

COMPARING FREQUENCY OF ONLINE NEWS COVERAGE, WORLDWIDE MORTALITY AND PERCEIVED RISK OF LEADING DISEASES AND INJURIES: CHALLENGING PARADIGMS IN THE NEW MEDIA LANDSCAPE

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Mass media are a leading source of health information for the public. Based on the theory of agenda setting, the media influence what users consider important with respect to health and disease. This study examines the frequency of health issues covered by major national online media outlets, worldwide mortality and the public's perception of risk. Frequency of media coverage was found to be correlated with both worldwide mortality and with perceived personal and societal risks for specific diseases and injuries. This suggests that online media news coverage is in line with the public's agenda with respect to health risk, and further corresponds to global mortality. Results also show that for all causes of death, the public's perception of risk to self is significantly lower than the perceived risk to society. Study limitations and implications are discussed.

Keywords: health news, online news, agenda setting, global mortality, perceived risk.

Over the past decade, Americans' pursuit of health information has drastically shifted and now occurs within a widening network of both online and offline sources, with recent

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studies finding the Internet to be a main source of health information (Hesse et al., 2005). Indeed, those who use the Internet – which now includes four-fifths of all Americans (Pew Research Center, 2009) – are just a click away from the world's biggest medical library, which includes more than 100,000 health-related websites (Dearness & Tomlin, 2001). Such access affords an array of benefits (tailored information, instantaneous access), but also presents a number of disadvantages (technical language, unequal access), obstacles (information overload, disorganization), and dangers (inaccurate and risk-promoting information, lack of peer review).

Given these challenges, the general public continues to turn to mass media to help synthesize health information (Bomlitz & Brezis, 2008), and sustained trends show media consumers increasingly look online for news (Pew Research Center, 2010). Based on the principles of agenda setting (McCombs & Shaw, 1972), what is presented in the media influences what media users consider important with respect to health and disease. Indeed, what is covered by mass media plays a major role in the way individuals receive information, the importance they ascribe to issues, and the perceived personal risk or susceptibility to each issue (Berry, Wharf-Higgins, & Naylor, 2007).

A contemporary example of the effect of media on perceptions of health issues is the heightened interest in infectious disease in American popular culture. Indeed, a noticeable increase of content related to viral and bacterial diseases in news coverage, advertisements, and entertainment media has occurred over the past two decades (Tomes, 2000). Consequently, this perception is associated with an increased sense of vulnerability to microbial threats, bringing with it increased vigilance, perception of vulnerability, and interest in mechanisms of transmission and prevention strategies (Berry et al., 2007). This study aims to examine these possible relationships between the frequency of media coverage of high-risk health issues, the public's perception of risk, and the actual risk of mortality posed by the injuries and diseases.

BACKGROUND

Agenda Setting and Health Information

In today's technologically-connected world, health knowledge is often gained through the media rather than through personal experience. About 65% of the world's first news about infectious disease now comes from informal sources, including press reports and the Internet (Heymann & Rodier, 2001). Only a small portion of all disease is experienced firsthand by individuals or even communities. Epidemics that occur at a national or international scope are generally experienced through the eyes of a journalist.

According to agenda setting theory, media does not tell people what to think, but what to think about (Cohen, 1963; McCombs & Shaw, 1972, 1993). General consensus among media scholars is that media portrayals affect individuals' views of issues and the world, and the pervasiveness of such media have led to living our lives as *mediated* (Altheide, 2002; Clarke & Everest, 2006). This concept is often used to describe how "media emphasis on political issues influences which issue is perceived as relatively important" (Dearing & Rogers, 1996, p. 8). The news and other media give the public context and language to describe various problems and issues from their lives (Altheide, 1997).

Previous research has indicated that the public's perception of disease is impacted by high levels of media reporting (Young, Norman, & Humphreys, 2008). Indeed, according to the priming hypothesis, individuals make decisions based not on a comprehensive analysis of a full range of information but rather on a smaller subset of information that is readily available, often due to extensive news coverage relating to the topic at hand (Miller & Krosnick, 1996). The basis for priming is that people find it easier to retrieve information recently stored or accessed frequently (Graber, 2001). Additionally, issues and stances presented in the media also gain greater legitimacy among the public. Indeed, a significant portion of individuals rely on mass media as their only source of knowledge about illness, treatment and prognosis of disease "as much as, or even more than health care providers" (Clarke & Everest, 2006, p. 2592). Consequently, diseases frequently portrayed in media gain higher status and can even lead to panic.

How the content is framed is as equally important as the content of the message. Frames refer to the assignment of importance to particular information or point of view in any particular story (Clarke & Everest, 2006). Both the media and the public have the tendency to ascribe metaphors to a disease (Sontag, 1988), framing the meaning of a disease for the public with little scientific basis. In the absence of scientific arguments, the frequency of coverage also serves to increase the salience of an issue and framing it as more important in the eyes of the audience (McCombs, 2004).

News Media and Coverage of Health Issues

The frequency of coverage by mass media creates a context for audiences to assess risk. Overstatement of risk can lead to panic (Nerlich, 2008), while understatement of risk may lead to apathy and a sense of invulnerability. Appropriate risk communication deals with providing knowledge about risk issues, influencing risk-related behavior, and facilitating cooperative conflict resolution (Rohrman, 1992). This is one of the key roles of media in public health.

Some research has been conducted to examine the relationship between the intensity of media coverage and the actual risk of an event to public health (Bomlitz & Brezis, 2008). In some cases, the amount of media coverage was inversely correlated with actual numbers

of deaths for the specific risks. In 2003, for example, SARS and bioterrorism generated over 100,000 media reports, though they were only linked with a small amount of fatalities (Bomlitz & Brezis, 2008). Similar parallels can be drawn to methicillin-resistant *Staphylococcus aureus* (MRSA) (Tomes, 2000), “mad cow disease” (Washer, 2006), and Ebola (Farmer, 1996; Ungar, 1998). Conversely, far less time, money and media are spent on common health threats, such as smoking and obesity.

Hypotheses and Research Question

The coverage on risk, agenda setting and media coverage suggests that public perception of risk is based on the frequency of media coverage on an issue, but that media coverage does not necessarily correspond to the mortality or global burden of diseases and injuries. These findings lead to Hypotheses 1-3.

H1: Frequency of media coverage correlates with the public’s perception of personal and societal risk of specific diseases/injuries.

H2: Frequency of media coverage is not correlated with actual mortality by diseases/injuries.

H3: The public’s perception of personal and societal risk of specific diseases does not correlate with actual mortality by diseases/injuries.

Research into the promotion of risk-reducing behavior has found that individuals process health and behavior-change information on a societal as well as personal level (Tyler & Cook, 1984). A perceived threat to society may thus not be considered at a personal level. This leads to research question 1.

RQ1: Is there a difference in perceived threat to society and perceived risk to self?

METHODOLOGY

Reported Mortality

Eleven causes of death were included in this study. Nine were chosen to represent the primary causes of death around the world, and include both chronic (cancer, heart disease, diabetes) and infectious diseases (HIV/Aids, tuberculosis, meningitis, Hepatitis C), as well as intentional injuries and unintentional injuries. Additionally, anthrax and H1N1 virus

(swine flu) were included because they have relatively low mortality but have received significant media coverage in recent years.

Mortality data was taken from the World Health Organization Mortality Estimates (World Health Organization, 2008), with estimates reflecting data from 2004. As two of the selected causes of death, H1N1 virus and anthrax, were not included in the WHO mortality report, estimates were sourced from additional WHO sources and nationmaster.com, a website that compiles a wide range of statistical data with international scope. Worldwide estimates were utilized instead of U.S. or regional mortality data for two reasons: First, in a globalized media environment, the public has access to health news from around the world, and the media outlets selected are international in nature. Second, the mortality from of the selected causes varies dramatically from region to region, and local or regional estimates report extremely low mortality.

Media Coverage

The researchers conducted a search of three major news web sites: CNN.com, MSNBC.com, and WashingtonPost.com using the Lexis-Nexis database. These sources were selected because they are among the most-visited online news sources (Alexa, 2010), are powerful news organizations that disseminate news across multiple media, and were available on Lexis-Nexis.

Full-article keyword searches, rather than headline counts or subjective story coding, were utilized to minimize coding bias; this approach further allows investigation into whether the mere mention of disease precipitates fear. Search terms included common word variations of the selected diseases and required the inclusion of either “death,” “deaths,” “died,” “fatality,” or “fatalities.” Results tabulated articles from June 1, 2009 to June 1, 2010. While there are many potential yardsticks for measuring frequency of coverage, criteria were chosen that would be widely acknowledged as significant, conducive to statistical analysis, and relatively immune to subjective interpretation.

Perceived Risk

To measure the public’s perceived risk, an online survey was administered utilizing a network referral sampling method. An initial purposive sample was selected based on demographic diversity in an attempt to reach respondents of all age groups, races/ethnicities and occupations. These individuals were then asked to circulate the survey link among their online networks, under the assumption that this would yield responses from demographically similar participants. The 25-item survey was developed to assess perceived risk to self and risk to society. It was pre-tested to ensure that respondents understood the causes of death, including broad labels like intentional and unintentional injury. Respondents were asked to

rate their level of concern over each of these causes of death to threaten them personally as well as their level of concern that the disease poses a threat to society. Level of concern was rated on a 5 point Likert-type scale ranging from “Very Concerned” (5) to “Very Unconcerned” (1), with the midpoint (3) representing “Neither Concerned nor Unconcerned”. A total of 225 participants responded to the survey, representing a diverse range of ages and ethnicities.

RESULTS

Reported Mortality

According to figures from the WHO and nationmaster.com, roughly 35 million individuals die from the selected causes each year. The primary causes of death were heart disease, cancer and unintentional injuries, which accounted for 80.1% of the worldwide deaths included in the study. The least-common causes of death, Hepatitis C, H1N1 virus and anthrax accounted for just 0.002% of annual deaths (see Figure 1).

Media Coverage

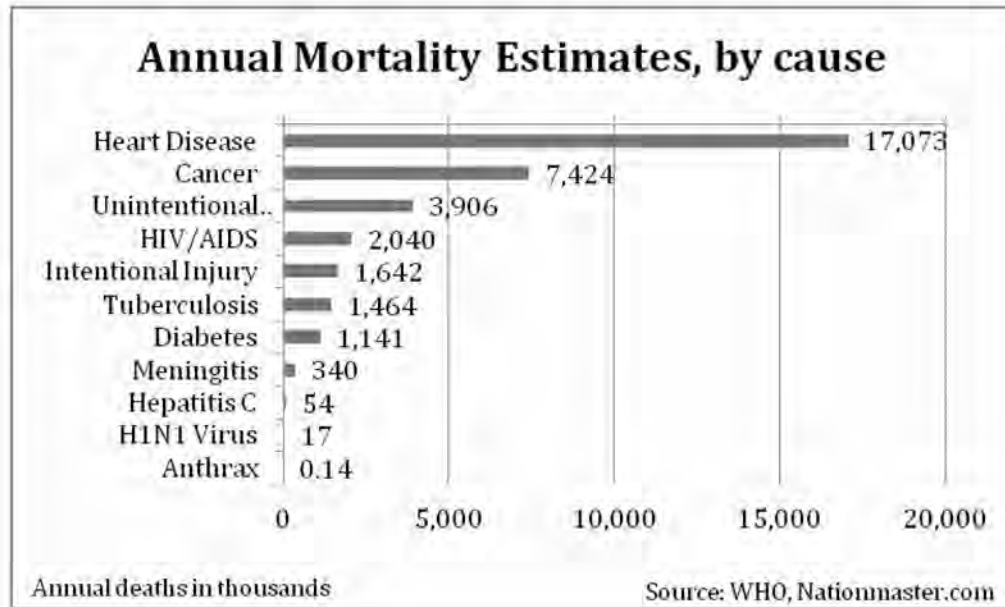
A total of 3,615 articles were found, with CNN.com yielding 79.4% of the story sample. Intentional injuries, HIV/AIDS, and cancer accounted for 74.3% of articles, while the three least common causes, meningitis, anthrax and hepatitis C were responsible for just 0.001% of articles (see Table 1).

Perceived Risk

The 225-person survey sample represented a range of age groups from 18 to over 65 years of age. Over half of respondents (56.9%) were between the ages of 26 to 46, while 24% were aged 46 to 65, and 15.1% were 18-25. Only 4% reported being over 65 years of age. Additionally, 41% of respondents identified themselves as White, 27% as Hispanic, 23% as Black or African American, 6% as Other, and 3% as Asian. Respondents' socioeconomic status was generally high, with more almost half of the sample (46%) reporting a combined household income greater than \$100,000, and the majority (83.1%) having at least a college degree.

The Internet was cited most frequently by respondents as the primary medium for news consumption (36.9%), and was followed by television (28%), newspaper (6.7%), radio

Figure 1: Worldwide mortality estimates



(4.9%), social media (3.1%), and magazines (0.4%). Twenty percent of respondents did not identify a primary source, or listed multiple sources that were treated by researchers as non-responses. The Internet was the most frequently used medium among survey respondents, with an average of 3.3 (± 3.0) hours per day of reported use.

Interestingly, respondents believed the causes of death to be a greater threat to society than the self at statistically-significant levels, in all cases. They perceived cancer, unintentional injuries and heart disease to be the most dangerous threats to the self, while cancer, heart disease and diabetes were the most dangerous threats to society. Anthrax and tuberculosis were perceived to be the least dangerous threats to both the self and society (see Figures 2 and 3).

Ranking Correlations

No cause of death ranked equally among all four sources measured. The greatest fluctuation occurred among intentional injuries, H1N1 virus and HIV/AIDS, while the least fluctuation occurred among meningitis, anthrax and cancer. Additionally, Spearman correlation measures of the rankings showed that coverage by the three mainstream media outlets studied correlated at a statistically-significant level with worldwide mortality (0.727; $p=0.011$), risk to self (0.633; $p=0.036$), and risk to society (0.735; $p=0.010$). The perception

Table 1: Number of articles in leading online media outlets

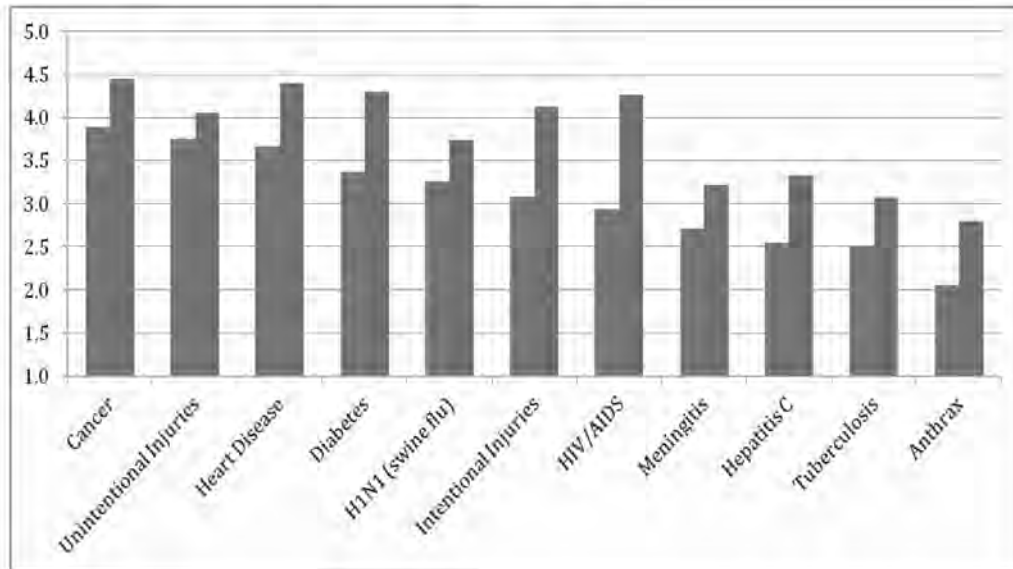
Injury Type	CNN	MSNBC	WaPo.com	COMBINED
Intentional Injury	1359	62	131	1552
HIV/AIDS	448	35	85	568
Cancer	396	59	111	566
Heart Disease	236	37	39	312
Unintentional Injury	169	30	54	253
H1N1 Virus	120	21	26	167
Diabetes	99	11	26	136
Tuberculosis	19	4	4	27
Meningitis	14	1	3	18
Anthrax	4	2	4	10
Hepatitis C	6	0	0	6

of risk to self also correlated with perception of risk to society (0.847; $p=0.001$) and worldwide mortality (0.715; $p=0.013$). Lastly, the perception of risk to society also correlated with worldwide mortality (0.781; $p=0.005$) (see Table 2).

DISCUSSION

Two of the study's hypotheses were not supported by the data, while one was. The first hypothesis posited that the frequency of media coverage would correlate with the public's

Figure 2: Perceived Threat to Self & Society

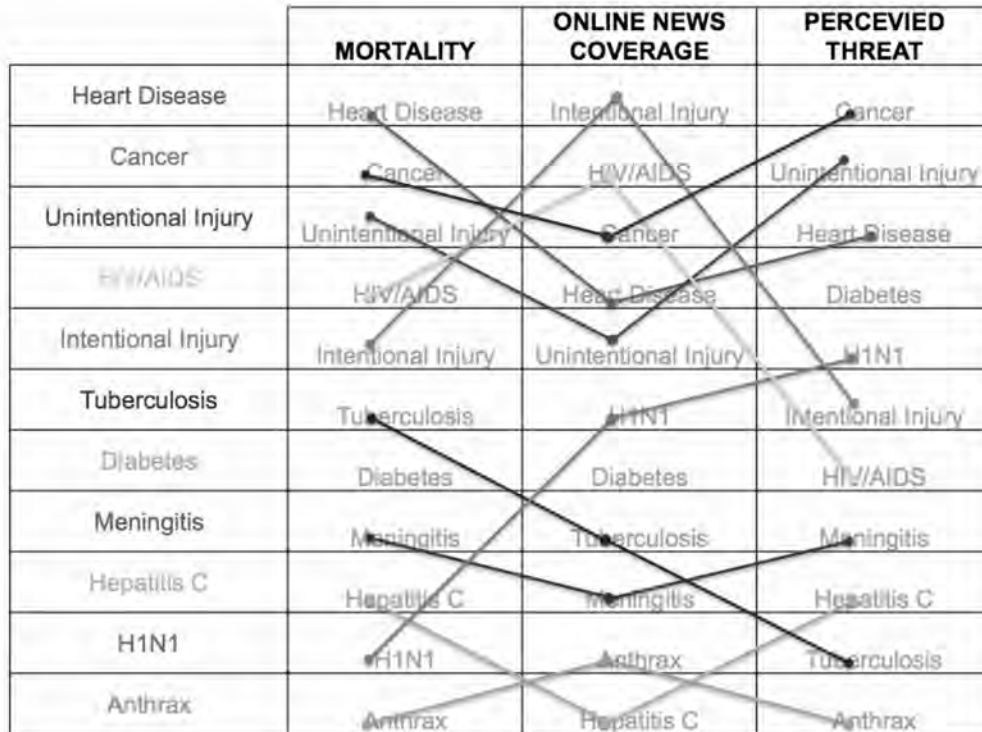


perceived personal risk of specific diseases/injuries. This assertion was supported, echoing previous findings (Young et al., 2008). It may thus be inferred that the mainstream media continue to set the agenda, at least in the context of affecting health risk perceptions. While the Internet has become a primary source of health information – a trend consistent with reported preferences by the present study’s sample – and offers a seemingly endless amount of sources, individuals may still be relying on the mainstream media to help them synthesize what may be perceived as complex information and assess the potential of health threats.

The second hypothesis posited that the frequency of media coverage would not be correlated with the actual mortality of diseases/injuries. This assertion was not supported, as a rank correlation was found to exist at a statistically significant level. This suggests that the frequency of mainstream coverage of health issues, in the context of risk and mortality among common threats, is symmetrical to the actual threat. It should be noted that nine of the eleven threats were conventional risks; of the two risks expected to have received great media attention (anthrax and H1N1 virus), only H1N1 virus yielded substantial media results for the time period specified, and was found to have the greatest discrepancy between coverage, mortality, and perception of risk to self.

This finding contradicts earlier studies that found that in some cases, the amount of media coverage was actually inversely correlated with actual number of deaths (Bomlitz & Brezis, 2008). This disagreement may be partly explained by the sources selected and keywords utilized, as well as the article-count approach utilized by researchers.

Figure 3: Cause of Death Rankings by Source



The third hypothesis posited that the public’s perceived personal risk of specific diseases would not correlate with actual mortality by diseases/injuries. This assertion was not supported, as a rank correlation was found to exist at a statistically significant level. This finding suggests that individuals are able to competently assess the risk of health threats, or perhaps are sufficiently influenced by what was found to be symmetrical media coverage.

The researchers also sought to investigate the existence of a difference in perceived threat to society and a perceived risk to self. Across all threats measured, respondents measured the risk to society to be at a greater level than the risk to the self, at statistically significant levels. Thus, while individuals recognize that these issues are a problem in society, they do not feel personally vulnerable. This finding highlights the need for health communicators to appeal directly to the individual, rather than relying on the mere specter of a threat to others.

Table 2: Spearman Rank Correlations

Source	Media	Risk to Self	Risk to Society	Mortality
Media		.633* (p=0.036)	.735** (p=0.010)	.727* (p=0.011)
Risk to Self	.633* (p=0.036)		.847** (p=0.001)	.715* (p=0.013)
Risk to Society	.735** (p=0.010)	0.847** (p=0.001)		0.781** (p=0.005)
Mortality	.727* (p=0.011)	.715* (p=0.013)	0.781** (p=0.005)	

Study limitations

Due to the nature of the convenience sample, the level of education and average income exceeded that of the general population, which may over-represent the use of new media and media literacy. It is recommended that future studies look at a broader range of education levels and range of media use. A larger respondent sample may also allow researchers to explore relationships between socio-demographical data and perceived health threats. The keyword selection, while taking into account popular terminology, may also have not accounted for all possibilities among individual disease and injury types. Additionally, the article-count approach may not reflect the true nature of media coverage and the manner in which issues are framed. Finally, mortality data was not concurrent with media coverage range data. Ideally, these should be from the same year.

Recommendations for future research

The findings in this study not only add perspective to the changing understanding of health news and the public’s perception of risk but also raise more questions. The correlation between frequency of news coverage and global mortality contradicts previous findings. Further research is needed to confirm these findings and determine whether online media have become more responsible or accurate in covering health threats, or whether previous studies focused on specific diseases that received dramatic media coverage but had low mortality (such as SARS and MRSA). Another possible explanation for the findings is that with cross-media agenda setting, health information does not only go from the media to the consumer, but also from the consumer to media through user-generated content. It would be important to conduct consumer behavior studies and understand how Internet users

consume health news, and whether they corroborate health news with other online sources of health information. Since this study included a sample with higher than average education, it would also be useful to compare these behaviors between Internet users of different education levels.

Of particular interest in this study were the categories of intentional injuries and HIV/AIDS: respondents rated these two risks on average as posing a serious threat to society, but a minor threat to themselves. This discrepancy in perceptions should receive further research to determine the existence of a phenomenon as well as the attitudes and reasons that underlie it. Future research could also assess how different media are used to corroborate information, and how credibility of Internet sources and overlap of media use may impact the public's consumption of health information. Lastly, to facilitate more global understanding of this topic and given media trends, it may also be conducive to study the area of new or social media, and whether its content reinforces or contradicts mainstream media. While open access to create content on the Internet can be a tremendous help in the speed of health news transmission, it can also be a source of inaccurate information since anyone can spread inaccurate information.

CONCLUSION

While new and social media have introduced a vast number of inexpensive and accessible resources for health information consumers and despite an increasingly pronounced shift toward both online and offline sources, individuals' perceptions of health threats continue to mirror that of mainstream media. This may not be detrimental, however, as the media's coverage, measured by frequency, may be symmetrical to the actual mortality rates of health risks, thus leading individuals' perceptions to be in line with actual mortality. Interestingly, individuals believe the threat to the self across the most lethal chronic and infectious diseases to be inferior to that of society at large, especially in the context of HIV/AIDS and intentional injuries. These findings illustrate a potential for significant changes in the fields of health news and risk communication, and thus deserve further study.

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