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The Spread of Medical Information Through Social Media Platforms

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The Spread of Medical Information Through Social Media Platforms

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Approved to fulfill the
Requirements of HON 437

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Approved to fulfill the
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of the Murray State Honors
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The Spread of Medical Information Through Social Media Platforms

Submitted in partial fulfillment
of the requirements
for the Murray State University Honors Diploma

Emma Durham

November, 2020

Abstract

Social media has exploded in the past decade making it hard to find a teenager or adult without a smartphone or tablet in their possession at all times. Social media makes it easy for people to access information and friends at the click of a button. Information is easier to spread today than it ever has been; however, with this widespread social media usage comes a rapid spread of information with little fact checking. The Covid-19 pandemic has resulted in a surge of medical information being posted online, and not all of it has been completely accurate. The purpose of this study was to examine the spread of medical information through the social media platform Facebook by looking specifically at Covid-19 claims circulating on the social networking site. The study utilized a survey that was posted on the social media site Facebook. The survey contained questions about statements that individuals had seen regarding Covid-19 on social media and their beliefs about those particular statements. The study had a total of 250 participants, all of which were over the age of 18 and active on Facebook. The results showed that misinformation is prevalent on social media in regard to Covid-19 statements, and while most individuals were able to separate the valid information from the misinformation, a good portion of participants were not able to do so. The study also found that the more popular misinformation statements had the most controversy around them, with participants being rather split on if they believed them or not. These findings add to the many studies already done that have yielded very similar results, and the information found in these studies can be used in the future to help portray the prevalence of misinformation on social media and come up with solutions to curb the spread.

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The Spread of Medical Information Through Social Media Platforms

Introduction

Background

Social media is a term that has become widely known throughout the past 20 years. Merriam-Webster dictionary defines social media as "forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)" (Merriam-Webster, n.d.). In order for something to be classified as social media based on the aforementioned definition, it must include communication through electronic means and user-generated content. In 2019, it was reported that approximately seven out of ten Americans use social media platforms for some form of communication, entertainment, connection, or news sourcing ("Demographics of Social Media," 2019). This is a significant increase from the previously reported statistic in 2005 that said only around 5% of Americans used at least one social media site ("Demographics of Social Media," 2019). While the young adult population was the quickest to adapt and take up social media, levels of usage have risen throughout all ages resulting in a broader range of social media users. This broad audience allows pathways on social media for all different types of individuals to interact, connect, and share with one another without ever having to leave the comfort of their home. These platforms have become a breakthrough for rapid information dissemination that can reach a vast audience very quickly (Vos & Zhang, 2015).

The establishment of social media has brought many changes to the modern world. One of these drastic changes is that information is found at an individual's fingertips with the press of a button. This has led to individuals increasingly turning away from traditional news outlets for

information, like newspapers, magazines, television, etc., and turning toward alternative routes through avenues online for quicker and more convenient information (Wura et al., 2017). It was reported in 2013 that about six in ten Americans have turned online to look for health information in the past year ("Majority of Adults," 2013). Having this information easily accessible is beneficial when an individual needs quick and easy findings; however, if the search turns up information that is not credible or is misleading it can have many negative consequences. A study conducted by Soroush et al. (2017) suggested that falsehoods spread farther and faster than the truth on social media platforms. While this may sometimes be innocent information propagated by individuals trying to help, medical falsehoods on social media have been causing individuals to change their habits and beliefs for the worse.

One of the biggest examples of this problem is the antivaccine movement, a movement that gained traction through social media and spread rapidly with only a false medical claim to back it up. The anti-vaccination movement has gained more momentum in the past years, due to a paper that was published in *The Lancet* in 1998 by former doctor Andrew Wakefield. The study suggested a causal relationship between the measles, mumps, and rubella vaccine and the development of autism. Since the publication of this article many more studies have been conducted that have debunked this claim and have disproven a causal relationship between the MMR vaccine and autism. Many specialists criticized Wakefield for his research methods and his data. It was later found that Wakefield was receiving funding from litigants that were against vaccine manufacturers, potentially causing a conflict of interest within the study. *The Lancet* eventually retracted the study and claimed it as false. Wakefield has since lost his medical license, due in part to the deliberate falsification of information in his research article (Hussain et al., 2018). Unfortunately, this study is the "evidence" that many anti-vaccine supporters use to

back up their claim, and, according to Carrieri et al. (2019), the spread of fake news and misinformation on social media is blamed as the primary cause of vaccine hesitancy. This movement has potentially led to the dangerous trend of many individuals skipping vaccinations for themselves and for their children. In 2019, multiple states within the U.S. were forced to declare public health emergencies related to measles outbreaks, outbreaks that normally would not have occurred, due to the fact that measles had previously been declared eliminated from the United States in 2000 due to vaccination efforts ("Measles," 2018).

Covid-19 emerged in the early months of 2019 and brought with it many changes. Covid-19 is an infectious disease that causes mainly respiratory symptoms. In the beginning of October 2020, it was reported that Covid-19 had claimed the lives of 206,774 Americans ("Covid in the U.S.," 2020). Times of outbreak or disaster are especially susceptible to the effects of social media. These times usually bring with them uncertainty and a thirst for information, leading to individuals scouring the internet for answers. A study conducted by Sutton et al. (2008) suggested that social media is gaining popularity as an information source in times of disaster or risk. This behavior can lead to complications, since the accuracy of the information during these times is often uncertain. Social media is different from many traditional news sources, because it leaves the fact-checking up to the user instead of the producer. The individual interacting with content through social media is often left wondering if the information was posted or shared by a credible source, and many individuals do not know how, or do not bother, to verify their source. During times of outbreak and disaster, many individuals want information as quickly and conveniently as possible. This information-seeking can lead to an overload of information with no assurance that it is true, during a period of time where facts are especially important.

Research Question and Purpose

Not enough research has been done on how medical information spreads through social media platforms, but it is a problem that should be looked at. The purpose of this study was to examine the spread of medical information through the social media platform Facebook by looking specifically at Covid-19 claims circulating on the social networking site. Social media has become an integral part of today's society and its risks and benefits relating to the spread of information should be thoroughly examined. Sometimes information spreading through social media can help get pertinent information out quickly and efficiently, but if this information is false it can have many negative effects. Some of these effects could potentially be dangerous and detrimental to an individual's health. The research question that this study aims to examine is as follows: What is the prevalence of misinformation regarding Covid-19 on the social media platform Facebook, and have individuals been able to separate the valid information from the misinformation?

<div align="center">

Review of Literature

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Information Seeking on Social Media

Finding medical information online has never been more convenient. With information available at an individual's fingertips, social media sites have become a popular way for people to ask medical questions, share stories, and get medical advice from others. Fox (2011) conducted a survey from August 9, 2010 to September 13, 2010 in order to examine how people seek out and interact with medical information online. The survey was conducted as a telephone survey and it used random digit dialing to reach potential participants. The survey was given only to those individuals that were US residents, over the age of 18, and spoke English. When the survey was concluded the final sample size consisted of 3,001 participants. This study found that 59% of adult Americans (80% of internet users) reported that they have looked online for

health information. More specifically, the study reported that 15% of social network site users said that they have gotten health information from those particular sites.

A study done by Thackeray et al. (2013) was concerned with just how prevalent medical information seeking on the internet and social networking sites was. This research study used information from the same survey that was conducted by the 2011 study mentioned previously; however, these researchers used more exclusion criteria. From the original 3,001 individuals the researchers filtered out for those that used the internet at least occasionally and reported going online for health information. This study focused on how people interacted with medical information online, instead of if they have ever interacted with it. The study ended up with a sample size of 1,745 individuals. The researchers analyzed the survey answers and found that: 41.14% (718/1745) reported consulting online rankings or reviews regarding health information, 31.58% (551/1745) reported using social networking sites for health information, 9.91% (173/1745) reported contributing to the information by posting reviews of doctors, hospitals, drugs, or medical treatments, and 15.19% (265/1745) reported posting a comment, question, or information on a blog, social networking site, twitter, a website, or an online discussion forum. Overall, this study was able to conclude that people are more likely to consume health related information online rather than post it.

A literature review published by Zhao and Zhang (2017) focused on health information seeking on social media. The researchers used a database called the Web of Science Core Collection to search for all articles related to their topic. The search was conducted on September 23, 2016 and used key words and phrases like "health information seeking" and "online" to filter the search. The search yielded a result of 214 articles. The researchers then filtered these articles based on their inclusion and exclusion criteria. They included all of the articles that looked at the

way consumers seek out health related information on social media. They excluded all of the articles that focused on certain online health-related websites and not social media, focused on the general online environment, included the perspectives of professionals and not the general consumers, or that only included editorials or expert opinions. These criteria left the researchers with 21 articles to work with, all published between 2011-2016. After systematically reviewing all of the remaining articles the researchers concluded that "seeking health-related information from social media is becoming as popular as searching from Internet search engines" (Zhao & Zhang, 2017, p. 276). The literature review also found that the majority of the research that has been conducted has focused on one or more specific health issues, such as a certain disease, instead of health information as a whole. The literature review also found that social media has sufficient and rich information in regard to these health topics, and there is an abundance of user-generated content on social media that may be helpful to others.

Types of Information Found on Social Media

Many different types of information can be found on social media, which is partly why it can be so difficult to distinguish between fact and fiction. Persily and Tucker (2020) argued that attention must be paid to the production and dissemination of false information, and they suggested the following categories of information: valid information, comforting information, perplexing information, misinformation, disinformation, shocking information, contradictory information, doubtful information, progressive information, postponed information, and confidential information. While individuals can most likely find information from all of these categories on social media, this study focuses on valid information, misinformation, and disinformation. Therefore, those three categories will be looked into in more depth.

Valid information is defined as information that is logically correct. This type of information is usually backed by evidence and is considered to be true by professionals in that field. Valid information consists of facts which are usually widely accepted. Misinformation on the other hand is defined as "incorrect or misleading information" (Merriam-Webster, n.d.). Misinformation is often a claim that contradicts or distorts common understanding or verifiable information. Simply put, misinformation is false and does not have evidence to support it. Misinformation is often used as an umbrella term in order to describe a variety of different types of false information. Disinformation is contained under this umbrella term, with disinformation being a subtype of misinformation. Disinformation by definition is "false information deliberately and often covertly spread in order to influence public opinion or obscure the truth" (Merriam-Webster, n.d.). The difference between misinformation and disinformation is the intent behind the dissemination. If the information was put out in order to intentionally mislead and deceive it falls into the category of disinformation, while misinformation is often spread inadvertently with the individual not knowing any better (Persily & Tucker, 2020).

Misinformation and Health

Many instances in the past have shown that social media can aid in the spread of false medical information, and many studies have documented the scope of this problem and its possible consequences. A study by Al Khaja et al. (2018) reviewed the dissemination of misleading drug information through social media. It evaluated the truthfulness of 22 claims made on a social media site called WhatsApp. The study focused on claims made about drugs, dietary supplements, and toxic bisphenol (an industrial chemical that has been used to make certain plastics and resins that is often found in food containers and water bottles). The study categorized each claim into one of three categories: objectively true, false, or potentially

misleading. In the end, the study found that potentially misleading claims that tended to exaggerate the efficacy or safety of a certain product without sufficient evidence were the most frequent messages. Only 13.6% of the messages studied could be classified as objectively true. These potentially misleading claims made up the majority of the cases in this study, and such information can lead to individuals following dangerous and incorrect advice with no credible support.

A study by Sommariva et al. (2018) lends more evidence to this problem. This study's purpose was to "explore the spread of health rumors and verified information on SNSs using the Zika virus as a case study" (Sommariva et al., 2018, p. 246). This study looked at a total of 120 news articles about Zika, from a variety of social networking sites. The researchers took the top ten news stories from each month starting in February, 2016 and going through January, 2017. Out of the 120 total top articles 27 (22.5%) of them were categorized as rumors, 92 (77%) were verified news stories, and one was categorized as satirical/parody. This study also found that among the top stories the number of shares for rumors outnumbered the shares for verified stories four to one. This trend of rumors receiving more attention on social networking sites is one that many research studies have found. In a time of disease when not all of the facts are known it is extremely dangerous to have this false information spreading alongside the truth. While the rumors were not in the majority in this study, they received more shares when compared to the verified stories and were therefore able to reach a wider audience.

Aside from the Zika epidemic, the world has seen many other instances involving outbreaks and uncertainty. One of these instances was the Ebola outbreak that lasted from 2013-2016. A study by Sell et al. (2020) looked into what they called the "US Ebola Communication Crises". The researchers tried to describe the content of Ebola-related tweets, focusing

specifically on misinformation, political content, health related content, risk framing, and rumors. The study looked at a random 1% sample off all tweets published in the time period between September 30, 2014 and October 30, 2014. After the sample was obtained it was then filtered for tweets that contained the word "Ebola" in either their content or hashtags, were in English, and had a minimum of 1 retweet. The final analysis focused on a total of 3,113 tweets. This study found that, when they excluded tweets that were joking in nature, 10% of Ebola related tweets contained false or partially false/misinterpreted information. They also determined that 38% of the Ebola-related tweets contained true information, and the majority (52%) contained opinion statements. While tweets depicting false information were not in the majority in this research, this study showed that these tweets still existed in a substantial amount and other users were interacting with this information at a high rate.

Dangerous information relating to medical topics spreading throughout social media is not limited to times of outbreak or disaster, it happens every day with all different types of subjects. The anti-vaccine movement has continued to be a dangerous trend and many studies have looked at the impact that social media has had on this movement. A study done by Keelan et al. (2007) focused on YouTube as a source of information regarding vaccines. The researchers searched YouTube using the keywords "vaccination" and "immunization" and included all of the videos that were in English and contained any message about human immunization in the analysis. The study ultimately analyzed 153 videos. The videos were categorized as being either positive, negative, or ambiguous. Being categorized as a positive video meant that the overall message of the video supported immunizations, negative meant that the overall message did not support immunizations, and ambiguous meant that the video contained a debate or was ambivalent. Overall, the study found that 73 (48%) of the videos were positive, 49 (32%) were

negative, and 31 (20%) were ambiguous. The study also found that, when compared with the positive videos, the negative videos were more likely to receive higher ratings and they received more views.

Another study conducted by Seeman et al. (2010) evaluated Canadian web users' beliefs about an H1N1 vaccination during an influenza pandemic. The study surveyed a random sample of 175,257 Canadian web users from October 27, 2009 to November 19, 2009 regarding their perceptions of the safety of the H1N1 vaccine. The study found that 23.4% of the respondents considered the vaccine safe, 41.4% of the respondents considered the vaccine unsafe, and 35.2% of the respondents reported ambivalence over the vaccine's safety. The study also explored web posted myths and facts about the vaccination, and it found that from October 27, 2009 through April 6, 2010 websites containing anti-vaccine sentiment remained popular among web users.

A study conducted by Syed-Abdul et al. (2011) was concerned with the amount of information being uploaded onto social video platforms. This overload of information was making it difficult to discern reliable health information from misleading videos. This study focused specifically on information relating to anorexia found on the social media site YouTube. The study retrieved 140 relevant videos and proceeded to have three doctors review each one and classify them as informative, pro-anorexia, or other. The study found that pro-anorexia content was found in 29.3% of the videos, and when those were compared to the informative videos, they found that the pro-anorexia videos were more highly favored and rated by the viewers. This is a common theme that has been shown through other studies; even though misinformation may not be the majority of information spreading, it often reaches a wide audience and is rated highly by those who share or see it. Anorexia is a complex problem, but it often stems from issues with

self-image. Pro-anorexia videos promote a very dangerous health trend to a very influential audience.

A literature review put together by Wang et al. (2019) included the analysis of 57 studies that were published anytime between January, 2012 and November, 2018. In order for a study to be included in the analysis it had to concern misinformation, disinformation, fake news, rumors, or any form of information disorder, it had to be propagated through online media, it had to be related to health, it had to be a modeling study or empirical analysis, it had to include humans, it had to be original research, and it had to be in English. The studies that met the inclusion criteria were then categorized and analyzed by the researchers. After putting all of these individual studies together and analyzing their content this systematic literature review was able to conclude that "misinformation is abundant on the internet and is often more popular than accurate information" (Wang et al., 2019, p. 7). The review also found that while there have been studies done regarding a wide range of topics, the literature is dominated by studies focusing on information circulating about infectious diseases, including vaccination information.

Misinformation During the COVID-19 Pandemic

The emergence of Covid-19 brought with it an explosion of information on social media, not all of it factual. Although the Covid-19 Pandemic has not been going on for an extensive period of time, many studies have already come out regarding the spread of misinformation on social media. One study done by Kouzy et al. (2020) looked at the information regarding the pandemic that was circulating on the social media platform Twitter. The study utilized tweets that included one or more of 11 different popular hashtags and three common key terms relating to Covid-19. The study excluded tweets that had four or fewer retweets and ended up with a sample size of 673 tweets. The study excluded the tweets that were classified as humorous/non-

serious and found that of the remaining tweets 153 (24.8%) of them included misinformation and 107 (17.4%) of them included unverifiable information. The study also concluded that some tweets or Twitter account characteristics were seen to be associated with a higher chance of spreading misinformation. Overall, the study found that 42.2% of the information studied was misinformation or unverifiable information, which is a significant amount.

Another study concerning Covid-19 and the resultant social media frenzy was conducted by Islam et al. (2020) from December 31, 2019 through April 5, 2020. This study focused on what they called an "infodemic", defined by them as "an overabundance of information- some accurate and some not- that makes it hard for people to find trustworthy sources and reliable guidance when they need it" (Islam et al., 2020, p. 1621). The study analyzed 2,311 reports related to Covid-19 in 25 languages and from 87 countries. Of these reports they found that 1,856 of the claims were false. These false claims were then sorted into categories; 2,049 (89%) of them were classified as rumors, 182 (7.8%) were classified as conspiracy theories, and 82 (3.5%) were classified as stigma. Rumors were found to be the most prevalent class by far in this study, and that could be due to the fact that individuals share these rumors with no evidence and the cycle continues on eventually reaching a broader and wider audience.

A study conducted by Allington et al. (2020) looked at the relationship between social media usage and Covid-19 conspiracy theory belief. The study gathered participants in partnership with CitizenMe. They sent out invitations to all members of a panel of UK residents that had expressed an interest in answering survey questions about Covid-19. The study ended up including a total of 949 participants. The survey results found that there was a positive relationship between holding one or more conspiracy beliefs and preference for social media over traditional media as a general source of information. In addition, the study also found that

there was a very strong negative relationship between holding conspiracy views and following all health-protective behaviors. The researchers also conducted two more studies with similar designs. After all of the data collection was concluded the study found that there was a positive correlation between COVID-19 conspiracy beliefs and the use of social media as a source of information about COVID-19, and a negative association between COVID-19 conspiracy beliefs and COVID-19 specific health-protective behaviors. The strongest negative effects were those associated with beliefs that imply that the coronavirus may not exist, that its lethality has been exaggerated, or that its symptoms may have a non-viral cause.

Another study conducted by Pennycook et al. (2020) was interested in Covid-19 misinformation and how people shared that information through social media. The study recruited 1,000 participants using an online recruiting source called Lucid. After narrowing down their sample to those who used Facebook or twitter and those who completed the entire survey, they were left with 853 participants. These participates were presented with headlines in the format of a Facebook post; a picture accompanied by a headline. The participants were then randomly assigned to one of two conditions; the accuracy condition or the sharing condition. The accuracy condition asked the participants if, to the best of their knowledge, the above headline was accurate. The sharing condition asked the participants if they would consider sharing the story online. The study found that for the false headlines, 32.4% more individuals than those who rated the headline as accurate, were willing to share the false headline on the internet. This means that participants were willing to share fake news stories about Covid-19 that they would have evidently been able to identify as being untrue if they were asked about the accuracy directly.

Covid-19 is still a relatively new thing to the world, and more studies regarding Covid-19 information spreading through social media will probably be published in the near future. The above studies have shown consistent results regarding health information on social media and its prevalence. Studies showed that health information-seeking online was done by a majority of Americans, and more people were likely to consume this information that they were to post it. A similar trend shown throughout many of the studies was that while misinformation was not usually the majority of information on social media, it was consistently rated highly and shared among users. Studies done regarding Covid-19 specifically showed that misinformation and rumors are a significant problem on social media, and holding conspiracy beliefs can lead to individuals not following health protective behaviors. All of these studies combined show just how substantial this problem is, and individuals should be aware of the information they are consuming on social media.

Methods

Participants

This study's target population was comprised of all individuals that were active on the social media platform Facebook and were over the age of 18. A sample was obtained from this target population through methods categorized as convenience sampling. In order to acquire the sample used in this study, a survey was posted on one of the researcher's personal Facebook page with the following recruitment description: "Hello, my name is Emma Durham and I am a junior nursing student at Murray State University. This semester I am completing my honors thesis and I have made a survey that will help me with my research that anyone over the age of 18 can take! The survey is short and will only take up about 10 minutes of your time. My thesis

is over how social media aids in spreading medical information. The survey consists of questions relating to what you have seen on social media regarding Covid-19. All answers to the survey will be anonymous and you are able to stop at any time if you would like to. Please click the link below, fill out the survey, and hit submit at the bottom if you would like to participate. I also welcome and ask you all to share this post in order to reach a broader range of participants. Thank you!". When the post was first shared, it was open for anyone to see and interact with. The post was also made shareable, which means that anyone was able to share the post with their friends on Facebook as well. This was done in order to reach a more diverse population and have a sample that was more reflective of the population as a whole. By the time the survey was closed the post had received a total of 14 shares.

The survey was posted on September 29, 2020 and was closed on October 26, 2020. The survey received a total of 251 responses all from different participants; however, one individual was not over the age of 18, so that participant was not able to complete any further questions. Results were only recorded for those individuals who filled out all of the required questions and hit submit at the end of the survey. If an individual decided to quit halfway through or not hit the submit button, none of the results for that particular individual were recorded. In order to ensure that all of the participants were active on the social media site Facebook the survey was only accessible through the Facebook website. This way if the participant was able to access and complete the survey, it was known that they did it through the Facebook site and not some outside source. Demographics for the participants are unknown, since the survey was completely anonymous and no identifying questions were asked. After removing the participant that was under the age of 18, the final sample consisted of 250 individuals that were all over the age of 18 and were all active on Facebook.

Survey and Data Collection

Data collection for this research study utilized an anonymous survey made by the researcher (Appendix A). The survey was created using Google forms, and the final product was sent out in that same format. The survey consisted of 34 total questions and used a multiple-choice format. This meant that individuals were not able to input their own responses, but instead chose from preselected answers. The survey started off by asking "are you over the age of 18?". The participant then selected from the predetermined choices of yes or no. Since the participants needed to be over the age of 18, if the individual selected no then they would not have been permitted to answer any of the other questions and their survey would have been submitted with no other answers. If the individual answered yes, then they moved on to a series of questions regarding what they have seen on social media in regard to Covid-19. The next 16 questions asked if the individual had seen a particular statement regarding Covid-19 on social media. The participants were given the same pre-determined answer choices of yes or no to choose from. If the participant answered yes, he/she would receive a follow up question asking if he/she believed the statement now or at any point in time. The answer choices for the follow up questions were as follows: yes, I do now; I did at one point in time, but I do not anymore; no, I never believed this. If the participant answered that he/she had not seen that particular statement on social media, he/she would not receive the follow up question and instead would move on to the next statement. The survey consisted of a total of 16 questions regarding Covid-19 statements, and then the participants could have potentially received 16 follow up questions depending on their answers. The last question asked the participants if they consented to their answers being used in this research study and had choices of yes or no. The survey was set up so that participants could

not skip questions, but instead needed to answer all of them in order to finish the survey and hit submit.

The Covid-19 statements featured in the survey were classified into one of two categories: valid information or misinformation. For the purpose of this study, disinformation was not used as a classification. Since the statements were not in context, it was impossible to tell what the intent behind them was, which is the distinguishing factor between misinformation and disinformation. The survey contained 16 total statements about Covid-19, 3 of which were classified as valid information and 13 of which were classified as misinformation (Appendix B). Data collection for this study began on September 29, 2020 when the original Facebook post was made, and individuals could begin taking the survey. Data collection ceased on October 26, 2020 when the survey stopped accepting new responses.

Protection of Human Rights

This research study was IRB approved through the Murray State Institutional Review Board. Documents laying out the purpose of the study, the methods of data collection, and how human rights were to be protected were all submitted to the Murray State IRB for review on September 18, 2020. An Institutional Review Board is a formal committee that is established in order to review the ethics and conduct of a particular study. This research received official IRB approval on September 28, 2020 (Appendix C). All human rights pertaining to the research participants were carefully assessed and protected throughout the entire research process. Along with the aforementioned recruitment letter, a paragraph detailing the specifics of the study was included at the top of the survey form (Appendix D). This paragraph, along with the paragraph posted with the Facebook post, provided participants with pertinent information relating to how

long the survey would take, how confidentiality would be maintained, how they were able to stop participating at any point throughout the survey, and who to go to with any questions.

Confidentiality was maintained throughout this study by using anonymity. Participants were not asked to input any identifying information into the survey, which made it impossible for the researchers to match any answers to a specific participant, or to even determine who participated in the study at all. The survey utilized Google Forms as the mode of data collection and participants were not asked to sign into any particular account in order to complete the survey. Since individuals were not required to sign in, the researchers were not able to link participants based on usernames or web addresses either. Complete anonymity was preserved throughout the entire study. Participants also had complete autonomy on whether or not they wanted to participate in the study, and they were made aware of what the study was attempting to examine before making a decision. If an individual decided to partake by completing the survey, they were also presented with the opportunity to withdraw from the study at any time and they were not required to submit their answers if they did not want to. Any individual on Facebook over the age of 18 was welcomed to participate in the study, meaning that while vulnerable groups were not targeted for this study, some individuals classified as being a part of a vulnerable group may have still participated. However, informed consent was obtained and there was minimal risk associated with participation. There were no costs or potential risks associated with the study besides time commitment which was explained in the recruitment letter. Informed consent was obtained through the last question of the survey, asking if the participants consented to their answers being used. Both the paragraph accompanying the original Facebook post and the paragraph at the top of the survey served to give participants all of the information that they needed in order to make an informed decision whether to participate or not. The survey question

asking for consent was made to be the last question asked to the participants, so that individuals had already completed all of the necessary questions and they knew exactly what the study consisted of before they had to make a decision. Contact information was also provided to the participants in case they had any questions or concerns.

Results

The survey used in this research study was closed on October 26, 2020. The results were then analyzed and arranged into tables. Table 1 shows the percentage of individuals that said they had seen or had not seen a particular statement regarding Covid-19 on social media. Every statement had been seen by at least some of the participants, with the lowest percentage of those that had seen a particular statement being 5.2%. Nine out of the sixteen statements had a higher percentage of individuals that had seen the statement on social media than had not seen it. Of those nine statements seven of them had more than a 50% difference between those that had seen the statement and those that had not, with those who had seen it being the higher percentage. Seven out of the sixteen statements had a higher percentage of individuals that had not seen the statement on social media compared to those that had. However, only three of them had more than a 50% difference between those who had seen the statement and those that had not.

Table 1: Prevalence of Covid-19 Statements on Social Media

Questions from Survey: Have you seen this statement on social media?	Number of Participants That:	
	Said They Have Seen the Statement	Said They Have Not Seen the Statement
Covid-19 is no worse than the annual flu.	85.6% (214/250)	14.4% (36/250)
If I can hold my breath for 10 seconds without coughing or discomfort, I do not have Covid-19.	28.4% (71/250)	71.6% (179/250)
Wearing a mask under the nose is just as effective as wearing a mask over the nose.	10% (25/250)	90% (225/250)

Covid-19 is mainly spread from person to person through respiratory droplets.	89.6% (224/250)	10.4% (26/250)
When a Covid-19 vaccination become available it will be used to implant a trackable microchip.	53.2% (133/250)	46.8% (117/250)
The prolonged use of medical masks, when properly worn, can cause CO_2 intoxication and oxygen deficiency.	67.2% (168/250)	32.8% (82/250)
Hydroxychloroquine is an effective treatment for Covid-19.	79.6% (199/250)	20.4% (51/250)
You should still social distance and wear a mask even if you have previously tested positive for Covid-19.	76.4% (191/250)	23.6% (59/250)
Breathing hot air from a hairdryer will kill any Covid-19 germs and protect me from contracting the virus.	5.2% (13/250)	94.8% (237/250)
Covid-19 was created by and released by individuals working in a lab in China.	90.4% (226/250)	9.6% (24/250)
Spikes in Covid-19 are solely due to an increase in testing.	90.4% (226/250)	9.6% (24/250)
Wearing a mask will weaken my immune system and make me sicker.	37.6% (94/250)	62.4% (156/250)
Covid-19 can impact all ages and have a significant effect on everyone.	88% (220/250)	12% (30/250)
Using a strong disinfectant to cleanse your body will protect you against Covid-19.	34.8% (87/250)	65.2% (163/250)
When a Covid-19 vaccination becomes available it will be more dangerous than the virus itself.	30.4% (76/250)	69.6% (174/250)
5G helps the spread of Covid-19.	17.2% (43/250)	82.8% (207/250)

The questions used were categorized into one of two categories: valid information or misinformation. The statements that qualified as valid information were: Covid-19 is mainly spread from person to person through respiratory droplets; you should still social distance and

wear a mask even if you have previously tested positive for Covid-19; and Covid-19 can impact all ages and have a significant effect on everyone. These statements, at the time of this research study, were generally accepted by scientists and evidence existed to back up the claims. The rest of the statements included in the survey were classified as misinformation, meaning there is no evidence behind these claims, and they are generally not accepted by specialists in the field. Most of the participants reported that they had seen the valid statements on social media with the lowest percentage being 76.4% and the highest being 89.6%. The statements classified as misinformation had a wider range, with some statements seeming to be very popular with the majority having seen them on social media, and some being not as popular with very few participants having seen them. The lowest percentage for the misinformation statements was 5.2% while the highest was 90.4%. This means that the misinformation statements had a range of 85.2%. Six of the statements from the misinformation category had over 50% of the respondents say that they had seen the statement on social media, while the remaining seven had more than 50% of the respondents say that they had not seen the statement on social media. The valid information seemed to be consistently popular, while the misinformation ranged from being very prevalent to only a few having seen it.

Table 2 shows further analysis of the data and looks at how many individuals, out of the ones that had answered that they had seen the statement on social media, believed the statement or had believed the statement at one point in time. For all of the statements that were classified as misinformation, the majority of individuals that had seen the statement had never believed the statement to be true. However, a few of the statements classified as misinformation had almost half of the individuals either believing the statement now or having believed it at one point in time. Two of these statements were: Covid-19 was created by and released by individuals

working in a lab in China and spikes in Covid-19 are solely due to an increase in testing. These statements both had over 40% of the respondents saying that they either believe this statement now or they believed it in the past at some point in time. The valid statements again stayed rather consistent and most of the participants believed these statements to be true across the board.

Table 2: Beliefs about Covid-19 Statements on Social Media

Questions from Survey: Do you, or have you at any point, believed this statement?	Of the Participants That Have Seen the Statement on Social Media How Many:		
	Believe this statement to be true now	Believed this statement at one point but do not anymore	Never believed this statement
Covid-19 is no worse than the annual flu.	18.7% (40/214)	18.7% (40/214)	62.6% (134/214)
If I can hold my breath for 10 seconds without coughing or discomfort, I do not have Covid-19.	2.8% (2/71)	28.2% (20/71)	69% (49/71)
Wearing a mask under the nose is just as effective as wearing a mask over the nose.	4% (1/25)	4% (1/25)	92% (23/25)
Covid-19 is mainly spread from person to person through respiratory droplets.	80.6% (179/222)	9.9% (22/222)	9.5% (21/222)
When a Covid-19 vaccination become available it will be used to implant a trackable microchip.	11.4% (15/132)	5.3% (7/132)	83.3% (110/132)
The prolonged use of medical masks, when properly worn, can cause CO2 intoxication and oxygen deficiency.	15.1% (25/166)	6% (10/166)	78.95 (131/166)
Hydroxychloroquine is an effective treatment for Covid-19.	19.2% (38/198)	19.7% (39/198)	61.1% (121/198)
You should still social distance and wear a mask even if you have previously tested positive for Covid-19.	92.1% (176/191)	3.1% (6/191)	4.7% (9/191)
Breathing hot air from a hairdryer will kill any Covid-19 germs and protect me from contracting the virus.	0% (0/13)	0% (0/13)	100% (13/13)

Covid-19 was created by and released by individuals working in a lab in China.	27.8% (62/223)	13.9% (31/223)	58.3% (130/223)
Spikes in Covid-19 are solely due to an increase in testing.	38.6% (86/223)	9% (20/223)	52.2% (117/223)
Wearing a mask will weaken my immune system and make me sicker.	18.3% (17/93)	6.5% (6/93)	75.3% (70/93)
Covid-19 can impact all ages and have significant effect on everyone.	87.6% (191/218)	5.5% (12/218)	6.9% (15/218)
Using a strong disinfectant to cleanse your body will protect you against Covid-19.	6.9% (6/87)	1.1% (1/87)	92% (80/87)
When a Covid-19 vaccination becomes available it will be more dangerous than the virus itself.	20% (15/75)	9.3% (7/75)	70.7% (53/75)
5G helps the spread of Covid-19.	0% (0/43)	0% (0/43)	100% (43/43)

The data also showed that the statements that were more popular, meaning that more individuals reported seeing them on social media, seemed to have more controversy around them as well. The misinformation statements that had been seen by more individuals had a larger split between those that believed them to be true and those who did not. The three statements that had the lowest number of individuals saying that they had seen them also had the highest percentage of individuals saying that they never believed the statement to be true. On the other hand, the misinformation statements that had the highest number of views also had the most divide between those that believed the statements or had believed the statements and those that had never believed them. The two misinformation statements that had the highest number of views, with 90.4% of the participants having seen both of them, were also the most split. Both of those statements had around 50%-60% of participants saying that they never believed the statements to be true, while the remaining 50%-40% said that they either believe the statement now or had at

one point. These two statements represented both the largest prevalence and the largest divide between beliefs.

<div align="center">**Discussion**</div>

Interpretation of Results

The research question that this study aimed to examine was as follows: what is the prevalence of misinformation regarding Covid-19 on the social media platform Facebook and have individuals been able to separate the valid information from the misinformation? The study examined this question by administering a survey on Facebook to all users over the age of 18 and analyzing the results. The survey asked participants if they had seen a particular statement on Facebook and then, if the participant answered yes, it asked a follow up question about if they believed the statement or not. It was important for the research to look at both the prevalence of these statements and the belief rate in order to determine if the misinformation is only spreading on social media with no credibility being given to it, or if individuals are spreading and believing this information.

The first thing the survey looked at was the prevalence of certain statements regarding Covid-19 on social media. This was accomplished by asking if participants had seen a particular statement about Covid-19 on social media. The results ranged from some statements having 226 out of 250 participants having seen the statement to others only having 13 of the 250 participants having seen the statement. This was an expected finding; some statements just happen to gain more traction on social media and spread further than others. The three statements that received the least amount of views consisted of the three statements that were the most outlandish, so it makes sense that these were the statements that were not spreading as far as others. The statements that had been seen the most by participants consisted of both valid statements and

misinformation. Some of the misinformation statements were very popular, and a lot of participants stated that they had seen those statements on social media. This is consistent with a lot of the findings from past studies and the general trends that other studies were reporting. Misinformation can spread to a wide audience and can be just as prevalent as valid information on social media. The valid statements were also popular among the participants, they had the majority of the participants stating that they had seen the statements on social media, but some misinformation statements were just as popular. The two statements that had the highest percentage of individuals seeing them on social media, with 90.4%, were misinformation statements and not valid statements. This can be seen as a tremendous problem; misinformation is becoming just as prevalent, or in some cases more prevalent, on social media as valid information is. Another trend that emerged in this research study was that misinformation was less consistent than valid information on if it had been prevalent on social media or not. Valid information had a high percentage of views across the board, while misinformation ranged from 90.4% to only 5.2% of participants having seen the statement.

The second aspect that the survey aimed to look at was the percentage of individuals, out of those that had seen a particular statement, that believed that statement to be true. This was examined in order to see if individuals were believing the misinformation that they were seeing on social media, or if they were seeing the statements but distinguishing them from fact and not believing them. The valid statements received fairly high percentages of individuals believing they were true, ranging from 80.6% to 92.1%. This is good, since the statements were valid information the statements were true, so the individuals that believed them were believing correct information. The statements categorized as misinformation on the other hand had a much wider range of percentages, ranging from 0% to 38.6% of participants believing the statements.

Since these statements were in the category of misinformation, they should not be believed because they are false, and the claims do not have evidence to back them up. While the majority of participants did not believe these statements, many of them did have a significant number of individuals that either believed them now or had believed them at one point. This is a dangerous finding, since these statements have to do with a medical issue and keeping themselves and others safe. As other studies have shown, like the one done by Allington et al. (2020), belief in these statements can lead to individuals following dangerous health behaviors and not protecting themselves or others. Another trend that seemed to emerge with this data was that the statements that had been seen by more individuals were often the statements that had a bigger split between those who believed them and those who did not. These statements did not seem to have a general consensus on if individuals believed them or not and appeared to be much more controversial than the statements that were not viewed by many participants. This means that individuals are seeing these statements on social media, believing them and then, since these statements seem to be very popular on social media, most likely sharing them with others. This may be leading to even more views of misinformation on social media and it may also be leading to even more people believing this dangerous information.

The survey results also showed that every statement, with the exception of two, had some participants say that they do not believe the statement to be true anymore, but they did at one point in time. This shows that individuals are able to adapt their opinions on statements that they see on social media. Sometimes statements are seen on social media and the individual viewing it will take it at face value instead of looking for more information on the subject. However, the survey suggests that individuals may believe these statements at first, and then when they see contradictory evidence, they may reevaluate their beliefs and change their minds. The survey

results also suggest that the statements being shared on social media are reaching a very wide audience. The majority of participants that had seen statements on social media were able to determine fact from fiction and did not believe the misinformation to be true. However, these statements were still somehow reaching them and many others through social media sites.

Overall, this survey found that misinformation is prevalent on social media, and while the majority of individuals are able to separate the valid information from the misinformation, there is still a significant number of individuals believing and propagating these claims. These results align with many previous studies done that have looked at information on social media. While the valid statements were seen by a high percentage of participants, the two statements that had the highest percentage of views, with 90.4% of participants saying they had seen the statement, were both statements classified as misinformation. This supports other studies, like the one done by Wang et al., (2019), that have found that misinformation is spread farther, or just as far, on social media as valid information is. The survey also showed that even though less than half of the participants believed the misinformation statements, some of those statements still reached the same number of people on social media as the valid statements that had a large majority of participants believing them. This can lend support to other research studies, like the one conducted by Syed-Abdul et al. (2011), that have found misinformation to be highly rated and shared among those on social media, because even though less people believed the statements they were being shared and propagated enough to reach almost the same audience as the valid statements.

Limitations

While this study yielded results that are in line with the previous literature, there are some limitations that need to be addressed. These limitations may have contributed to error in the

study and could have possibly caused the results to not be as accurate as possible. Many steps were taken in order to minimize error and bias, but there are some variables that could not be controlled for. The limitations for this study come mostly from problems with the sampling methods and the surveying methods.

The first limitation in this study was the fact that the survey was disseminated only from the researchers personal Facebook account. This method of participant recruiting may have led to bias in the sampling population, since only Facebook friends of the researcher could see and interact with the original post. The study attempted to limit this bias by having individuals who saw the post share it with their friends on Facebook as well, in order to reach a broader range of individuals and beliefs. The post received a total of 14 shares which helped to minimize bias but could not work to eliminate it completely. This highlights a flaw in the sampling methods of this study. The ideal method would have been to utilize a completely random sample of all Facebook users over the age of 18, but that was not a possibility, so it was impossible for sampling bias to be controlled all the way. Another problem that arose with the sampling method was that participants could have possibly taken the survey multiple times. Since no identifying characteristics were asked, it was impossible to know if individuals participated multiple times. This was limited by putting a statement in the instructions that asked participants only to participate one time.

The second limitation to this study can be found in the survey itself. The problem comes from the fact that the survey only included 3 statements classified as valid information, while it included 13 statements classified as misinformation. This made it harder to compare the two categories during data analysis. If more valid statements had been included the data may have shown a wider range of presence and belief regarding valid statements on social media. Instead,

the three statements used all showed very similar viewing and belief rates. However, the data gathered from the three valid statements showed findings that are consistent with the expected results and were not surprising. Looking at past studies and the results found here it can be assumed that the results with more valid statements would have stayed rather consistent; however, the research still should have utilized more valid statements in the survey in order to make the categories even.

The last limitation that this study faced is the fact that science is always changing. The Covid-19 pandemic is still rather new, and the science surrounding it may change as more information becomes available. This means that some of the statements used in this survey may change categories over time. Some statements that are classified as misinformation right now may, in the future, be proven to be valid information, while some statements classified as valid information may, in the future, be proven to be misinformation. While this is something that needs to be taken into consideration, the fact does not significantly affect the results of this particular study. At the time this survey was given these statements had a general consensus among scientists about what category they belonged in, so it does not matter if the science changes over time, because this study is looking at a snapshot in time and not a continuous period. Overall, the study attempted to minimize bias and error the best that it could, but some problems still remain relevant and are worth mentioning.

Conclusion

Social media has become a hub for information seeking and many individuals use some form of it every day. This makes it extremely important to examine how information is spreading and if that information is true or not. The results found in this study were consistent with past findings and can lend support to many other studies done on this topic. This research found that

misinformation regarding Covid-19 is prevalent on social media, and while individuals are able to separate the valid information from the misinformation most of the time, there is still a significant number of individuals believing false statements. Belief in these false statements can lead to many individuals not following guidelines during a pandemic, and instead following health behaviors that may be dangerous. This data can be used in the future to help others see the prevalence of this issue and find solutions to counteract it. Misinformation is spreading to a wide audience on social media and with the correct solutions and evidence this may be able to be minimized. In the future, variables could be added to this study to look at the differences between age groups, the differences between gender, and the results if more valid statements had been added to the survey. The results of this study, along with those from Al Khaja et al., Wang et al., and Islam et al., can be utilized by the general public, and they show that individuals on social media need to be more aware of the misinformation being spread and they need to fact check the information found before taking it at face value.

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Survey Questions:

Are you over the age of 18?
1. Yes
2. No

Question 1:
Have you seen this statement on social media? Covid-19 is no worse than the annual flu.
1. Yes
2. No

Question 1 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 2:
Have you seen this statement on social media? If I can hold my breath for 10 seconds without coughing or discomfort, I do not have Covid-19.
1. Yes
2. No

Question 2 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 3:
Have you seen this statement on social media? Wearing a mask under the nose is just as effective as wearing a mask over the nose.
1. Yes
2. No

Question 3 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 4:
Have you seen this statement on social media? Covid-19 is mainly spread from person to person through respiratory droplets.

1. Yes
2. No

Question 4 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
   1. Yes, I do now
   2. I did at one point in time, but I do not anymore
   3. No, I never believed this

Question 5:
Have you seen this statement on social media? When a Covid-19 vaccination becomes available it will be used to implant a trackable microchip.
   1. Yes
   2. No

Question 5 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
   1. Yes, I do now
   2. I did at one point in time, but I do not anymore
   3. No, I never believed this

Question 6:
Have you seen this statement on social media? The prolonged use of medical masks, when properly worn, can cause CO_2 intoxication and oxygen deficiency.
   1. Yes
   2. No

Question 6 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
   1. Yes, I do now
   2. I did at one point in time, but I do not anymore
   3. No, I never believed this

Question 7:
Have you seen this statement on social media? Hydroxychloroquine is an effective treatment for Covid-19.
   1. Yes
   2. No

Question 7 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
   1. Yes, I do now
   2. I did at one point in time, but I do not anymore
   3. No, I never believed this

Question 8:

Have you seen this statement on social media? You should still social distance and wear a mask even if you have previously tested positive for Covid-19.
1. Yes
2. No

Question 8 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 9:
Have you seen this statement on social media? Breathing hot air from a hairdryer will kill any Covid-19 germs and protect me from contracting the virus.
1. Yes
2. No

Question 9 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 10:
Have you seen this statement on social media? Covid-19 was created by and released by individuals working in a lab in China.
1. Yes
2. No

Question 10 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 11:
Have you seen this statement on social media? Spikes in Covid-19 are solely due to an increase in testing.
1. Yes
2. No

Question 11 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 12:
Have you seen this statement on social media? Wearing a mask will weaken my immune system and make me sicker.
1. Yes
2. No

Question 12 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 13:
Have you seen this statement on social media? Covid-19 can impact all ages and have significant effects on everyone.
1. Yes
2. No

Question 13 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 14:
Have you seen this statement on social media? Using a strong disinfectant to cleanse your body will protect you against Covid-19.
1. Yes
2. No

Question 14 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now
2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 15:
Have you seen this statement on social media? When a Covid-19 vaccination becomes available it will be more dangerous than the virus itself.
1. Yes
2. No

Question 15 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
1. Yes, I do now

2. I did at one point in time, but I do not anymore
3. No, I never believed this

Question 16:
Have you seen this statement on social media? 5G helps the spread of Covid-19.
    1. Yes
    2. No

Question 16 Follow Up:
If yes: Do you, or have you at any point, believed this statement?
    1. Yes, I do now
    2. I did at one point in time, but I do not anymore
    3. No, I never believed this

Consent Question:
Do you consent to these answers being used for this research study?
    1. Yes
    2. No

Appendix B

Questions Classified as Valid Information:

1. Covid-19 can impact all ages and have significant effect on everyone.

2. You should still social distance and wear a mask even if you have previously tested positive for Covid-19.

3. Covid-19 is mainly spread from person to person through respiratory droplets.

Statements Classified as Misinformation:

1. Covid-19 is no worse than the annual flu.

2. If I can hold my breath for 10 seconds without coughing or discomfort, I do not have Covid-19.

3. Wearing a mask under the nose is just as effective as wearing a mask over the nose.

4. When a Covid-19 vaccination become available it will be used to implant a trackable microchip.

5. The prolonged use of medical masks, when properly worn, can cause CO2 intoxication and oxygen deficiency.

6. Hydroxychloroquine is an effective treatment for Covid-19.

7. Breathing hot air from a hairdryer will kill any Covid-19 germs and protect me from contracting the virus.

8. Covid-19 was created by and released by individuals working in a lab in China.

9. Spikes in Covid-19 are solely due to an increase in testing.

10. Wearing a mask will weaken my immune system and make me sicker.

11. Using a strong disinfectant to cleanse your body will protect you against Covid-19.

12. When a Covid-19 vaccination becomes available it will be more dangerous than the virus itself.

13. 5G helps the spread of Covid-19.

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Appendix C

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TO: Jessica Naber, Nursing

FROM: Jonathan Baskin, IRB Coordinator

DATE: 9/28/2020

RE: Human Subjects Protocol I.D. – IRB # 21-019

The IRB has completed its review of your student's Level 1 protocol entitled *The Spread of Medical Information Through Social Media Platforms*. After review and consideration, the IRB has determined that the research, as described in the protocol form, will be conducted in compliance with Murray State University guidelines for the protection of human participants.

The forms and materials that have been approved for use in this research study are attached to the email containing this letter. These are the forms and materials that must be presented to the subjects. Use of any process or forms other than those approved by the IRB will be considered misconduct in research as stated in the MSU IRB Procedures and Guidelines section 20.3.

Your stated data collection period is from 9/28/2020 to 11/20/2020.

If data collection extends beyond this period, please submit an Amendment to an Approved Protocol form detailing the new data collection period and the reason for the change.

This Level 1 approval is valid until 9/27/2021.

If data collection and analysis extends beyond this date, the research project must be reviewed as a continuation project by the IRB prior to the end of the approval period, 9/27/2021. You must reapply for IRB approval by submitting a Project Update and Closure form (available at murraystate.edu/irb). You must allow ample time for IRB processing and decision prior to your expiration date, or your research must stop until such time that IRB approval is received. If the research project is completed by the end of the approval period, then a Project Update and Closure form must be submitted for IRB review so that your protocol may be closed. It is your responsibility to submit the appropriate paperwork in a timely manner.

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Opportunity afforded

murraystate.edu

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Equal education and employment opportunities M/F/D, AA employer. Murray State University supports a clean and healthy campus. Please refrain from personal tobacco use.

The protocol is approved. You may begin data collection now.

Appendix D

Explanation Provided with Survey

Hello everyone and thank you for clicking on my survey. I am working on my Honors Thesis at Murray State University and I am collecting data on how social media spreads medical information. This survey is a total of 34 questions (16 yes or no, and then 18 follow up questions). It should only take around 10 minutes to complete and all answers will be completely anonymous. If at any point during the survey you would like to not complete it, you are able to close out of the window and your answers will not be submitted. Answers that are submitted will not be associated with any personal information and there will be no personal questions throughout the survey that could be used to link answers back to a certain participant. I do ask that if you are interested in participating that you take the survey seriously and only provide accurate answers, only take the survey one time, and that you are over the age of 18. Any questions about the procedures or conduct of this research should be brought to the attention of Dr. Jessica Naber at 270.809.6690 or jnaber@murraystate.edu. Thank you. This project has been reviewed and approved by the Murray State University Institutional Review Board (IRB) for the Protection of Human Subjects. If you have any questions about your rights as a research participant, you should contact the MSU IRB Coordinator at (270) 809-2916 or msu.irb@murraystate.edu