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RESEARCH

THE RELIABILITY OF HANDMADE MASK VIDEOS PRESENTED ON YOUTUBE® PLATFORM IN COVID-19 PANDEMIC

Abstract

In this study, we aimed to determine whether these instructive videos on handmade masks published on YouTube® are compatible with the criteria issued by Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). The present study investigated 184 videos yielded by a search on YouTube® with the keywords “DIY mask, handmade mask, fabric mask” during the period from January 01, 2020 to April 01, 2020. The videos were categorized according to the criteria recommended by WHO and CDC. Audience interest parameters such as total members, views, likes, dislikes, comments made, video sources and upload date were evaluated. 66.8% (n=123) of the instructive YouTube® videos concerning handmade masks were uploaded by craft-DIY-tutorial pages, 57.1% (n=105) included the sewing method, 97.3% (n=179) included unsuitable material usage as per CDC, 98.4% (n=181) were not compatible with CDC directives, 99.5% (n=183) used non-fluid-resistant material, 78.3% (n=144) involved masks that collapse against the mouth and 95.7% (n=176) involved gaps between the face and the mask. We found that the videos published on YouTube® are not reliable sources of information about handmade masks.

Keywords: Centers for Disease Control and Prevention, Instructional Films and Videos, Masks, Social Media.

ARAŞTIRMA

YOUTUBE® PLATFORMUNDA SUNULAN EL YAPIMI MASKE VİDEOLARININ COVID-19 PANDEMİSİNDE GÜVENİLİRLİĞİ

Öz

Bu çalışmada YouTube® üzerinden yayınlanan el yapımı maskeler ile ilgili eğitici videoların Hastalık Kontrol ve Önleme Merkezleri (CDC) ve Dünya Sağlık Örgütü (WHO) tarafından yayınlanan kriterlere uygun olup olmadığını belirlemeyi amaçladık. Bu çalışmada, 01 Ocak 2020 - 01 Nisan 2020 tarihleri arasında YouTube®’da “DIY mask, handmade mask, fabric mask” anahtar kelimeleri ile yapılan arama sonucunda elde edilen 184 video incelenmiştir. Videolar WHO ve CDC tarafından önerilen kriterlere göre kategorilere ayrılmıştır. Toplam üye, görüntüleme, beğenme, beğenmeme, yapılan yorumlar, video kaynakları ve yükleme tarihi gibi izleyici parametreleri değerlendirildi. El yapımı maskelerle ilgili eğitici YouTube® videolarının %66,8’i (n=123) zanaat-kendin yap-eğitici sayfalar tarafından yüklendiği, %57,1’inin (n=105) dikiş yöntemini içerdiği, %97,3’ünün (n=179) uygun olmayan malzeme içerdiği saptandı. Videoların %98,4’ünün (n=181) CDC direktiflerine uygun olmadığı, %99,5’inde (n=183) sıvıya dayanıklı olmayan malzeme kullandığı, %78,3’ünde (n=144) ağza temas edecek şekilde yapılan maskeler içerdiği ve %95,7’sinde % (n=176) yüz ve maske arasında boşluklar içeriyordu. YouTube®’da yayınlanan el yapımı maskeler hakkındaki videoların güvenilir bilgi kaynağı olmadıkları saptandı.

Keywords: Hastalık Kontrol ve Önleme Merkezi, Eğitim Filmleri ve Videoları, Maskeler, Sosyal Medya.

1. Introduction

The new Coronavirus disease 2019, “COVID-19” is a worldwide spread respiratory system disease and was first reported in Wuhan, in Hubei province in China in December 2019 (1,2). Present data shows that respiratory droplets and contact are two main ways of transmission of the COVID-19 virus (3).

On 11 March 2020, World Health Organization (WHO) characterized COVID-19 as a pandemic (4). Besides, the WHO public health interventions working group proposes non-drug interventions as an important supplement because of the fact that sufficient drug supply cannot be provided promptly and may be inadequate for the whole population (5).

Pregnant women and their fetuses are considered as a high-risk population during infectious outbreaks. Besides, physiological changes in pregnancy could increase the occurrence of infections, especially when the cardiovascular and respiratory systems are affected (6). Furthermore, despite the postponement of gynecological surgeries except in emergency cases, it has been reported that gynecological cancer patients who are prone to be infected COVID-19, can be operated only after providing a suitable environment for patients and health-care providers (7).

In the guideline issued on 6 April 2020 by WHO, it pointed out that the need to wear a medical mask as one of the prevention procedures that can restrict the spread of respiratory viral infections, including COVID-19 (8). Accordingly, surgical masks were insufficient as a result of the increasing demand. People have had to use their masks repeatedly, and the number of hand-made mask manufacturers has increased (9).

On 9 April 2020, the Centers for Disease Control and Prevention (CDC) has published guidelines on making masks to prevent COVID-19 (10,11). However, video sharing sites such as YouTube®, which are visited by more than two billion users every month, have become the source of unreliable videos about handmade mask making, especially during the COVID-19 outbreak (12,13).

In this study, we aimed to determine whether these instructive videos on handmade masks published on YouTube® are compatible with the criteria issued by CDC and WHO.

2. Material and Method

A video search was performed with the keywords “DIY mask, handmade mask, fabric mask”, on YouTube® (<https://www.YouTube.com>) platform. Each video corresponding with the designated keyword criterion were assessed. The search consisted of videos uploaded from 01 January 2020 to 01 April 2020.

It was found that a total of 227 videos were uploaded within the specified date range. A total of 43 videos with descriptive content in languages apart from English and videos without mask making were left out. The study included 184 (81%) eligible videos.

Validation from ethics committee was not necessary since this was an observational study using only data that is publicly available.

After the application of the exception criteria summarized above, every video was evaluated by the two researchers (AT, CK). The video sources such as surgeon/practitioner, hospital/free clinic, social media / TV channel, medical website, university and advertisement were registered. The technical elements such as the video upload date, the time since the video upload, views, likes, dislikes and comments, video duration, ratios such as like/view, like ratio ($\text{like} \times 100 / [\text{like} + \text{dislike}]$), view ratio (number of views/days) and Video Power Index (VPI; $\text{like ratio} \times \text{view ratio} / 100$) (14) were noted.

The videos were reviewed in two categories. First, according to the criteria recommended by WHO: Fabric/texture layers numbers, breathability of the used material, water-repellent / hydrophobic properties, shape of the mask and fitting of the mask were recorded. Besides, the suggestions of WHO on mask use are as follows: A face shield or goggles should protect the eyes while at the same time the mouth and nose are preserved with a medical or surgical fluid-resistant mask which has a shaped style that does not fall on the mouth (e.g. duckbill or cup shape) (8,15). The mask should be cautiously set up, making sure it covers the mouth and nose, and safely attached to minimize gaps between the face and the mask (8).

Second, the criteria by the CDC for DIY/handmade masks were taken into consideration. It is advised by CDC to put on fabric face

coverings in public places where other social distance measures (e.g. grocery stores and pharmacies) are difficult to keep, particularly in community-based transmission areas. Fabric face coverings, which are shaped from daily household items or using homemade materials (cotton fabric, t-shirt, square cotton fabric) at low cost can be an option to use as a supplementary voluntary public health measure (10,11).

Duplicate videos and videos in which the number of likes, dislikes, or comments was disabled by the uploader were also omitted from the analysis.

Statistical analysis was applied using SPSS Version 20 (SPSS, Inc., Chicago, IL). To assess the agreement between the two independent reviewers, the Kappa coefficient was employed.

Averages, standard deviations and minimum - maximum for quantitative data and numbers and percentages for qualitative data were calculated.

3. Results

A significant agreement was observed between the reviewers considering video analysis (kappa coefficient 0.81). The results in Table 1 show that 66.8% (n:123) of the instructive YouTube® videos concerning handmade masks were uploaded by craft-DIY-tutorial pages, 57.1% (n:105) included the sewing method, 40.2% (n:74) used cotton fabric as material, 97.3% (n:179) included unsuitable material usage as per CDC, 98.4% (n:181) were not compatible with CDC directives, 49.5% (n:91) used 2 layers of fabric/tissue, 100% (n:184) used breathable fabric, 99.5% (n:183) used non-fluid-resistant material, 78.3% (n:144) involved masks that collapse against the mouth and 95.7% (n:176) involved gaps between the face and the mask (Table 1).

The results in Table 2 show that the time since the upload was 29.3207 ± 12.57330 days for the instructive YouTube® videos concerning handmade masks, with $368208.8424 \pm 1182219.11300$ views on average, $4114.1304 \pm 14131.85771$ likes on average, 219.0272 ± 640.68111 dislikes on average, 136.5 ± 485.41967 comments on average, mean duration of 379.4511 ± 284.66012 seconds, mean like/view ratio of 0.0555 ± 0.15319 ,

mean like ratio of 91.9373 ± 12.26032 , mean view ratio of $12463.1282 \pm 41605.20236$, mean Video Power Index of $10880.0308 \pm 37922.16285$ and 2.1522 ± 2.37673 layers of fabric/tissue on average (Table 2).

4. Discussion

In our study, we found that 40.2% (n:74) of the instructive YouTube® videos concerning handmade masks were made using cotton fabric as material.

There are no data in the literature on whether homemade masks and other materials are protective against Coronavirus. Van der Sande et al. (16) indicated that unapproved masks such as surgical and handmade can provide a significant decrease in aerosol exposure (16). Balazy et al. (17) found that to evaluate mask protection against biological particles of similar form and size, we can benefit from the use of non-biological particle stimulants (17). The lowest filtering performance of the masks for non-biological particles can also be implemented to virus-having particles. Davies et al. (18) found that the filtration efficiency for *B. atrophaeus*, which is a rod-shaped spore-forming bacterium, was 69.42% on average on 100% cotton t-shirt, 62.30% on scarf, 83.24% on tea towel, 61.28% on pillowcase, 65.62% on antimicrobial pillowcase, 94.35% on vacuum cleaner bag, 74.60% on cotton mix, 60% on linen and 58% on silk (18). As there is no reliable data on the permeability of coronavirus particles through handmade mask materials, the particle size of *Bacillus atrophaeus*, that ranges from 0.95-1.25µm (18,19), can be used as reference to compare the size of the coronavirus particles, which is 0.060 - 0.140µm (20,21).

CDC published guidelines on the methods of making a mask, including Sewn Cloth Face Covering using cotton fabric, Quick Cut T-shirt Face Covering (no sew method) using a T-shirt, Bandana Face Covering (no sew method) using a bandana or any square cotton cloth (10,11). In our study, we found that 32.6% (n:60) of the instructive YouTube® videos concerning handmade masks were not made with the materials proposed by the CDC, 97.3% included unsuitable

material usage (quantity, length, capability and numbers of layers of fabric/tissue), 28.8% included unsuitable method (Gunk, Stapler, Knit) as per CDC. There is no evidence in literature that cotton fabric and similar materials used in the manufacture of handmade masks protect from COVID-19. WHO has made a number of recommendations to ensure that everyone is protected from COVID-19, including minimizing contact with people and frequent hand washing (8). For this reason, as it is an obvious wisdom that the use of handmade masks alone is not sufficient, the recommendations of WHO should be followed.

WHO advises that decision makers can proceed by recommending the use of non-medical masks. In such a situation, the following properties regarding non-medical masks should be considered: Number of fabric/texture layers, breathability of the material used, water-repellence / hydrophobic properties, mask form and fitting of the mask. WHO's suggestions on mask use are as follows: A face shield or goggles should protect the eyes while at the same time the mouth and nose are preserved with a medical or surgical fluid-resistant mask which has a shaped style that does not fall on the mouth (e.g. duck-bill or cup shape) (8,15). In our study, we found that 100% used breathable fabric, 99.5% used non-fluid-resistant material, 78.3% involved masks that collapse against the mouth and 95.7% involved gaps between the face and the mask. The reason that the breathability of the materials used in making the mask is 100%, even though the material used is not breathable (e.g. skin, plastic), is caused by opening holes on them to breathe. None of the videos had duckbill or cup shapes, which WHO suggested. But 21.3% made the mask shape similar to duckbill. Despite the use of insufficient material, 4.3% of the videos used metal that could take shape to prevent any gaps with the face / nose.

Up to now, two researchers in the field of gynecology have published the reliability of YouTube® videos. Kaya et al. (22) reported that YouTube® is not a reliable platform regarding endometrioma cystectomy procedure (22). Besides, Orhan et al. (23) reported that YouTube® has a negative impact on the mesh-related

discussions (23). In general, previous studies have also identified that the data obtained from YouTube® videos on health-related issues are weak, insufficient, and unconfirmed due to no scientific approval or data standardization (24-26).

Furthermore, the credibility of the results was inconsistent, depending on the scope of interest and data source (27-29). In our study, we discovered that craft-DIY-tutorial pages uploaded 66.8% of the informative YouTube® videos concerning handmade masks. We suggest that the practices performed to protect and maintain health (such as mask-making) should be followed from the guidelines published by CDC and WHO, which are reliable health authorities.

Most of the population is reported to tend to view misleading videos more frequently than dependable videos. Lee et al. informed that videos regarded as very useful received much less views and likes than misleading videos (30). On the contrary, Sahin et al. (24) assessed videos of premature retinopathy, and beneficial videos appeared to have more views and likes than misleading videos [24]. In our study, we discovered instructive YouTube® videos concerning handmade masks, with 368208.8424±1182219.11300 views on average, 4114.1304±14131.85771 likes on average, 219.0272±640.68111 dislikes on average, mean like ratio of 91.9373±12.26032, mean Video Power Index of 10880.0308±37922.16285. These results are in the same line with the previous research results.

There are few limitations in our study. First, to interpret the videos, subjective score criteria were exercised since there is no approved tool for evaluating video data yet. Second, these results show the information quality at certain point, and the results may change over time as videos are uploaded or removed. As the third; content was searched only from YouTube®. The results on other websites may differ. Therefore, we cannot generalize our results for all web platforms describing handmade masks.

5. Conclusions

The videos published on YouTube® videos are not reliable sources of information about

handmade masks. For this reason, we suggest that the applications (such as mask making) performed in order to protect and maintain health should be carried out in accordance with the guidelines of reliable health authorities.

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Author contributions

Concept- A. Turan, C. Kaya; Design- A. Turan, C. Kaya; Supervision- A. Turan, C. Kaya; Resources- A. Turan, C. Kaya; Materials- A. Turan, C. Kaya; Data Collection and/or Processing- A. Turan, C. Kaya; Analysis and/or Interpretation- A. Turan, C. Kaya; Literature Search- A. Turan, C. Kaya; Writing Manuscript- A. Turan; Critical Review- A. Turan

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Conflict of interest

None.

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Table 1. Results of the analysis of the 184 YouTube® videos.

Variables (N=184)	n	%
Upload Source		
Civilian	37	20.1
Commercial Website	1	.5
Craft-DIY-Tutorial Page	123	66.8
Drawing Page	2	1.1
Florist Page	1	.5
Food Page	5	2.7
Game Page	2	1.1
Health and Beauty Page	4	2.2
Leather Page	1	.5
News Page	1	.5
Religious Page	1	.5
Sewing Page	6	3.3
Sew or no sew method		
Gunk	27	14.7
Gunk+Stapler	1	.5
Knit	6	3.3
No Sew	26	14.1
Sew	105	57.1
Stapler	19	10.3
Materials (Cotton Fabric, T-shirt, Bandana, Square Cotton Cloth)		
Acrylic Yarn	6	3.3
Bandana	2	1.1
Bed Sheet	1	.5
Bra	1	.5
Cloth Bag	46	25.0
Cotton Fabric	74	40.2
Cotton Fabric+PaperTowel+Removable Pad	1	.5
Cotton Fabric+Sponge	1	.5
Handkerchief	13	7.1
Leather	1	.5
Leggings	2	1.1
Men's Underwear	1	.5
Napkin	1	.5
Paper Towel	19	10.3
Paper Towel+Removable Pad	1	.5
Plastic Bottle	1	.5
Removable Pad	2	1.1
Silver Fiber	1	.5
Socks	1	.5

Variables (N=184)	n	%
T-shirt	2	1.1
Vacuum Bag	1	.5
Vegetable Carry Bag	1	.5
Wet Wipes	5	2.7
Material Suitability According to CDC		
Suitable	5	2.7
Unsuitable	179	97.3
Compliance with CDC Directives		
Yes	3	1.6
No	181	98.4
Numbers of layers of fabric/tissue		
1	74	40.2
2	91	49.5
3	5	2.7
4	5	2.7
6	1	.5
9	2	1.1
12	4	2.2
15	1	.5
18	1	.5
Breathability of the material used		
Breathable	184	100.0
Non-breathable	0	0
Water repellence/hydrophobic qualities		
Fluid-resistant	1	.5
Not fluid-resistant	183	99.5
Shape of the mask		
Does not collapse against the mouth	40	21.7
Collapses against the mouth	144	78.3
Fit of the mask (gaps vs. no gaps between the face and the mask)		
Gaps between the face and the mask	176	95.7
No gaps between the face and the mask	8	4.3

n: sample size

Table 2. Results of the analysis of the 184 YouTube® videos.

Variables (N=184)	X	SD	Min-Max
Time since the video upload (days)	29,3207	12,57330	14-82
Views	368208,8424	1182219,11300	1-11295183
Likes	4114,1304	14131,85771	0-108000
Dislikes	219,0272	640,68111	0-5600
Comments	136,5	485,41967	0-4800
Duration of the Video (seconds)	379,4511	284,66012	71-1784
Ratios like/view	,0555	,15319	0-1.67
Like ratio	91,9373	12,26032	0-100
View ratio	12463,1282	41605,20236	0,04-322719,51
Video Power Index	10880,0308	37922,16285	0-306810,81

X: Mean, SD: Standart Deviation

