A Google Search Trend Analysis: Understanding How Celebrities Diagnosed With Diseases Impact Awareness In The United States

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ABSTRACT

Health concerns within America have become a major topic of discussion. There are many underlying health conditions that Americans are faced with every day. However, this research focuses on some of the more prevalent illnesses that have a treatment process, but no cure to date. The illnesses that are top of mind in America are breast cancer, mental illness, diabetes. These illnesses have plagued the United States for decades and have been the cause of millions of deaths throughout the nation. The study takes on a granular research approach into dissecting mental illness, while also examining the effects of clinical depression, suicide, and the impact it has on the individuals. Another illness that has devastated the population is breast cancer. The disease known as breast cancer, comes in both common and rare forms. The research and methodology focus on breast cancer, the stages and treatments. Yet another growing concern within the American population is diabetes, which is why the food products are labeled with contents, calories, and ingredients. Through digital search analysis this research examines how these illnesses not only affect the general population, but also the hierarchy of the population such as celebrities and if the celebrities are so impactful to create awareness for the society.

Keywords: google trends, breast cancer, diabetes, mental illness, celebrities

INTRODUCTION

Often celebrities and public figures share their personal health-related experiences and advise their followers through social platforms to stay vigilant with health screenings. Celebrity endorsements are utilized to generate large-scale publicity for health campaigns due to their popularity, public interest, and influence. An example of this celebrity influence is Kylie Minogue, a singer, actress and is Australia's highest-selling female artist of all time. In 2005, Kylie shocked her fans with an online post announcing that she had canceled all her concerts for that year after being diagnosed with breast cancer. Following the news, mammography bookings rose 40% in four Australian states (Tan, 2015). Although few in numbers, empirical studies have also shown the considerable influence celebrities can have. For instance, a 2009 survey of 1,552 Americans found that 24% of parents place "some trust" in vaccine safety information given by celebrities (Freed, Clark, Butchart, Singer, & Davis, 2011).

The purpose of this research is to examine impact of breast cancer, mental illness, and diabetes have on the American population by analyzing google search patterns for celebrities. This research also investigates six different celebrities that were affected by the aforementioned diseases within the United States and how their announcements impacted Google search queries. After finalizing the diseases and the celebrities that would be considered for the research, the next step is to investigate the moment people began to make search inquiries on these high-profile celebrities and their respective illnesses.

The first disease that was studied for this research was breast cancer. In 2013, Angelina Jolie openly discussed that she was a carrier of a mutation in her BRCA1 gene (MacCuaig, 2014). The BRCA1 gene is a medical term to describe a tumor suppressor gene that individuals have in the human body. Robin Roberts is another celebrity who was diagnosed with breast cancer in 2007. In America 30% of all new cancer cases among women are breast cancer in 2017 (Sun, et al., 2017). Angelina Jolie and Robin Roberts, are two of the more well-known celebrities that have been diagnosed with breast cancer and brought awareness to this deadly illness.

The second disease that was considered for this research was mental illness, which has long been considered a stigma across American culture. It is often thought that people who suffer from mental illness disorders, such as depression, anxiety, bipolar, and other mood disorders are incapacitated human beings incapable of adding value to society or accomplishing life goals. However, mental illness has gone mainstream, and now more and more celebrities are opening about their own personal struggle with mental illness. By acting as advocates of a cause, celebrities often serve as a catalyst by helping reduce public stigmas, embrace acceptance, and help create social norms (McCarteny, 2019). For instance, in 2011 Demi Lovato, known for some out-of-control behavior, became vulnerable with her fans and shared her story about her struggle with mental illness and the importance of self-care. The twist of events has allowed her to become a mental health advocate. "This recalibration of her image has found a willing resonance with her audience and has boosted her cultural power. Her experiences with mental illness have become a highly valued part of her celebrity persona" (Franssen, 2019).

As a result, celebrities play a major role in the lives of everyday people and are often looked at as credible role models among their followers. "Celebrities can have tremendous influence on the knowledge we retain, the attitudes we adopt and the decisions we make, including those that affect our health" (Hoffman, 2017).

The curiosity that American culture has on the lives of celebrities holds true through data explored on Google Trends. In 2014, when the news of Robin Williams' suicide was made public, the internet went into a frenzy actively searching information on the death of the late actor. "Google reported more than 10 million searches for information concerning Williams the day he died, making the information the most sought-after" (Parrott, 2016). Henceforth, the two celebrities considered for mental illness are Demi Lovato and Robin Williams.

The third disease considered for this study is diabetes. Actor Tom Hanks and Halle Berry are the two of the many celebrities who have diabetes. Famous actor Tom Hanks revealed in 2013 that he was diagnosed with type 2 diabetes. "Hanks had attributed his diagnosis to the fact that he had often gained and lost large amounts of weight in a short space of time for film roles" (Muskiet, Wheeler, & Heerspink, 2018). Halle Berry was diagnosed with Type 1 diabetes at the age of 22. The actress had reportedly collapsed on a film set and fell into diabetic coma that lasted for one week. "Berry speaks publicly about diabetes to spread awareness and to help others obtain treatment. Halle Berry is often heard telling people with diabetes not to be ashamed of the condition with the purpose of removing the stigma associated with the disease" (Cbiz, 2014).

The framework of this research project will focus on the impact celebrity illnesses have on the American population. Section 2 of this research gives an overview of the datasets used for the analysis. Section 3 will illustrate the methodology and provide visualizations via Google Trends. Section 4 provides a coherent explanation of the keyword search data. Finally, Section 5 will provide a succinct and breviloquent conclusion of the entire study.

METHODOLOGY

The main purpose of this research is to try to correlate the impact celebrities have on the search behavior and awareness for "breast cancer", "mental illness", and "diabetes" among the United States population. "Among several studies in the fields of economics, business and policy that use Google Trends data, many studies have attempted to understand people and society through search activities and thereby predict behavior" (Jun, Jung, & Jun, 2017). Google Trends is designed to capture keyword search data on a quantitative level. Moreover, Google Trends also allows users to perform a comparison analysis between relatable keyword searches made during a specific time period and pull interesting insights. The resulting numbers on Google Trends range on scale from 0 - 100, based on a topic's proportion to all searches on all topics (Fowle, 2020). To fulfill the purpose of the research study, Google Trends was significantly utilized to draw a correlation between the celebrity illness announcement and its impact on the behavior of people and society as a whole.

In reviewing the social impact celebrities' illnesses have over the American population and how they search for health information. It was decided to further investigate and explore how celebrities with illnesses such as "breast cancer", "mental illness" and "diabetes" are affecting the overall American population. For instance, "breast cancer" is the second most common cancer amongst women and has the second highest mortality rate in America behind lung and bronchus cancer in 2019 (Richardson, Dowling, & Henley, 2021). In addition to the use of Google Trends, statistical CDC data visualizations on annual new cases and mortality rates for "breast cancer." Mortality rates based on demographic data was also utilized while conducting "breast cancer" research.

The data analysis determines the impact celebrities with these illnesses have on the American population. This research was conducted on keyword findings within the last 20 years. Once the data is populated, the data tells the story of the research in a visual format to align closely with the verbal analysis.

The data will be aligned with a readout that will be assembled in Excel, to deliver metrics in the form of graphs and charts. The customized visualization supports the analysis for users to follow the concise flow of data. In addition to the data analysis for the aforementioned illnesses, the data visualization delivers the mortality rate for each illness over time.

The theory of the research is linked to the meticulous literature review. A PubMed search for "Google Trends" revealed an over 20-fold increase in original research articles or research letters using Google TrendsTM from 2009 to 2018 (Arora, McKee, & Stuckler, 2019). A literature research has been observed by leveraging the utility of Google Trends focusing on cancer screening, examined the correlation between 2012 Google Trends and self-reported breast, cervical, colorectal and prostate cancer screening (Schootman, et al., 2015).

RESULTS

The statistical data and analysis that will be provided is comprised of information provided by government agencies such as the Center for Diseases Control (CDC), National Institute of Mental Health (NIMH), and American Foundation for Suicide Prevention (AFSP). These statistics will provide visualization for mortality rates, Google Trends results, and research funding in America for these illnesses.

The statistical data and research conducted to analyze breast cancer, mental illness, and diabetes within America. The next step in the research process is to analyze the statistical keyword search data that is directly linked to celebrities, user searches and if these celebrity announcements increase search results on the illnesses.

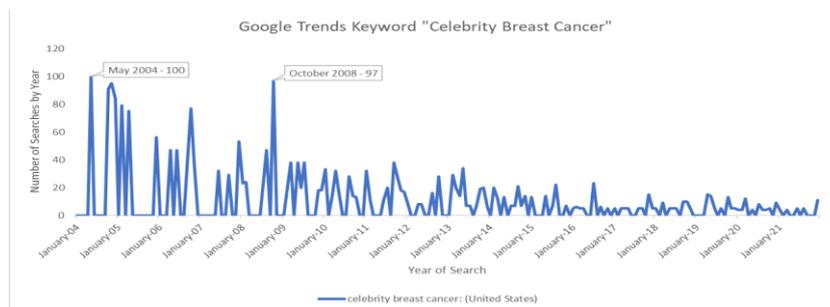### Google Trends "celebrity breast cancer" Search Results

Figure 1. "Celebrity breast cancer" searches in the United States via Google Trends search results from January 2004 - January 2021.

Figure 1 shows the annual search activity by searching "celebrity breast cancer" via Google Trends. The highest search totals took place in May of 2004 and October of 2008. The peak in search results may be attributed to Angelina Jolie's aunt being diagnosed with breast cancer in 2004. In 2008, actress Christina Applegate went public with her breast cancer diagnosis. The 36-year-old actress discovered the disease when her doctor ordered an MRI, which detected "breast cancer" in its early stages. The Google Trends data shows how frequently the population searches for "celebrity breast cancer" and the lift that higher profile celebrities provide to keyword search results.

Google Trends Search Results for "Angelina Jolie", "Robin Roberts" and "Breast Cancer"
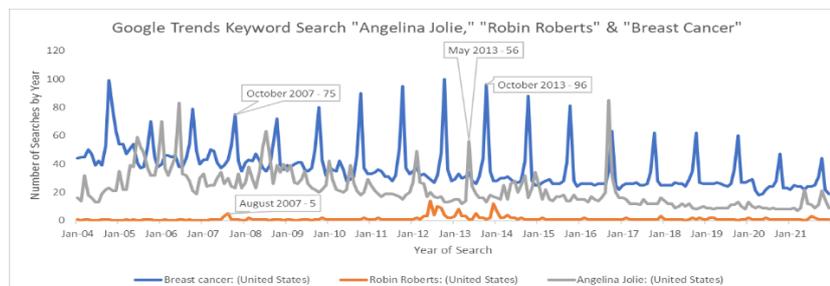

Figure 2. "Angelina Jolie", "Robin Roberts", "Breast Cancer", searches in the United States via Google Trends search results from January 2004 - January 2021.

The line chart in Figure 2 provides the keyword search results by searching "Angelina Jolie", "Robin Roberts" and "breast cancer" via Google Trends. The results show that in August of 2007, when "Robin Roberts" announced her cancer diagnosis there was a significant increase in searches within the next two months. In

October 2007, breast cancer searches had risen by 92% within a two-month period between August 2007 to October 2007.

When "Angelina Jolie" announced her cancer diagnosis in May of 2013, there was an increase in searches within a five-month period. "Breast cancer" searches increased by 71%, from the time "Angelina Jolie" made the breast cancer announcement up until the month of October.

Statistical Data Visualization for Breast Cancer Cases in the United States
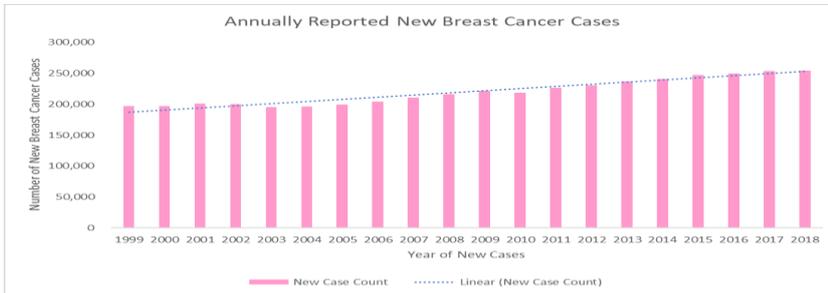

Figure 3. Annual number of breast cancer cases in the United States between 1999-2018 retrieved from the CDC cancer statistics (Group, 2021).

"Breast cancer" cases have continued to rise as shown in the Figure 3 visualization. This steady growth can be attributed to population growth and aging each year. Between 1999-2018, cases have grown by approximately 50,000 cases within that 19-year period. That equates to an increase of 25%. The rates of cancer diagnoses are impacted by changes in exposure to risk factors, screening test use, and improvements in treatments. (Group, 2021). This is why celebrities spreading awareness is imperative to the American population researching "breast cancer" and scheduling screenings for early detection to receive treatment early if diagnosed to reduce the risk of mortality.

Statistical Data Visualization for Breast Cancer Deaths in the United States

Figure 4. Annual number of breast cancer mortality rates in the United States between 1999-2018 retrieved from the CDC cancer statistics (Group, 2021).

The graph visualization in Figure 4 provides statistics on the annual mortality rate for "breast cancer" over a 19-year period. The CDC has consistently reported a mortality rate of over 40,000 "breast cancer" deaths annual between the years of 1999 to 2018. Celebrities Angelina Jolie and Robin Roberts have been very outspoken about their battles with "breast cancer" to spread awareness about the deadly disease. Research has shown that celebrity endorsements can boost awareness and drive more breast cancer test screenings throughout the population (Igoe, 2016). New "breast cancer" cases have an average of 220,000 since 1999, the mortality rate has an annual average of approximately 41,000 deaths for the past 19 years (Group, 2021). What's interesting to note is that breast cancer mortality only accounts for 19% of the new cases annually when comparing both statistics.

Data Visualization for Breast Cancer Deaths Based on the United States Demographics
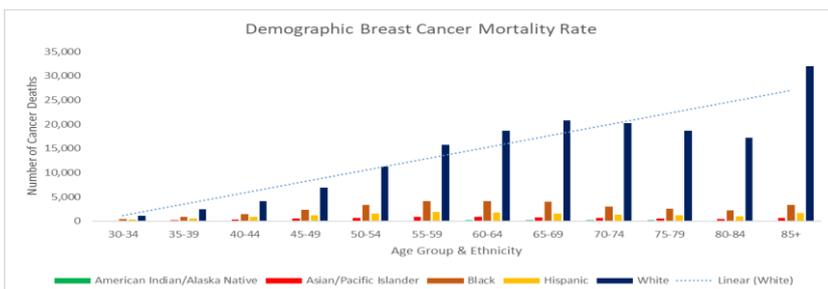

Figure 5. Demographic "breast cancer" mortality rates in the United States between 2014-2018 retrieved from the CDC cancer statistics (Group, 2021).

The visualization in Figure 5 depicts statistical data for the "breast cancer" mortality within the American demographic between 2014-2018. The demographic within this chart is parallel to the Census demographic for races and ethnicities in America. During this four-year period of mortality rate tracking, the data shows that the white population in America accounts for 75% of "breast cancer" mortalities. The white population ages 85+, also accounts for the highest mortality rate amongst all ethnicities at any age. The American Indian/Alaska Native ethnicity accounts for the fewest "breast cancer" mortalities at 0.5%. "Breast cancer" mortalities in the black population account for 14%. While cancer impacts people of all ages, races, ethnicities, and sexes, it does not always affect them equally. Many factors play a role in the risk among different groups of people (Group, 2021). However, increasing age is the most significant risk factor. This statistical data is significant with both Angelina Jolie and Robin Roberts being of white and black ethnicity.

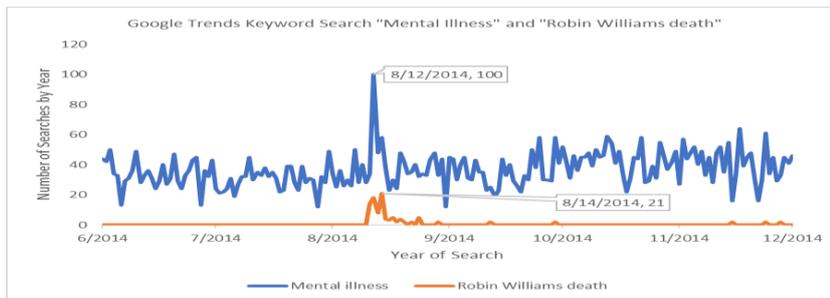### Google Trends Search Results for "Mental Illness" and "Robin Williams Death"

Figure 6. "Mental illness", "Robin Williams death", searches in the United States via Google Trends search results from June 2014 - December 2014.

Figure 6 provides an illustration of search activity conducted on Google search over a 6-month period in 2014. The data was collected by conducting a search comparison via Google Trends with the keyword searches for "mental illness" and "Robin Williams death" between June 2014 and December 2014. The line graph in figure 6 provides a correlation on how celebrity diseases influence search activity on diseases such as "mental illness". Up until the time of his death the keyword data for "mental illness" and "Robin Williams death" was static. However, in August of 2014, when the news broke of "Robin Williams death" due to his struggle with "mental illness" the data shows a significant increase in keyword search activity for "mental illness" and "Robin William death". On August 12, 2014, the day after Robin Williams died, the keyword "mental illness" scaled on Google Trends. In addition, the keyword "Robin Williams death" also showed a prominent lift on Google Trends. It's evident that the news of Robin Williams death drove an increase of search activity for keywords "mental illness" and Robin Williams death.

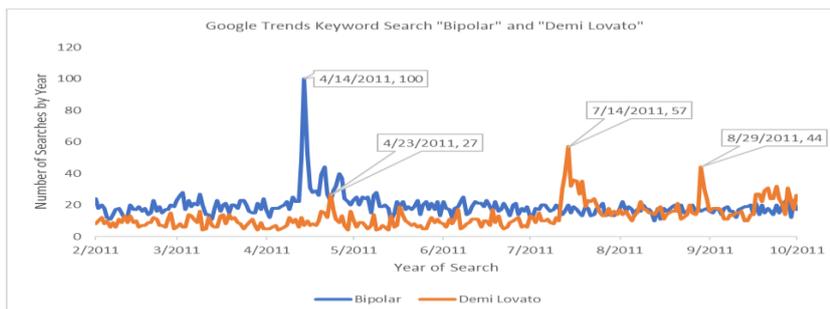### Google Trends Search Results for "Bipolar" and "Demi Lovato"

Figure 7. "Bipolar" and "Demi Lovato" searches in the United States via Google Trends search results from February 2011 - October 2011.

In Figure 7, the data details the correlation between another celebrity, "Demi Lovato" and how news of her illness drove an increase in search. The data was collected via Google Trends by utilizing keyword searches "bipolar" and "Demi Lovato" during the months of February 2011 and October 2011. In early April 2011, news about "Demi Lovato" circulated the internet as it was her first time speaking with the media in relation to her "bipolar" illness, as well as time spent in rehabilitation. The keyword bipolar showed a significant lift on April 14, 2011 as users were actively searching Google during the same time of Demi Lovato's announcement. As the days passed more search activity followed in regards to Demi Lovato. The keyword "Demi Lovato" showed a considerable lift in search on April 23, 2011, which emphasizes the celebrity's announcement drew attention to bipolar disorder. "Demi Lovato" also appears to trend in July 2011, which was not a result of mental illness, but rather a release of a new song. In August of 2011 the keyword "Demi

Lovato" also showed a lift in search trend, which was a result of news circulating about "Demi Lovato" posing in pictures with her ex-boyfriend Joe Jonas.

Statistical Data Visualization for Annual Suicide Deaths in the United States
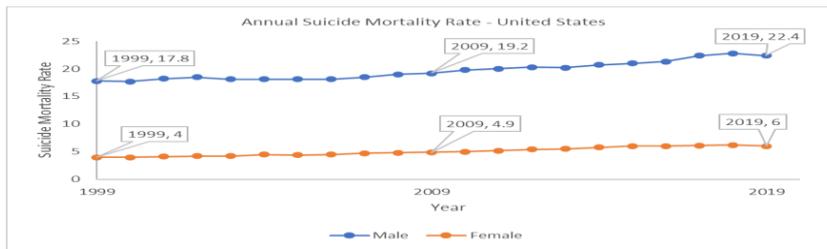

Figure 8. Annual number of suicide mortality rates in the United States between 1999-2018 retrieved from the CDC suicide statistics (National Institute of Mental Health, 2021).

The visualization in Figure 8 provides an overview of a 20-year period focusing on the mortality rate of men and women in the United States. Over time the mortality rate has grown substantially in men. In 1999 men accounted for 17.8% of suicides in the United States. Over the last 20 years that number has grown by 25%. As of 2019, "suicide" is the 10th[th] leading cause of death among the US population. The age-group 75 and over among men are the most affected age group to suicides. The age group 45-64 is the second most affected age group to "suicide" in men (H, SC, & M., 2021). Robin Williams was 63 years old at the time of his death. As a result, Robin Williams age aligns with one of the most impacted male age groups affected by suicide.

The suicide rate among women has also shown a significant increase over the last 20 years. In 1999, women accounted for 4% of suicides in the United States. By 2019 women accounted for 6% of suicides in the United States, which reflects a 50% increase over the last 20 years.

The age group 45-64 is the most affected female age group to suicide. The female age group 15-24 is the 5th[th] leading age group in women affected by suicide (H, SC, & M., 2021). In 2011, when Demi Lovato announced her battle with mental illness, she was 19 years of age. Although, Demi Lovato did not commit suicide, she did struggle with suicidal thoughts for most of her life.

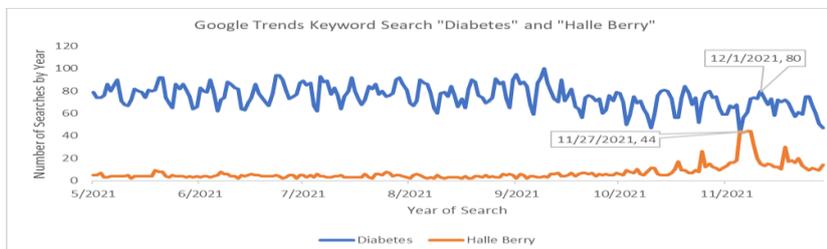## Google Trends Search Results for "Diabetes" and "Halle Berry"

Figure 9. "Diabetes" and "Halle Berry" searches in the United States via Google Trends search results from May 2021 - November 2021.

The line graph data in Figure 9 demonstrates the correlation between search trends for "Halle Berry" and "diabetes". The data was collected via Google Trends by utilizing keyword searches "diabetes" and "Halle Berry" between May 2021 and November 2021. "Halle Berry" directed and starred in the movie "Bruised", which was released on November 24, 2021. The actress shared how she cracked two of her ribs while shooting a big fight scene and traced the incident to her diabetes. The data analysis illustrates an increase in search queries for "Halle Berry" and "diabetes" three days after the movie's launch on November 27, 2021. It can be observed that the incident shared by the actress influenced search trends for the term diabetes.

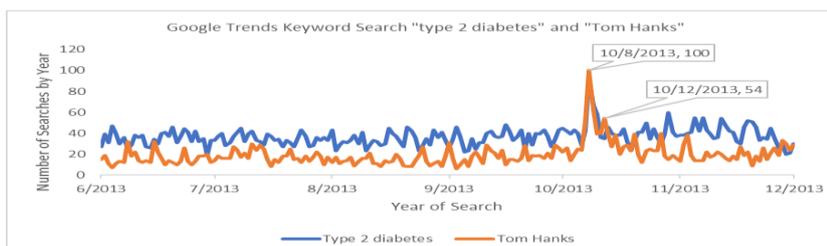## Google Trends Search Results for "Type 2 Diabetes" and "Tom Hanks"

Figure 10. "Type 2 diabetes" and "Tom Hanks" searches in the United States via Google Trends search results from June 2013 - December 2013.

Figure 10 shows the Google Trends search results for a six-month period starting from June, 2013 up to December, 2013 using the keywords "type 2 diabetes" and "Tom Hanks". The American actor "Tom Hanks" announced his type 2 diabetes during an interview with David Letterman in October, 2013 (Beguerisse-Díaz, McLennan, Garduño-Hernández, Barahona, & Ulijaszek, 2017). Tom Hanks" diabetes announcement correlates with the lift in search for "diabetes" on October 8, 2013. There was also a prominent increase in the search query for "diabetes" on Google on November 13, 2013, because the World Diabetes Day is observed on November 14th worldwide (UN News, 2013).

Statistical Data Visualization for Annual Diabetes Mortality Rate in the United States
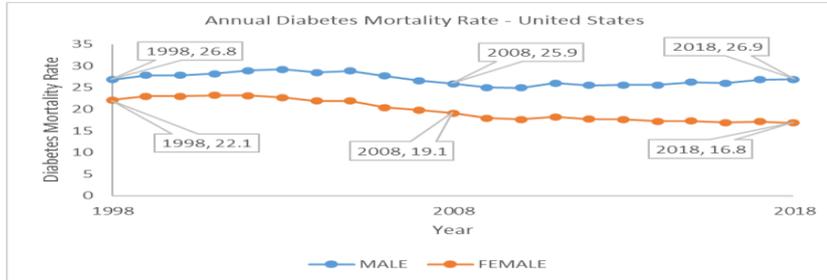

Figure 11. Annual number of diabetes mortality rates in the United States between 1998-2018 retrieved from the CDC diabetes statistics (CDC, 2021).

As of 2019, among the US population, 28.7 million of all ages i.e., 8.7% of the overall population had been diagnosed with diabetes (CDC, 2021). Figure 11 shows the statistical data obtained from the CDC's database. The visualization provides an overview of a 20-year period focusing on the number of deaths in men and women in the United States. In the datasheet, number of deaths for each disease were calculated as deaths for every 100,000 people for each year between 1998-2018.

The numbers were significantly higher for deaths in males during the year 1998 as compared to deaths in the female population. In 1998, out of the total number of deaths caused by diabetes i.e., 48.9 (per. 100,000), male population accounted for 26.8 of the deaths, whereas the female population accounted for 22.1 deaths.

"In 2010, diabetes was the seventh leading cause of death in the United States. It was listed as the underlying cause of death on 69,091 death certificates i.e., 2.8% of total deaths" (Stokes & Preston, 2017). The number of deaths dropped down in 2008 as compared to 1998. The total number of deaths caused by diabetes plummeted from 48.9 to 45 deaths (per. 100,000). Out of the 45 deaths, 25.9 of them were accounted for by men and 19.1 to women.

Funding Estimates For Breast Cancer, Diabetes, Depression, Mental Health, And Major Depressive Disorder
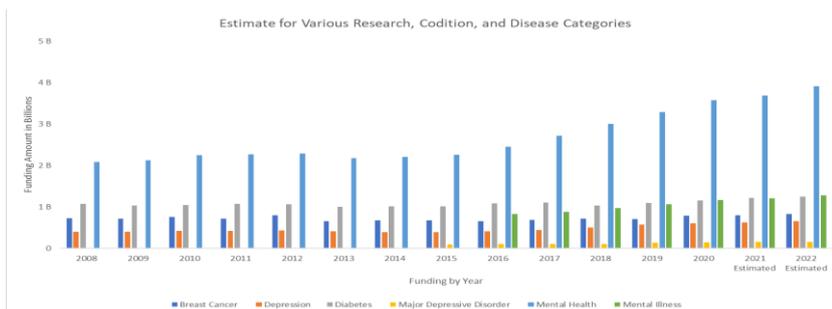

Figure 12. Breast cancer, diabetes, mental health, mental illness, depression, mental depression disorder, research funding allocated in dollars by National Institute of Health from 2008 - 2020. Years 2021 and 2022 are estimated funding forecasted for each illness (Report, 2021)

The visualization in Figure 12 represents research funding, such as grants, and contracts allocated to breast cancer, mental illness, and diabetes over the last 14 years. The data collected from the National Institute of Health correlates with how celebrity illnesses drive public health awareness. In addition, it is also evident that the timelines of when celebrity illnesses surface, so does the support in research funding for these diseases. Both breast cancer and diabetes showed gradual increases in funding through the years of 2008 and 2020. In 2008, breast cancer received funding of $726 million and steadily grew through 2020 with an allotment in funding of $788 million. Over the 14-year period, breast cancer grew in funding by 8.5%. In 2008, diabetes received funding of a little over $1 billion and by 2020 funding was a bit over $1.1 billion. Over the years of 2008 and 2020 funding for diabetes grew by 7%. In the later years, mental illness became more of a concern, which established a need for more research and funding to be done for this disease. In 2016, mental illness

received an initial funding of $826 million and funding grew strong through 2020. By 2020, funding for mental illness grew by 41%. The funding received for mental illness aligns with the timelines that celebrity illnesses helped fast track the investment towards mental health diseases (Report, 2021).

CONCLUSION

The research has been conclusive in exhibiting the impact celebrities who have been diagnosed with health conditions such as "breast cancer", "mental illness", and "diabetes" contribute to building awareness within the American population. The research, statistical data and trends also provide a visual correlation between celebrities announcing their diagnosis and the increase in keyword searches. This keyword search growth can be seen in the visualizations for "breast cancer", "mental illness", and "diabetes.". The key finding of this research is that celebrities are creating awareness for the societies for every aspect including the diseases. Google Trends is a method to follow up the society's area of interests on these types of diseases. Insurance companies, healthcare centers can benefit from this knowledge to understand how to communicate these kinds of diseases.

"Breast cancer" within the United States continues to account for tens of thousands of deaths annually. As the size of the US population continues to grow and age, the number of "breast cancer" cases and deaths will lead to a rise in "breast cancer" cases and deaths annually (CDC, 2021). All of the research and statistical data provided is inclusive of females from all ethnicities, ages and races. Angelina Jolie's public announcement has unquestionably, raised awareness amongst women to schedule BRCA gene testing whether the test is covered by insurance or not (Jr. & F.A.C.O.G, 2013). Early-stage detection is one way to reduce the mortality rate of "breast cancer" deaths in America.

It is evident, celebrities have helped fast track awareness of "mental illness" and the importance of doing more. There are over 47 million Americans who struggle with a form of "mental illness", while 10 million Americans have also attempted "suicide" (America, 2022). The visualizations of keyword search provided via Google Trends and medical research funding towards mental health ties to the timelines of celebrity illness announcements. A-list celebrities help influence the adoption of a cause and are important drivers in driving marketing campaigns through online, TV, and other traditional media outlets. In addition, celebrities have ample reach through their loyal fan base, which helps leverage promotion for these causes.

In conclusion, by using data analysis and visualization techniques, it is clear that celebrity illnesses help promote awareness of a cause and justify the necessity to aid in medical research to improve the quality of health in America. It is also obvious Americans are observant of news affecting celebrity health, which also increase search queries on precise keywords that relate to "breast cancer", "mental illness", and "diabetes." Lastly, it is also presumed that as more celebrities become affected by these diseases research funding will continue to grow to help improve early detection and promote a healthier population in the years to come.

Future research studies could investigate the association between celebrity illness announcement and search queries and discussions made by the population across various other platforms other than Google Trends, such as Facebook posts, Twitter tweets, Reddit forums, or gather primary data by conducting surveys, interviews, and focus groups. Succeeding research should initiate further testing if a correlation exists between the celebrity announcements and their impact on the number of health screenings for the diseases.

Conflict of Interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Funding

Authors` Contributions

All authors have participated in drafting the manuscript. All authors read and approved the final version of the manuscript. All authors contributed equally to the manuscript and read and approved the final version of the manuscript.

REFERENCES

1. America, M. H. (2022). *Prevalence of Mental Illness 2020*. Retrieved from Mental Health America: https://www.mhanational.org/issues/2020/mental-health-america-prevalence-data

2. Arora, V. S., McKee, M., & Stuckler, D. (2019, March). *Google Trends: Opportunities and limitations in health and health*. Retrieved from Health Policy: https://doi.org/10.1016/j.healthpol.2019.01.001

3. Beguerisse-Díaz, M., McLennan, A. K., Garduño-Hernández, G., Barahona, M., & Ulijaszek, S. J. (2017, January 1). *The 'who' and 'what' of #diabetes on Twitter*. Retrieved from NCBI Resources: https://journals.sagepub.com/doi/10.1177/2055207616688841

4. Cbiz. (2014, November). *Cbiz Wellbeing Insights*. Retrieved from Cbiz: https://www.cbiz.com/portals/0/documents/insurance%20&%20hr/services/wellness%20solutions/cbizwellbeinginsightsnov2014-12pg.pdf

5. CDC. (2021, March 2). *Health, United States, 2019 - DataFinder*. Retrieved from Centers For Disease Control and Prevention: https://www.cdc.gov/nchs/hus/contents2019.htm?search=Diabetes

6. CDC. (2021, December 29). *Prevalence of Diagnosed Diabetes*. Retrieved from Centers For Disease Control and Prevention: https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-diabetes.html

7. Fowle, C. (2020, May 24). *Using Google Trends at Scale*. Retrieved from Towards Data Science: https://towardsdatascience.com/using-google-trends-at-scale-1c8b902b6bfa

8. Franssen, G. (2019, July 17). *The celebritization of self-care: The celebrity health narrative of Demi Lovato and the sickscape of mental illness*. Retrieved from Sage Journals: https://journals.sagepub.com/doi/full/10.1177/1367549419861636

9. Freed, G. L., Clark, S. J., Butchart, A. T., Singer, D. C., & Davis, M. M. (2011, May). *Sources and Perceived Credibility of Vaccine-Safety Information for Parents*. Retrieved from American Academy of Pediatrics: https://publications.aap.org/pediatrics/article-abstract/127/Supplement_1/S107/30154/Sources-and-Perceived-Credibility-of-Vaccine?redirectedFrom=fulltext

10. Group, U. C. (2021, June). *U.S. Cancer Statistics Data Visualizations Tool*. Retrieved from Centers for Disease Control and Prevention and National Cancer Institute: www.cdc.gov/cancer/dataviz

11. H, H., SC, C., & M., W. (2021). *Suicide Mortality in the United States, 1999–2019*. Retrieved from National Center for Health Statistics: https://dx.doi.org/10.15620/cdc:101761

12. Hoffman, S. J. (2017). *Celebrities' impact on health-related knowledge, attitudes, behaviors, and status outcomes: Protocol for a systematic review, meta-analysis, and meta-regression analysis*. Retrieved from Harvard Library: https://dash.harvard.edu/bitstream/handle/1/30371158/5251292.pdf?sequence=1&isAllowed=y

13. Igoe, K. (2016, December 14). *The "Angelina Jolie" Effect*. Retrieved from Harvard Medical School: https://hms.harvard.edu/news/angelina-jolie-effect

14. Jr., H. D., & F.A.C.O.G. (2013, May 21). *Angelina's Story And Hereditary Cancers: Is BRCA Genetic Testing Right For You?* Retrieved from Cartersville OBGYN: https://www.cartersvilleobgyn.com/client_files/file/BRCA-Testing.pdf

15. Jun, S.-P., Jung, S., & Jun, C. (2017). *Ten years of research change using Google Trends: From the perspective of big data utilizations and applications*. Retrieved from Science Direct: https://doi.org/10.1016/j.techfore.2017.11.009

16. MacCuaig, M. (2014, May). *The Angelina Jolie Effect: Assessing the Impact of a Celebrity's Story on Cancer*. Retrieved from Brandeis University: http://bir.brandeis.edu/bitstream/handle/10192/27243/MacCuaigThesis2014.pdf;sequence=1

17. McCarteny, T. (2019, July 16). *The Use of Celebrity and Non-celebrity Examples to Reduce Stigma in University Students*. Retrieved from Seton Hall University eRepository: https://scholarship.shu.edu/cgi/viewcontent.cgi?article=3773&context=dissertations

18. Muskiet, M. H., Wheeler, D. C., & Heerspink, H. J. (2018, December 19). *New pharmacological strategies for protecting kidney function in type 2 diabetes*. Retrieved from The Lancet Diabetes & Endocrinology: doi.org/10.1016/S2213-8587(18)30263-8

19. National Institute of Mental Health. (2021). *Mental Health Information*. Retrieved from National Institute of Mental Health: https://www.nimh.nih.gov/health/statistics/suicide#part_2557

20. Parrott, F. R. (2016, March 16). *Young adults' information seeking following celebrity suicide: Considering involvement with the celebrity and emotional distress in health communication strategies.*

Retrieved from Taylor & Fancis Online: https://www.suicideinfo.ca/wp-content/uploads/gravity_forms/6-191a85f36ce9e20de2e2fa3869197735/2017/07/Young-adults-information-seeking-following-celebrity-suicide-Considering-involvement-with-the-celebrity-and-emotional-distress-in-health.pdf

21. Report, N. (2021, June 25). *Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC)*. Retrieved from NIH Report Portfolio Research Online Reporting Tool: https://report.nih.gov/funding/categorical-spending#/

22. Richardson, L. C., Dowling, N., & Henley, J. (2021, February 23). *An Update on Cancer Deaths in the United States*. Retrieved from Centers for Disease Control and Prevention: https://www.cdc.gov/cancer/dcpc/research/update-on-cancer-deaths/index.htm

23. Schootman, M., Toor, A., Cavazos-Rehg, P., Jeffe, D. B., McQueen, A., Eberth, J., & Davidson, N. O. (2015, May 14). *The utility of Google Trends data to examine interest in cancer screening*. Retrieved from BMJ Open: http://dx.doi.org/10.1136/bmjopen-2014-006678

24. Stokes, A., & Preston, S. H. (2017, January 25). *Deaths Attributable to Diabetes in the United States: Comparison of Data Sources and Estimation Approaches*. Retrieved from Plos One: https://doi.org/10.1371/journal.pone.0170219

25. Sun, Y.-S., Zhao, Z., Yang, Z.-N., Xu, F., Lu, H.-J., Zhu, Z.-Y., . . . Zhu, H.-P. (2017, November 1). *Risk Factors and Preventions of Breast Cancer*. Retrieved from National Center for Biotechnology Information: https://dx.doi.org/10.7150%2Fijbs.21635

26. Tan, S. J. (2015, January 19). *Biological, psychological and social processes that explain celebrities' influence on patients' health-related behaviors*. Retrieved from NCBI: https://archpublichealth.biomedcentral.com/track/pdf/10.1186/2049-3258-73-3.pdf

27. UN News. (2013, November 14). *On World Diabetes Day, Ban urges greater access to healthy foods, physical activity*. Retrieved from UN News: https://news.un.org/en/story/2013/11/455332-world-diabetes-day-ban-urges-greater-access-healthy-foods-physical-activity