Distorted Realities: A Research Study of Media Exposure's Role in Shaping Public and Personal Perceptions of Critical Health Issues

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Received November 03, 2024
Accepted April 02, 2025
Electronic access April 30, 2025

In the past few decades, research has identified a consistent pattern of people's perceptions of reality not associating with the actual world due to the exponentially increasing usage of digital resources. This study investigates the influence of media exposure (ME) compared to the influence of factual data on the perception of critical health issues. An original survey was conducted and responses from 80 valid participants were analyzed. The results confirm that media plays a significant role in shaping public perception of health priorities, often driven by the emotional impact of the content rather than factual data. Furthermore, our results contradict previous hypotheses in this field by finding a weaker correlation between media exposure and stress levels of major leading causes of death for the younger generation. On the contrary, the correlation for the older generations is stronger with the leading causes of death. Results regarding media exposure and its correlation with the leading causes of death illustrate that media sources do not use fatality rates to direct broadcasting priorities. Some of the findings from this study can be explained by previously published theories. A new model, ME Feedback Model (MEFM), was introduced as an attempt to explain the behavior of media outlets. Furthermore, this study highlights the need for extended research to fully understand the mechanisms behind media influence on health perceptions, particularly across different age groups.

Keywords: Media exposure (ME), ME Feedback Model (MEFM), leading health issues, leading causes of death (LCD), distorted realities, public perceptions, public policy

Introduction

In the past few decades, people all over the country have spent increasing hours on their cell phones and computers, constantly being fed information from news outlets, social media, and other media sources[1]. As a result, many of one's personal beliefs are based more on what one sees and hears about in the media, rather than on verified facts and personal experiences. The subconscious and consistent act of absorbing new information from the media can introduce a significant bias in people's perceptions, particularly in how people process and react to health-related information.

Numerous studies have been conducted on the intersection of media exposure and health-related misinformation. The definition of media exposure (ME) includes exposure to a complete variety of content, including news, advertising, newspapers, TV, billboards, social media, and others[2]. A study completed by Nagler et al. discusses ways to measure ME for contradictory health information, finding that survey strategies that ask the participants specifically about how something may be good or harmful for their health proved to have the most consistent responses[3]. Another research paper, conducted by Holman et al., analyzes the effect that ME has on trauma and mental health, further confirming that early media-based exposure to traumatic events leads to persistent symptoms of trauma in the future[4]. Such studies have also found evidence supporting the claim that ME and original biases profoundly influence the development of personal opinions. For instance, A 2021 study conducted by Loomba et al. found that exposure to COVID-19 vaccine misinformation on social media led to a decline in vaccination intent by 6.2 percentage points in the UK and 6.4 percentage points in the US among those who initially intended to get vaccinated[5]. A list of evidence-based theories regarding ME and opinion development discussed in this study can be found in Table 1.

The evidence-based theories offer a qualitative context and explanation for opinion development and ME. These theories help us understand the underlying processes that influence how media content forms and shapes opinions. However, a more in-depth study is needed to understand the impacts of ME in areas intimately related to people's lives, such as their opinions on health issues in our society. With the increasing reliance on the internet for information, there is a risk that ME may offer a distorted view of the current reality of health issues. There is also a lack of research in ME associated with different age groups. This research paper attempts to better understand the ME impact among the younger generation using a certain degree of statistical analysis, and how it compares with the older

Theory	Description
Agenda-Setting Theory	The Agenda-Setting Theory states that the media can control public opinions through extensive coverage of specific topics and the lack of coverage for others.[6]
Framing Theory	For communication, the Framing Theory identifies biases in communication sources, such as media outlets, and states that those biases influence citizens' perceptions and attitudes toward things.[7]
Exemplification Theory	The Exemplification Theory elaborates on how people use specific examples to influence the formation of different opinions. Specifically, it states that media sources may highlight issues that do not accurately represent the reality of society from a larger perspective.[8]
Mood Management Theory	The Mood Management Theory states that people will consciously and subconsciously find information similar to their mindset and beliefs to minimize personal negative mood and stress.[9]
Reinforcing Spirals Model	The Reinforcing Spirals Model states that selective media allows different groups of people to become more polarized rather than creating a more mainstream effect.[10]

Table 1 Theories of Media Effects Impact

population.

Methodology

To examine the statistical relationships among the ME and different factors, a self-administrated online survey was conducted. The purpose of the survey is to quantitatively examine ME, perception, and incline to action on major health issues. While an online survey has an obvious benefit of lower cost, it could introduce non-responsive bias where people who are more interested in social issues may choose to fill out the survey more often than those who are not.

The population targeted in this survey is clustered in the City of Irvine, California. Since the survey samples are localized, the conclusion drawn from the data may not apply to the other populations.

The sampling method is simple random samples in clusters. Survey emails were sent out to one local high school and one college. Survey flyers with QR code were distributed to residents in one Irvine community. Within the school, college, and community, the selection of survey samples is random. A total of 81 surveys were completed. Two invalid responses were excluded (data is all ones), resulting in 79 valid data points for four different age groups. The numbers of samples by age group are summarized in Table 2. Since the number of samples in the age group 65+ is significantly less than other groups, the group 65+ is excluded in this study. The reason that the interval in the 15-24 age group is less than the other two groups is because one of the motivations of this study is to compare the group of students (from high school to post-graduate) with other age groups. However, the difference interval and different sample sizes may introduce a certain level of sampling bias.

In the survey, three closed-ended questions were presented to the surveyees (see below). A list of health issues and LCDs are covered in those survey questions. The health issues and LCDs are selected from the Centers for Disease Control and Prevention (CDC) Web-based Injury Statistics Query and Reporting System (WISQARS)'s 2021 Leading Cause of Death data chart[11] (Appendix A).

Age Group	15-24	25-44	45-64	65+	Total
Sample Size	21	29	24	5	79

Table 2 Number of Survey Samples by Age Group

Q 1: For this section, we will give you a series of illnesses/ diseases/ causes of death. Please rank these on a scale of 1-10 based on how stressed you are about being affected by these in your current situation. (1 - Don't know what it is/ haven't ever thought about it. 10 - constantly worried about it, or the effect of it)

Q 2: This next part of the survey will require you to rank the causes of death based on how much money and time should be dedicated to curing or researching this cause. (1 - should have the most money dedicated to it. 10 - should have the least money dedicated to it.)

Q 3: In this final section, you will be given the list of health issues and decide on the top 3 that you feel have been the most popular or represented in the media.

The goal of these questions is to quantify three key metrics. ME is measured by the total number of LCD appearances in top three choice selection, in Question 3, across all participants. The Stress Level, defined in Question 1, as the averaged value of stress magnitude (1-10, 1 being the LCD with the least stress) specified by the survey participants, attempts to measure the

influence of ME on the survey participants. The Funding Priority, which indicates the inclination toward action, is defined as the averaged value of funding priorities (1-10, 1 being the LCD that should have the most funds allocated to it) answered by the participants.

All the participants above 18 signed a consent form in the questionnaire stating that their answers are anonymous but would be displayed publicly. If the participant was under 18, both themselves and a parent or guardian needed to sign the consent form.

In the section of Results and Observations, the correlations between different variables were studied for all age groups. Pearson correlations coefficients were calculated. Typically, a correlation coefficient >0.7 demonstrates a strong correlation. A correlation coefficient between 0.4 and 0.69 only means a moderate correlation. A correlation coefficient between less than 0.39 means weak to none correlation [12].

To determine if a correlation coefficient is statistically significant, the corresponding p-value is also calculated. Typically, a p-value less than 5% (0.05) demonstrates high probability that a null hypothesis is disapproved. A p-value between 0.05 and 0.1 only means weak evidence to reject null hypothesis. Scatter plots between variables understudy are also provided to illustrate the correlation.

Results and Observations

Does Media Exposure Follow the Facts?

In Figure 1, the top LCD that received the highest ME among the 'all participants' group, the 25-44 age group, and the 45-64 group is cancer. However, based on factual data by CDC, cancer is the second actual LCD. Instead, the leading LCD is heart disease for all age groups.

To further illustrate the gap, this study plots correlation between ME and CDC fatality data for all LCDs in Fig. 2. With all the age groups combined, correlation coefficient 0.30 means the correlation is very weak between CDC's fatality rates and media coverage. A p-value 0.016 shows the result is statistically significant. This data supports the claim that there is no correlation between the facts and ME for LCDs. It indicates that media sources do not produce and broadcast news stories based on the actual occurrence rate of health issues. Instead, the media sources direct more focus on issues like cancer and suicide, two health issues that can be relatively more emotionally captivating compared to other LCDs, such as cerebrovascular disease and the flu. This study will discuss in a later section how the Exemplification theory and ME Feedback Model (MEFM) can explain this behavior.

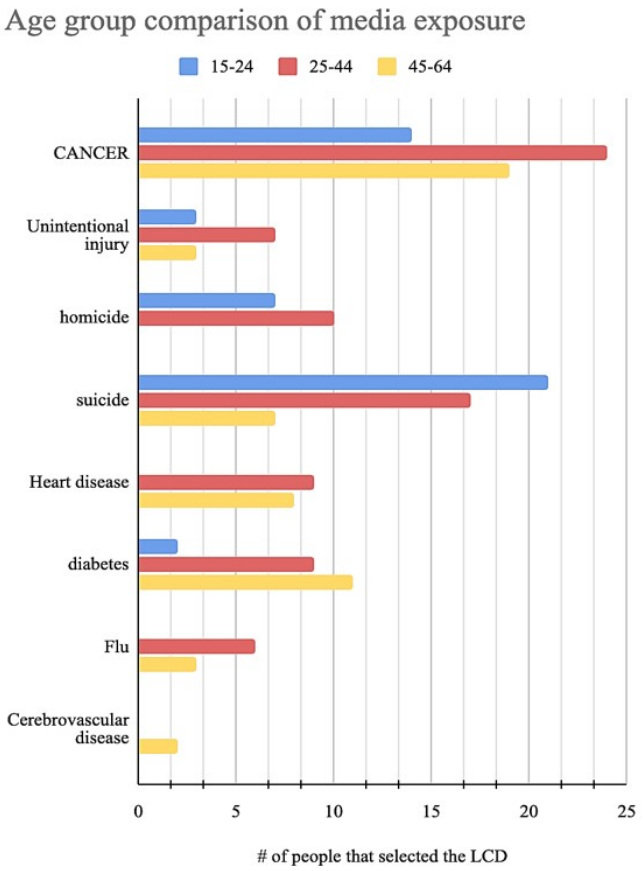

Fig. 1 A Comparison of media exposure to LCDs among three age groups (15-24-, 25-44-, and 45-64-year-old)

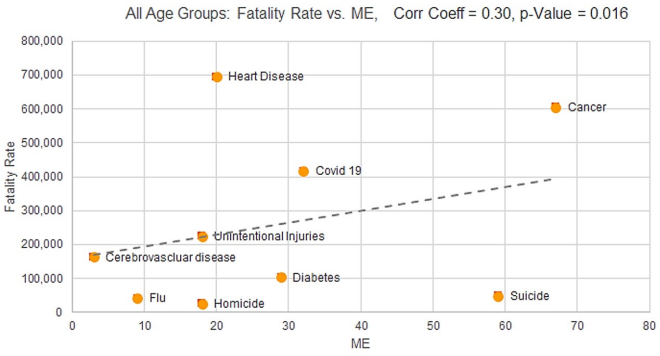

Fig. 2 The correlation between CDC's fatality rates and media coverage.

Is the Younger Generation More Influenced by The Media?

A common concern in this society is that the younger generation spends excessive time on social media and the internet. A report [13] from Pew research center states that the younger the population of age 18 to 24 are likely to use Instagram (76%), Snapchat (75%) or TikTok (55%). Another study from Pew

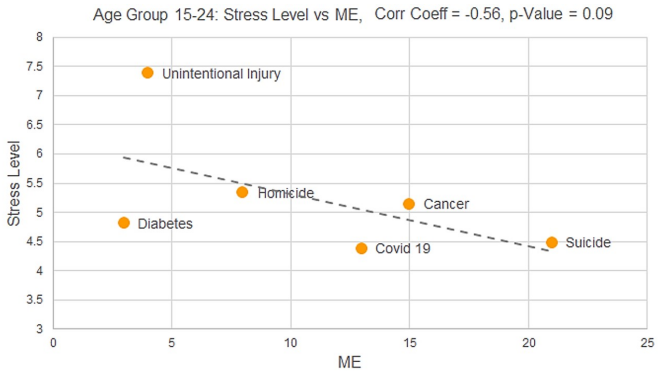

Fig. 3 Correlation between ME and stress levels in the 15-24-year-old age group.

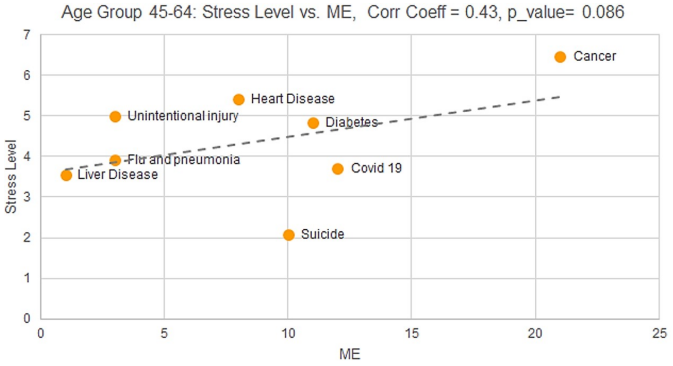

Fig. 4 Correlation between ME and stress levels in the 45-64-year-old age group.

research center states that approximately 75% individuals in the age range of 50 to 64 use television for news consumption while only around 46% of individuals in the age group of 18-29 do [14].

Does this difference lead to a more significant stress level on health issues reported in the media for the younger generation?

Such a question can be described in a hypothesis: individuals within the 15–24-year-old age group have a higher correlation between the ME of LCDs and their corresponding stress levels compared to that of an older age group such as 45-64.

In Fig. 3 and Fig. 4, such correlations are plotted. The data is intriguing. For the younger age group 15-24, the correlation coefficient from the data is moderate and negative, -0.56. It indicates ME doesn't have a substantial impact on the Stress Level for this age group. A closer look at the data shows there is one single high Stress Level, "Unintentional Injuries", that appears to be on youth's mind more than other LCDs. The p-Value of 0.09 shows the statistical significance of this conclusion is relatively weak.

For the older age group (45-64), a positive and weak correlation 0.43 suggests the same conclusion as that of the younger age group. The p-value 0.086 is also close to that from the younger group.

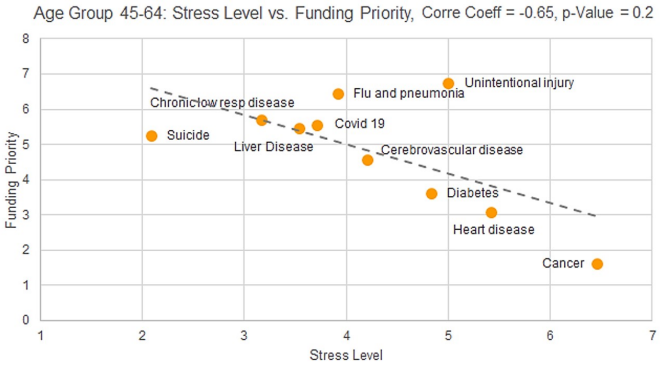

Fig. 5 Correlation of stress levels and funding priority of the 45-64-year-old age group.

The results from Fig 3 and Fig 4 do not statistically support the hypothesis that the younger generation is more influenced by the media. A previous study explains this as it suggests that younger generations may be able to tell the difference between factual data and misinformation online more efficiently than older generations [15]. Therefore, they are not more inclined to trust the online sources compared to the older generation.

Is The Younger Generation Less Inclined to Support Public Policy Changes?

Fig. 5 and Fig. 6 present the correlation of two data points from the survey: the stress levels associated with each LCD and the funding priorities in two different age groups.

For the 45-64 age group, a correlation coefficient of -0.65 between funding priority and stress levels suggests a moderate correlation between the two variables. Fig.6 shows the same correlation for the 15-24 age group, which has a much lower correlation coefficient of -0.13, suggesting nearly no correlation. The different correlation coefficients suggest that the older age group tends to consider social policies as solutions for health issues more than the younger age group.

The p-values of correlations from the older and younger groups are 0.2 and 0.38, respectively. It means the correlations may not be statistically significant, especially for the 15-24 year-old group.

Discussion

This study has shown that the magnitude of media exposure of critical health issues is not necessarily aligned with the actual significance of those issues.

Such misalignment can be explained by theories described in Table 1, such as Exemplification Theory [7], which emphasizes the role of emotions in shaping our beliefs. Studies suggest that when news outlets report events that arouse strong emotional

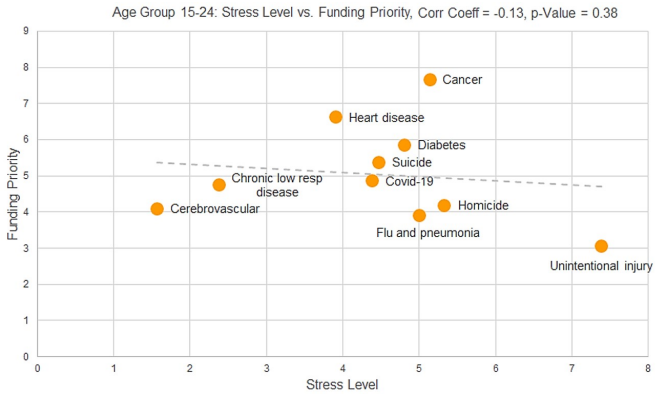

Fig. 6 Correlation of stress levels and funding priority of the 15-24-year-old age group

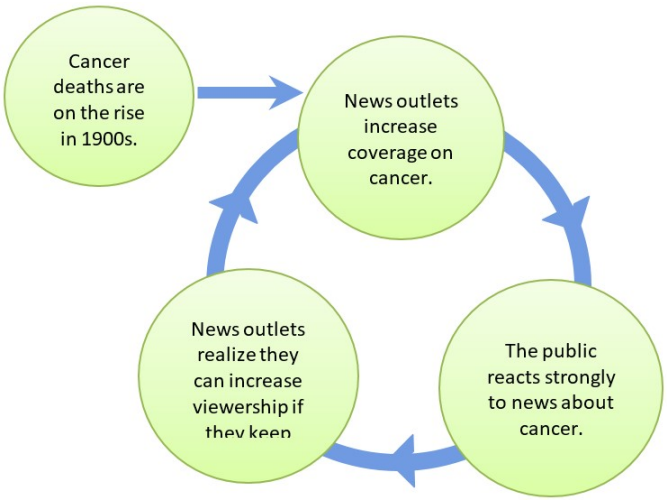

Fig. 7 ME Feedback Model (MEFM) describing how cancer became the health issue with the highest ME.

responses from the viewer, they tend to leave a lasting impression of the event on the viewer as opposed to reports that focus solely on numbers and data[6]. Another theory, the Reinforcing Spirals Model, shows that news, whether false or accurate, with a large emphasis on manipulative intent, causes stronger emotions. The Mood Management Theory, also described in Table 1, describes human tendency to avoid pain with the subconscious act of only seeking news that aligns with their predetermined beliefs to reduce stress. These behaviors explain why the media influence is stronger for participants whose opinions were already solidified prior to the media consumption. The individuals feel significantly more stressed about some health issues while less interested in other health issues

Behavior of media outlets

Theories mentioned in Table 1, including the Agenda-Setting Theory and the Framing Theory focus on the behavior of news outlets and media companies rather than the behavior of the individuals. Stever et al. describes Agenda-Setting Theory as the tendency for media outlets to prioritize certain stories and news, thereby guiding public attention. Chong et al. states that the Framing Theory highlights how the presentation and context of news can shape public perception of the subject of discussion. Both of these theories describe how the news is able to guide, and therefore manipulate, public perception. News outlets are also subject to much bias due to these theories. For example, confirmation bias, described as behavior that refers to the tendency of media outlets to produce content that aligns with the pre-existing beliefs and values of their target audience, or the behavior of individuals to seek news that support their own values[16]. Not only do both theories support this bias, confirmation bias can also strongly influence the development of "echo chambers", as mentioned above. It is clear that media output and behavior has a critical influence on the viewer perception of news, a factor that has been considered for this study.

Cancer and Heart Disease

Fig 2 illustrates that, while heart disease is the leading cause of death in the US, the emotional response to cancer is often more potent—mainly due to the emotion of hope. From 1985-2020, there have been nearly 70 different formulations of therapies and medical devices to treat cancer approved by both the US Food and Drug Association (FDA) and the European Medicines Agency (EMA)[17]. This speed of treatment development is extremely expedited compared to heart disease treatment advancements. Between 2009 and 2017, 17.54% of the drugs passed by the FDA were anti-cancer drugs, while only 5.29% were for cardiovascular disorders. Batta et al. stated that anti-cancer drug research is on the rise compared to lifestyle disorders, including cardiovascular disease and drug research, which is on the decline[18]. With the combination of the surge in medical advancements and the drama-inducing stories of strong cancer survivors, society has portrayed the future of cancer care to be filled with hope, a strong emotion that media sources have capitalized on, and therefore, increasing coverage of cancer.

ME Feedback Model (MEFM)

In this paper, a new model (MEFM) is introduced as an attempt to further understand why cancer is an outlier for ME. In Fig. 7, the MEFM begins when cancer deaths started to rise in the early 1900s17 and led to an increase in media coverage of cancer. Emotional portrayals in the media led to solid public reactions, a phenomenon supported by the Exemplification Theory. Over time, news outlets realize they can increase their viewership and revenue by continuing their cancer coverage.

In the section "Behavior of Media Outlets", the idea that news outlets' behaviors influence viewer perception has been

confirmed by previous theories and models. Furthermore, in a study by Holman et al., news has been proven to evoke strong emotions in viewers, as seen through the study's focus on the connection between graphic and distressing content, and higher levels of stress and post-traumatic stress symptoms[4]. This result proves that people will have a higher likelihood to react strongly to dramatic or sensational news rather than factual, analytical news. Once the public reacts strongly to cancer, research has proven that news outlets will use this viewership as data to continue pursuing similar topics. After analyzing 14 television systems and 29 stations, Arbaoui et al. highlights that sensationalism is often used to attract and retain viewers, suggesting that such content is perceived as engaging[19]. This study directly applies to the MEFM as it explains why new outlets continue to publish stories and articles related to cancer. This apprehension eventually results in extensive coverage of cancer and minimal coverage of other previously popular topics of interest, such as heart disease.

The reason that this model is used for cancer, and not, perhaps the leading cause of death globally, health disease, is due to the unpredictability and lack of prevention of cancer. This lack of control leads to more dramatic and vivid stories compared to that of more predictable health issues, circling back to the Exemplification Theory. Furthermore, cancer has proven itself to attack all populations, specifically, being the 2nd leading cause of death for 10-14 year olds while heart disease remains as the 6th leading cause of death for the same age group[11]. Due to these factors, this study has chosen to focus the MEFM on cancer. The MEFM may apply to other health and non-health-related issues as well. However, further research on other topics would be needed to confirm this hypothesis.

Recommendations

The findings from this study call attention to the importance of media literacy amongst the public. Even though it is critical for viewers to exercise caution when surfing the media, this study suggests that it is of higher importance for the media outlets to be regulated in this digital era. Policymakers must understand the profound effect that the media has on public perception of critical health issues. A more balanced, evidence-based media portrayal of health issues is for the best interest of society.

Limitations

Some limitations of this study are associated with the survey design, which have been highlighted in the results section. Certain degree of sampling bias and nonresponse bias can be introduced. The survey sample size is relatively small. All these factors may affect the accuracy of the findings. A larger sample size and more comprehensive survey are recommended for future studies.

The second source of error comes from the timeline of the survey. The CDC data on LCD was published for the year 2021. The survey in this study was conducted in 2024. The LCD index or people's perception of certain diseases, such as COVID-19, may have shifted from the 2021 to 2024.

Conclusions

This study aimed to identify factors that affect people's perception of leading health issues and perceived public policy priorities. Survey data suggests there is a minimal correlation between the amount of media coverage and the fatality rate of LCDs among all age groups combined, which disproves the hypothesis that media coverage of critical health issues is based on an accurate depiction of reality. Furthermore, similar correlations between ME and stress levels between the younger and the older participants does not support the hypothesis that the media influences the younger generation the most. It is theorized that the younger generation can tell the difference between misinformation and the truth online more easily, allowing them to have a lower level of trust for the media and, therefore, less prioritization of ME in their opinion-making even when they have more exposure to social media and online contents. The bias in media coverage can be attributed to the emotional attachment of the viewers. Emotional factors drive the participants' perceptions of health issues with more significant influence than factual data. This paper attempts to explain the quantitative findings from the survey through many established theories and a new model proposed, the ME Feedback Model (MEFM).

Future research should expand the survey dataset by including focus groups for each age group, allowing for more in-depth discussions and a broader understanding of the factors that influence ME and perceptions of health. Additionally, a more diverse sample population from different regions of the state or country would help provide a more comprehensive analysis.

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Appendix - A

The current leading causes of death (LCD) for all ages in the United States in 2021 (CDC).

Leading Causes of Death	Total Number of Deaths
Heart Disease	695,547
Cancer	605,213
Covid 19	416,893
Unintentional Injury	224,935
Cerebrovascular	162,890
Chronic Lower Respiratory	142,342
Diabetes	103,294
Liver Disease	56,585
Suicide	48,183
Flu	41,917
Homicide	26,031

Table 3 Leading Causes of Death and Their Total Numbers

Heart disease is an overarching term involving a variety of issues regarding heart performance and function. Cancer refers to a disease where cells multiply uncontrollably in the body, also known as malignant tumors. Unintentional injury can include anything from car accidents to food poisoning. Other than these three causes of death, this project also investigates eight other health issues, including Covid 19, flu and pneumonia, diabetes, cerebrovascular disease, suicide, homicide, chronic lower respiratory disease, and liver disease.