, however the number of views and type of coverage differs across categorical criteria. Because the challenge hashtag is set to a specific song with specific steps to follow, handwashing techniques were exhibited to a greater extent in these videos. These techniques were absent from many videos not linked to a challenge. Further, coverage of the important steps involved in handwashing such as drying hands was minimal as was background information related to how germs

Table 1 Observed characteristics, content, and views of 100 handwashing videos, 50 with #WashYourHands and 50 with #SafeguardSplash.

	Total (n = 100)			#WashYourHands (n = 50)			#SafeguardSplash (n = 50)		
	N	Views	% of Total Views	N	Views	% of # Views	N	Views	% of # Views
	100	1,990,834,567	100%	50	1,857,280,100	100%	50	133,554,467	100%
Uses Music	77	1,423,101,567	71.48%	27	1,289,699,300	69.44%	50	133,554,467	100.00%
Uses Dance	45	142,961,908	7.18%	6	11,900,000	0.64%	39	131,214,108	98.25%
Uses Humor	60	733,504,644	36.84%	25	606,154,100	32.64%	35	127,502,744	95.47%
Wet Hands With Clean Running Water	19	90,056,008	4.52%	14	87,354,100	4.70%	5	2,701,908	2.02%
Lather Soap Between Hands	72	261,856,367	13.15%	22	128,454,100	6.92%	50	133,554,467	100.00%
Scrub Hands For At Least 20 Seconds	24	147,254,100	7.40%	7	35,500,000	1.91%	17	111,754,100	83.68%
Use A Song To Determine How Long They Wash Their Hands	55	141,591,967	7.11%	5	8,189,700	0.44%	50	133,554,467	100.00%
Rinse hands Under Clean Running Water	68	282,220,967	14.18%	20	149,054,100	8.03%	48	133,319,067	99.82%
Dry Their Hands On Clean Towel	3	9,023,500	0.45%	2	8,400,000	0.45%	1	623,500	0.47%
Air Dry Hands	4	6,909,336	0.35%	2	4,300,000	0.23%	2	2,609,336	1.95%
Use Sanitizer Instead Of Soap	6	25,500,000	1.28%	6	25,500,000	1.37%	0	0	0.00%
Mention COVID 19	22	601,270,700	30.20%	21	601,195,300	32.37%	1	75,400	0.06%
Mention How Germs Spread	2	17,000,000	0.85%	2	17,000,000	0.92%	0	0	0.00%
Mention Key Times To Wash Hands	5	502,044,500	25.22%	5	502,044,500	27.03%	0	0	0.00%
Actually Washing Hands	76	345,402,531	17.35%	28	212,009,600	11.42%	48	133,545,131	99.99%

spread and the key times to wash hands. This knowledge can be integral in motivating an individual to wash hands and to follow through with doing so completely.

One of the most important findings from this study is that the general handwashing videos were viewed nearly 2 billion times. This widespread viewership indicates that there is a great opportunity to educate the public for disease prevention and health promotion. There is a paucity of literature which compares the two efforts, a campaign driven by a product versus one driven by consumers, with the same purpose in mind, to promote hand washing. In one

respect, a campaign can be very effective if it gains popularity and the demonstration of an activity (such as handwashing) is done so in an accurate and comprehensive way. In this case, we identified key components of the handwashing process that were not or rarely included in the videos in this sample. Social media is a powerful communication medium with widespread, rapid reach that spans the globe. Unfortunately, our results show that while this opportunity is being realized to some degree, some important topics related to handwashing need more attention.

Table 2 Likes and comments data for videos exhibiting the most prevalent of the content characteristics studied.

	Total (n = 100)		#WashYourHands (n = 50)		#SafeguardSplash (n = 50)	
	Likes	% of Total Comments	Likes	% of # Comments	Likes	% of # Comments
Uses Music	40,355,468	100%	33,274,800	100%	7,080,668	100%
Uses Humor	29,939,268	74.19%	22,858,600	68.70%	7,080,668	100.00%
Lather Soap Between Hands	20,530,114	50.87%	14,338,400	43.09%	6,191,714	87.83%
Use A Song To Determine How Long They Wash Their Hands	21,588,968	53.50%	14,508,300	43.60%	7,080,668	100.00%
Rinse hands Under Clean Running Water	8,384,368	20.78%	1,303,700	3.92%	7,080,668	58.03%
Actually Washing Hands	22,387,291	55.48%	15,317,500	46.03%	7,069,791	99.31%
	32,519,138	80.58%	25,438,700	76.45%	7,080,438	100.00%
			173,422	100%	32,166	100%
			119,317	68.80%	32,166	100.00%
			89,108	51.38%	28,251	87.83%
			96,691	55.75%	32,166	100.00%
			25,527	14.72%	18,666	58.03%
			87,945	50.71%	31,944	99.31%
			127,375	73.45%	32,166	100.00%

The findings of this study are consistent with those from the few studies that examined consumer content on social media related to handwashing. Handwashing was a common theme present in YouTube videos related to COVID-19 specifically [41–44], however existing studies simply noted presence or absence of a number of themes rather than level of comprehensiveness. Studies of handwashing content on other social media platforms are sparse and varied. For instance, one study examined social media use and other characteristics as predictors of self-reported handwashing. The findings indicated that gender and number of children were predictors of handwashing moderated by the amount of time one spends on social media [45]. Others examined use Twitter to bolster dialogue at a professional conference [46] or to measure behaviors and sentiment related to COVID-19 [47].

This study has limitations that should be mentioned. The design was cross-sectional and the sample is small, which limits generalizability. Further, any study of social media is limited by the constant fluctuation in information. In addition, the search results attained did not adjust for algorithms, as they are not made public. TikTok is an emerging social media platform, with far fewer published studies on content than others (e.g. YouTube, Twitter, Facebook, Instagram). While the methods used in this study were based on several prior research studies [36–39], emerging research will may reveal methods that lead to greater generalizability of results. On TikTok, there is no way to account for a viewer who has not watched the complete video. Despite having several limitations, this study addresses a gap in the literature related to handwashing videos on a highly popular social media networking service.

While the effort to promote an important behavior is commendable, lack of comprehensive information could negate efforts to provide information and raise awareness. In promoting health on TikTok, a challenge is to work within time constraints of short videos to provide comprehensive messaging. In an era of information abundance, an ideal scenario for public health messaging would be one whereby professionals form partnership with content creators to inform campaign efforts and overall messaging. Thus, increasing the likelihood for increased accuracy while retaining popularity. Given the high engagement of younger audiences with TikTok, an opportunity exists for demonstrating and encouraging proper handwashing in a population with low rates of handwashing.

Ethics

Since human subjects were not involved in this study, it was not reviewed by the Institutional Review Board (IRB) at William Paterson University; the study was deemed exempt by the IRB at Teachers College, Columbia University.

Authorship statement

CH Basch and CE Basch conceptualized the study. AP collected the data, JF conducted the data analysis. All authors contributed to the manuscript production.

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