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Association Between Health Information–Seeking Behavior on YouTube and Physical Activity Among U.S. Adults: Results From Health Information Trends Survey 2020

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Introduction: Although physical activity has many health benefits, 45.8% of U.S. adults did not meet the WHO recommendation in 2018. Delivering health-related content, particularly physical activity, through YouTube may help to overcome some barriers, such as lack of access to resources. This study aimed to examine the association between watching health-related information on YouTube and increased levels of physical activity among U.S. adults.

Methods: Using the U.S. national cross-sectional survey—Health Information National Trends Survey 2020 (n=3,865), we conducted a multivariable logistic regression on obtaining 150 minutes of at least moderate-intensity physical activity per week (WHO guidelines) by watching health-related information on YouTube, controlling for demographics (age, sex, race/ethnicity), socioeconomics (income, education level, insurance coverage, employment), current use of cigarettes and e-cigarettes, use of electronic wearable devices (e.g., Fitbit), self-reported health status, BMI, and the presence of chronic conditions (e.g., diabetes, heart disease, cancer) and depression or anxiety disorders.

Results: Overall, 40.8% (weighted) of respondents reported using YouTube to watch health-related videos, and 39.2% reported meeting the WHO-recommended physical activity level. After controlling for covariates, adults who reported watching health-related videos on YouTube in the past 12 months (versus not watching) were 1.33 times more likely to do 150 minutes or more of moderate physical activity a week (AOR=1.33; 95% CI=1.01, 1.76).

Conclusions: This study suggests that adults who view health-related YouTube videos may be more likely to meet the WHO−recommended level of physical activity. This finding could inform future behavioral interventions using online video platforms to promote physical activity.

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INTRODUCTION

Physical activity promotion is one of the most important public health agendas to reduce the risk of chronic conditions (e.g., diabetes, cancer, heart disease) and improve overall population health.[1] Currently, the WHO recommends at least 150 minutes of moderate-intensity physical activity per week.[2] However, 45.8% of U.S. adults did not meet this standard in 2018.[3] There are numerous barriers to engaging in physical activity, such as lack of access to community resources (e.g., parks), high costs (e.g., gym fees), and lack of social support.[4]

Social media may be a useful tool to overcome some of these barriers to physical activity by delivering increasingly accessible health-related resources.[5,6] Indeed, social media is now a channel for online resources for health information and effective health intervention,[7–10] even for low- and middle-income countries.[11] Social media sharing user-generated content could be divided into various types on the basis of their characteristics such as blogs or microblogs (e.g., Twitter), social networking sites (e.g., Facebook), virtual gaming (e.g., Twitch), and content communities (e.g., YouTube).[12] YouTube is particularly useful because it uses a video format to deliver information and is effective in explaining complex ideas in a simple format.[13] As of 2022, YouTube has 2.1 billion global users[14] and is the most popular social media platform among U.S. adults.[15] In 2021, 81% of U.S. adults reported that they have used YouTube; this use rate is still steadily growing and higher than those of other social media platforms (Facebook: 61%; Instagram: 40%; Pinterest: 31%).[15] As such, many health organizations utilize YouTube to deliver health-related topics, including substance use, cancer, vaccinations, heart disease, and physical activities.[13]

Hence, YouTube has become a new channel for health promotion, particularly for physical activity. Previous review papers[16,17] suggested that social media intervention can positively change the physical activity level and diet-related behaviors (e.g., increases in physical activity levels, healthy modifications to food intake),[16] especially during the time that facilities were not accessible (i.e., due to coronavirus disease 2019 [COVID-19]).[18–20] A recent national survey found that 39.5% of adults reported using digital platforms (e.g., YouTube live streaming service for exercise) for physical activity during the COVID-19 pandemic.[18] Preliminary evidence has also shown that viewing fitness content (e.g., at-home exercise, no-equipment exercise) on YouTube significantly increased before and during the COVID-19 pandemic.[20] A randomized control trial by McDonough et al.[19] found that YouTube-delivered physical activity intervention may improve physical activity–related outcomes, including free-living moderate-to-vigorous physical activity and muscle-strengthening physical activity frequency, among young adults during the COVID-19 pandemic.

Such potential positive associations between engaging with health-related information on social media (e.g. YouTube) and positive health behavior change (referred to as physical activity in this paper) might be explained by obtaining self-efficacy related to physical activity (i.e., level of individual's confidence in the ability to successfully perform a behavior), perceived benefits of physical activity, and cue to action (i.e., trigger the decision-making process to accept a recommended health action).[21] Social networking features of YouTube (e.g., YouTube creators with viewers or viewers' interaction through comments) might be able to transmit information, channel personal or media influence, and eventually lead to a positive attitude or behavioral changes in physical activity.[22]

Previous studies have shown that health promotion, especially messages urging viewers to engage in physical activity, is frequently portrayed on YouTube.[5,13] Bopp and colleagues[5] (2019) conducted a content analysis reviewing 150 pieces of YouTube physical literacy content and found that 72.7% of those videos promoted physical activity. Content analyses of 106 sedentary behavior–related YouTube videos documented that 62.2% of videos showed physical activity and 67.0% of videos aimed to educate the public about health-related topics such as the risks of sedentary behaviors and the benefits of physical activity.[13] As such, a study by Durau et al.[23] (2022) found that physical fitness and training involvement with YouTube fitness videos increases behavioral intentions; however, this study was limited to German-speaking Europeans. However, whether watching health-related information on YouTube itself increases physical activity among U.S. adults remains unclear. Because YouTube is popular among the U.S. population and has a wide variety of health information delivery characteristics (e.g., video-based, interactive with content creators and viewers), it is important to fill the knowledge gap in how digital media use is associated with health promotion by understanding the link between watching health-related videos on YouTube and physical activity. Therefore, we used a U.S. national data set to examine such associations. We hypothesized that using YouTube for health-related information is associated with higher physical activity levels among U.S. adults.

METHODS

Study Sample

This study followed the STROBE guidelines (Appendix Table 1, available online).[24] We used the Health Information National Trends Survey (HINTS) 5 Cycle 4 (2020) conducted by the

National Cancer Institute.[25] The HINTS is a nationally representative survey using data from the U.S. civilian, non-institutionalized adult population. The HINTS used a 2-stage sampling design, including a stratified sample of residential addresses and 1 adult from the sampled household. The HINTS oversampled the high-minority stratum to increase the precision of estimates for minority subpopulations. The survey was conducted exclusively by mail with a $2 pre-paid monetary incentive to encourage participation. The HINTS 5 Cycle 4 was conducted from February to June 2020, and the weighted response rate was 37%. More details about HINTS can be found elsewhere (https://hints.cancer.gov/data/methodology-reports.aspx). This study included all respondents (n=3,865).

Measures

For study outcomes, we used (1) the number of days an individual participated in at least moderate-intensity physical activity in a typical week (frequency) and (2) the time engaged in moderate-intensity physical activity in a typical week (duration). Frequency was assessed with the question, *In a typical week, how many days do you do any physical activity or exercise of at least moderate intensity?* Duration was assessed with the question, *On the days that you do any physical activity or exercise of at least moderate intensity, how long do you typically do these activities?* Notably, the HINTS physical activity questions combined both moderate and vigorous physical activity (i.e., at least moderate intensity). We multiplied frequency by duration and categorized respondents into (1) <150 minutes per week of at least moderate-intensity physical activity and (2) 150 minutes or more of at least moderate-intensity physical activity per week on the basis of the WHO recommendation on physical activity for adults.[26] For the independent variable, we used a binary variable asking whether respondents had used the Internet to watch health-related videos on YouTube in the past 12 months (*In the last 12 months, have you used the Internet to watch a health-related video on YouTube?* yes or no). For the covariates, we selected the factors associated with physical activity and social media use on the basis ofa previous review paper and a paper that used the HINTS survey using the same physical activity outcome,[26,27] including demographics (e.g., age, sex, race/ethnicity); socioeconomic variables (income, education level, insurance coverage, employment); and health-related variables such as current use of cigarettes and e-cigarettes, past 12-month use of electronic wearable devices (e.g., Fitbit), self-reported health status (poor–fair versus good–excellent), BMI, and the presence of chronic conditions (e.g., diabetes, hypertension, heart disease, lung disease, cancer) and depression or anxiety disorders.

Statistical Analysis

We compared sample characteristics by physical activity status using Rao–Scott chi-square tests. We conducted a multivariable logistic regression to estimate the probability of engaging in 150 minutes or more of at least moderate intensity physical activity by the use of YouTube for watching health-related videos, controlling for the covariates mentioned earlier. We incorporated JackKnife replication for variance estimation, and p<0.05 (2-tailed) was set as statistical significance. The secondary data analyses of publicly available deidentified data are deemed exempt from review by the University of Florida.

RESULTS

The weighted population is 253,815,197 U.S. adults. Respondents' average age was 48.4 years, and 51.4% were female. Approximately 73.0% were White, and 15.7% were Hispanic (Table 1). Overall, 40.8% (weighted) of respondents reported using YouTube to watch health-related videos, and 39.2% reported meeting the WHO-recommended physical activity level (more than 150 minutes of at least moderate-intensity training a week). Physical activity was significantly higher for those who watched health-related YouTube videos (47.0% vs 37.8% of those who did not watch YouTube videos, p=0.002). Having watched health-related videos on YouTube in the past 12 months was more prevalent in adults who are younger, have higher educational attainment, are Hispanic, have higher income, are employed, and are users of wearable devices and in individuals with anxiety disorders or depression (Table 1).

After controlling for associated factors, we found that those who used the Internet for watching health-related videos on YouTube in the past 12 months (versus those not watching) were 1.33 times more likely to do at least moderate physical activities for >150 minutes a week (AOR=1.33; 95% CI=1.01, 1.76) (vs <150 minutes per week). Other correlates for meeting the WHO-recommended physical activity level were being male (AOR=1.41; 95% CI=1.10, 1.80), having higher educational attainment (AOR=1.58; 95% CI=1.18, 2.12), and having lower BMI (AOR=1.72; 95% CI=1.30, 2.28) (Table 2).

DISCUSSION

To our knowledge, this is the first study that highlights the positive associations between watching health-related YouTube videos and increased levels of moderate-intensity physical activity among U.S. adults. It has been suggested that the interactive and collaborative nature of YouTube (e.g., comments, likes, sharing, or streaming) may be more engaging, thus encouraging adults to participate in a healthy lifestyle, especially in physical activity.[13] Furthermore, YouTube also provides a way to deliver health-related content remotely, which may be valuable during the COVID-19 pandemic.[19]

It is important to note that in this study, we were not able to specify the particular content in the health-related YouTube videos that respondents watched. In detail, the videos might be general health-related information (e.g., diet, other chronic diseases), sedentary behavior–related content (e.g., the negative impacts of prolonged sedentary behavior and different strategies for how to break up daily sedentary

Table 1. Characteristics of Sample by Watching Health-Related Information on YouTube Status

Variables	Overall, *n* (weighted %)[b]	No, YouTube use for health information,[a] (*n*=2,340; 59.3%) *n* (weighted %)[b]	Yes, YouTube use for health information,[a] (*n*=1,388; 40.8%) *n* (weighted %)[c]	*p*-value
Physical activity[c]				
No	2,320 (60.8)	1,447 (62.2)	795 (37.8)	**0.001**
Yes	1,369 (39.2)	773 (53.0)	558 (47.0)	
Age				
Weighted mean (SD)	48.45 (18.11)	51.39 (19.38)	43.39 (14.80)	**<0.001**
Sex				
Female	2,204 (51.4)	1,303 (60.3)	821 (39.7)	0.447
Male	1,561 (48.7)	976 (58.0)	547 (42.0)	
Education				
≥Some college	2,480 (60.8)	1,396 (52.4)	1,037 (47.6)	**<0.001**
<Some college	1,242 (39.2)	846 (69.5)	328 (30.5)	
Ethnicity				
Non-Hispanic	2,914 (77.4)	1,786 (59.4)	1,054 (40.6)	**0.003**
Hispanic	596 (15.7)	311 (51.4)	268 (48.6)	
Unknown	355 (6.9)	243 (77.2)	66 (22.8)	
Race				
White	2,707 (73.0)	1,683 (59.6)	952 (40.5)	0.786
Nonwhite	867 (19.8)	484 (57.4)	345 (42.6)	
Unknown	291 (7.2)	173 (61.3)	91 (38.7)	
Income				
≥$50,000	2,076 (59.3)	1,199 (55.9)	839 (44.2)	**0.003**
<$50,000	1,771 (40.7)	1,131 (64.7)	544 (35.3)	
Insurance				
Insured	3,604 (91.0)	2,189 (59.1)	1,295 (40.9)	0.706
Not insured	203 (9.0)	118 (61.7)	79 (38.4)	
Employed				
No	1,888 (40.9)	1,263 (67.0)	543 (33.0)	**<0.001**
Yes	1,890 (59.1)	1,025 (53.9)	828 (46.2)	
BMI				
<30	2,471 (65.8)	1,480 (60.1)	901 (39.9)	0.289
≥30	1,274 (34.2)	776 (56.7)	462 (43.3)	
Wearable device use[d]				
No	2,745 (69.8)	1,809 (63.8)	861 (36.2)	**<0.001**
Yes	1,068 (30.2)	531 (48.8)	526 (51.2)	
Current cigarette use				
No	3,357 (86.2)	2,009 (58.2)	1,235 (41.8)	0.095
Yes	436 (13.8)	284 (65.5)	139 (34.5)	
Current e-cigarette use				
No	3,696 (93.6)	2,240 (59.2)	1,329 (40.8)	0.874
Yes	114 (6.4)	65 (60.7)	48 (39.3)	
Self-perceived health[e]				
Poor/fair	627 (14.1)	412 (63.2)	186 (36.8)	0.167
Good—excellent	3,192 (85.9)	1,899 (58.5)	1,195 (41.5)	
Depression/anxiety[f]				
No	2,897 (75.7)	1,810 (61.4)	982 (38.6)	**0.003**
Yes	908 (24.3)	490 (52.2)	397 (47.9)	
Any chronic illnesses[g]				
None	1,424 (47.2)	789 (55.9)	611 (44.1)	0.056
Any	2,366 (52.8)	1,504 (62.0)	760 (38.0)	

[a]Assessed with the question, *In the past 12 months, have you used the Internet to watch a health-related video on YouTube?*
[b]Numbers do not sum to total sample N due to missing values for YouTube use information.
[c]Multiplied, *In a typical week, how many days do you do any physical activity or exercise of at least moderate intensity?* and *on the days that you do any physical activity or exercise of at least moderate intensity, how long do you typically do these activities?* and dichotomized as *had physical activities for 150 mins per week or more* and *had physical activities for less than 150 mins per week.*
[d]Assessed with the question, *In the past 12 months, have you used an electronic wearable device to monitor or track your health or activity? For example, a Fitbit, Apple Watch or Germin Vivo fit. . ..*
[e]Assessed with the question, *In general, would you say your health is. . .;* the response options were *excellent, very good, good, fair*, and *poor.*
[f]Assessed with the question, *Has a doctor or other health professional ever told you that you had depression or anxiety disorder?*
[g]Includes diabetes, hypertension, heart disease, chronic lung diseases, and cancer.

behavior), physical activity—related content (e.g., taught participants the aerobic and muscle-strengthening physical activity guidelines and various strategies to increase their daily physical activity and muscle-strengthening physical activities), and/or home-based aerobic and muscle-strengthening workouts that participants could follow along on screen. Therefore, future studies should examine what types of YouTube content and characteristics (e.g., topics, themes, duration, uploaders, streamed) may be associated with individual achievement of a higher level of physical activity.

Despite some potential advantages of public health information dissemination, YouTube has been identified as a source of misinformation and unconfirmed health information.[28,29] For example, advertising videos promoting health-related products or services also frequently failed to disclose their sponsors, which may mislead viewers.[30] Development of surveillance and quality assurance system on such content seems to be needed to mitigate the spread of health-related misinformation. Healthcare systems may be able to provide a list of YouTube health-related videos, particularly physical activity—related videos, that they would endorse as accurate to share with patients. More importantly, future studies considering YouTube-based health education or behavioral interventions should ensure information transparency while considering existing digital divides among socioeconomically disadvantaged groups with barriers to healthcare access.[31]

Notably, our study also found that health-related YouTube use was higher among individuals reporting a diagnosis of anxiety or depression-related disorders. For example, individuals with mental health conditions might have sought information and validations for social support and shared experience on YouTube videos.[32] This suggests that YouTube (or other video platforms available on social media) may be a useful tool to improve health literacy and health education for those who need social support.[14,15] Furthermore, promoting physical activities on such platforms may be helpful in reducing mood disorder symptoms.[33] Future studies should explore this further to determine preferences for health-related YouTube content among individuals with depression and/or anxiety disorders and whether YouTube can be used as a platform to deliver health-related interventions, particularly exercise interventions, for this population.

Limitations

This study has several limitations. First, this is a cross-sectional design; thus, we cannot rule out the possibility of reverse causality (i.e., those who are physically active were more likely to watch health-related information on YouTube). Future studies should use longitudinal and experimental designs to provide a more comprehensive investigation into the causality of increased levels of physical activity by watching YouTube for health-related information. Second, because of the nature of the question in HINTS, we were unable to distinguish the topic, content, uploaders, or featured products/interventions in the videos viewed by respondents. We should acknowledge that dichotomized questions within the past 12 months in watching YouTube videos and health-related information might be too broad, and we were unable to examine the frequency of watching YouTube and what content respondents watched. There is a need for further research to determine the effect of the frequency of health-related information viewing on YouTube, and the types of topics respondents watched, on the levels of physical activity. Third, watching health-related videos does not necessarily imply interacting or engaging with a video (e.g., comments, likes, shares). Fourth, questions on the HINTS used modified versions of physical activity—related variables (e.g., did not distinguish between vigorous and moderate intensity physical activity). The HINTS—assessed vigorous intensity was combined with moderate intensity in the questions (i.e., at least moderate intensity); thus, we were unable to separately examine the vigorous-intensity physical activity. Furthermore, such questions did not ask about the specific context of physical activity (e.g., occupational, leisure). More research is warranted to validate the findings with other types and intensities of physical activity. Fifth, self-report biases, including recall and social desirability biases, might exist. As such, there might be a dilution bias that occurred when correcting random measurement errors in the predictor. Self-

Table 2. Results of Multivariable Binomial Logistic Regression

	Physical activity[a] (*n*=1,369; 39.2%)	
Variables	**aOR (95% CI)**	***p*-value**
YouTube use for health information[b]		
No	ref	
Yes	**1.33 (1.01, 1.76)**	**0.042**
Age		
Continuous	1.00 (0.99, 1.01)	0.506
Sex		
Female	ref	
Male	**1.41 (1.10, 1.80)**	**0.008**
Education		
≥Some college	**1.58 (1.18, 2.12)**	**0.003**
<Some college	ref	
Ethnicity		
Non-Hispanic	ref	
Hispanic	1.16 (0.74, 1.82)	0.498
Unknown	1.13 (0.64, 2.00)	0.674
Race		
White	ref	
Non-White	0.74 (0.52, 1.06)	0.103
Unknown	0.71 (0.23, 2.21)	0.547
Income		
≥$50,000	ref	
<$50,000	0.83 (0.65, 1.07)	0.152
Insurance		
Insured	ref	
Not insured	1.07 (0.55, 2.07)	0.839
Employed		
No		
Yes	1.00 (0.74, 1.35)	0.997
BMI		
<30	**1.72 (1.30, 2.28)**	**<0.001**
≥30	ref	
Wearable device use[c]		
No	ref	
Yes	1.25 (0.96, 1.63)	0.099
Current cigarette use		
No	ref	
Yes	1.17 (0.80, 1.71)	0.411
Current e-cigarette use		
No	ref	
Yes	1.03 (0.50, 2.13)	0.928
Self-perceived health[d]		
Poor/fair	ref	
Good—excellent	1.42 (0.88, 2.28)	0.147
Depression/anxiety[e]		
No	ref	
Yes	0.92 (0.70, 1.21)	0.551
Any chronic illnesses[f]		
None	ref	
Any	1.00 (0.70, 1.43)	0.997

[a]Multiplied, *In a typical week, how many days do you do any physical activity or exercise of at least moderate intensity?* and *on the days that you do any physical activity or exercise of at least moderate intensity, how long do you typically do these activities*? and dichotomized as *had physical activities for 150 mins per week or more* and *had physical activities for less than 150 mins per week.*
[b]Assessed with the question, *In the past 12 months, have you used the Internet to watch a health-related video on YouTube?*
[c]Assessed with the question, *In the past 12 months, have you used an electronic wearable device to monitor or track your health or activity? For example a Fitbit, Apple Watch or Germin Vivo fit. . ..*
[d]Assessed with the question, *In general, would you say your health is. . .*; the response options were *excellent, very good, good, fair*, and *poor.*
[e]Assessed with the question, *Has a doctor or other health professional ever told you that you had depression or anxiety disorder?*
[f]Includes diabetes, hypertension, heart disease, chronic lung diseases, and cancer.

reported physical activity measures tend to be over-reported.[34] Even though similar physical activity questions were validated in other national studies,[35,36] checks for reliability and validity of self-reported physical activity measures are warranted. Finally, this survey might have a cohort effect because it was conducted during the COVID-19 pandemic when non-essential businesses (e.g., fitness centers or swimming pools) were closed.

Nonetheless, we observed higher physical activity levels among U.S. adults who watched health-related YouTube videos. This preliminary finding could inform future research considering health-related YouTube videos in association with physical activity, especially for those with limited access to traditional settings and physical activity facilities.[18] YouTube has been identified as an effective learning resource that could be integrated into school settings[37] or at workplaces.[38] For future considerations, a recent trend in social media platforms might be noteworthy. Short-form (vertically oriented) videos (e.g., Shorts on YouTube, Reels on Instagram, or TikTok) might be now the most popular methods of consuming video content on the Internet. A recent national survey in 2022 found that short-form video applications (e.g., TikTok) gained popularity among young people and that TikTok was the most frequently used social media platform, followed by YouTube.[39] In addition, mobile short-form videos have the potential to persuade new technology adoption and might be related to a higher level of viewer engagement.[40] As such, those aiming to disperse health-related information might consider using such short-form videos for their information deliveries and interventions. More research is warranted to examine the effectiveness and efficacy of emerging social media video platforms in promoting health behaviors in large populations.

CONCLUSIONS

This study suggests that U.S. adults who watched health-related YouTube videos are more likely to achieve the physical activity level recommended by clinical practice guidelines. The findings of this study could be used to inform future behavioral interventions aimed at increasing physical activity rates using health-related videos.

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CREDIT AUTHOR STATEMENT

Juhan Lee: Conceptualization, Data Curation, Formal analysis, Investigation, Writing — Original Draft, Visualization, Writing — Review & Editing, Project administration. **Kea Turner:** Writing — Review & Editing. **Zhigang Xie:** Writing — Review & Editing. **Bashar Kadhim:** Writing — Review & Editing. **Young-Rock Hong**: Conceptualization, Formal analysis, Investigation, Writing — Review & Editing, Funding acquisition, Supervision.

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