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An Epidemic Response: Framing the Zika Virus Risk Crisis in Singapore

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Abstract – In 2016, the World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC) on the Zika virus, categorized as a global epidemic after reports of its detection in various countries and territories across the world epidemic. Since then, Zika had received widespread coverage in both the international and local news media. This study analyses The Straits Times (ST) one of Singapore's major broadsheet to assess the framing of its news coverage from 1 January to 31 June 2016, in relation to the risks imposed by the Zika virus. Four key frames were identified: Information of risk-magnitude, citizen as risk manager, sensational content, and comparison of risk scenarios. Findings revealed that news coverage was highly dominated by the frames of sensational content and comparison of risk scenarios that exhibits high sensationalism, and contained a significant amount of information to promote self-efficacy.

Keywords – Framing, News frames, Zika, Mosquito-borne disease

INTRODUCTION

On February 1, 2016, WHO declared a Public Health Emergency of International Concern (PHEIC) on the Zika virus. Following the declaration of the PHEIC, the Centers for Diseases Control and Prevention (CDC) heightened its response efforts for Zika to Level 1 on February 8, 2016. It is the highest response level at the agency. Referring to World Health Organization (2016a), the outbreak of Zika had expanded drastically. Since then, more than 60 countries and territories had been reported with cases of Zika virus transmission (World Health Organization, 2016a). In Singapore, the first case of the virus was reported on May 13, 2016, when a 48-year-old male Singapore permanent resident returned from Sao Paulo, Brazil.

Due to the emergence and transmission of Zika virus in through the globe, it is therefore of utmost importance to emphasize on the ways in which information such as health and risks-related information are communicated

effectively to the public. Effective communication of health epidemics from government and health boards is one of the key aspects of an epidemic response. During epidemics, strategic communication informs and empowers the public to respond and make judgment such as risk assessments appropriately. News Media is one of the most prevalent platforms used by agencies to manage their relationships with the public. Through this platform, agencies are able to purposefully disseminate their perspectives such as the risk involved, interventions on preventing and containing outbreaks and fatalities (Gandy, 1980; Park & Reber, 2010; Shih, Wijaya, & Brossard, 2008). It is, therefore, essential to study how health and risks-related information are presented in the news media as majority of its readers would place and make judgment on the risk magnitude based on the information that is presented (Roche & Muskavitch, 2003). According to Mummert and Weiss (2013), the collaboration between health boards and news media outlets could result in a significant reduction in the severity and risk magnitude of during and epidemic outbreak through timely updates on new cases of infections and deaths.

Looking specifically at the study of the West Nile virus conducted by Roche and Muskavitch (2003), it was discovered that the West Nile virus news coverage by a major North American newspapers in 2000, provided its readers with limited or marginalized information health and risks-related information such as the symptoms, individual protection measures, etc. According to Roche and Muskavitch (2003), the presentation of limited contextual information could hinder the readers' ability to construct informed risk judgments to reduce overall individual risk. Similarly, Coleman (1993) also found that the public's level of risk judgments are highly influenced by the information provided by the news media. Additionally, both quality and frames in which the news stories are presented could either amplify or dampen the public's attitude and perceptions of risk. The use of media frames, therefore, plays an active role in providing quality risk-related information, as well as, constructing the public's understanding of a highly contagious virus, and its attitudinal and prevention

measures to contain the virus (Gandy, 1980; Park & Reber, 2010; Shih et al., 2008).

Accordingly, this study explores how an epidemic, the Zika virus, was framed in a Singapore local English broadsheet, *The Straits Times*' (ST). The study takes on two specific interests. Firstly, the use of framing with regards to risk communication such as the allotment of alarming, reassuring or neutral stances, in influencing the public's perceptions, understanding, and attitudes towards their formation of risk judgment. Secondly, the evaluation of the main frames present in the successive stages of the Zika outbreak. The Zika virus is considered a new virus with many factors that are highly uncertain and undetermined. Therefore, it provides an ideal ground for the study of framing of a new epidemic in especially for a country such as Singapore who has been dealing with a comparable virus such as dengue since the 1960s.

ZIKA VIRUS

An infectious disease known as the Zika virus was first discovered in 1947, during a research fieldwork for yellow fever by a group of scientists in Uganda. The virus was then detected in the *Aedes* mosquitoes from the same forest in 1948, following the first human diagnosis in 1952 (World Health Organization, 2016b). Since then, outbreaks of the virus have been recorded periodically in various parts of Africa and Southeast Asia (World Health Organization, 2016b). In the year 2007, a series of Zika outbreaks were recorded in the Federated States of Micronesia, Yap, which is located outside its previously known geographic regions. This caught the attention of major health organizations and government officials for its viral potential to spread to other Pacific islands (World Health Organization, 2016b). In October 2015, Pernambuco, located in the Northeast region in Brazil, reported a spike in the number of newborns with microcephaly, a birth defect that resulted in the underdevelopment of a baby's brain (Barreto, 2016). Categorized as a global epidemic after reports of its detection in various countries and territories across the world, Zika received widespread coverage in both the international and local news media. Given the global nature of this epidemic, the role of news print media then becomes an essential platform for agencies to communicate and relay information, updates or issues concerning Zika to the public.

ZIKA VIRUS IN SINGAPORE

In Singapore, the Ministry of Health (MOH) and National Environmental Agency (NEA), largely uses the news media for the dissemination of health-related information, the establishment of public's awareness, understanding of health and chronic diseases, and communication of health campaigns and intervention. Considering the extensive political and media attention

on the Zika virus, it is likely to generate the public's interest and concerns on the risk involved.

On January 1, 2016, ST published its first news report of the Zika virus. Since then, an average of 15 articles/month was published from the period of January 1, 2016, to June 30, 2016. Due to the frequent publication of Zika virus related news articles, it is, therefore, taken into consideration by the researcher that a significant percentage of local readers would have been exposed to information relating to the Zika virus. Zika virus was chosen as the focus of interest due to its sudden viral spread, in December 2015, and its connection to microcephaly and Guillain-Barré syndrome (GBS). Singapore has been fighting an ongoing battle with a mosquito-borne virus, dengue, which is transmitted by the same species of mosquito, the *Aedes* mosquito, since 1960. Since then, the implementation such as the identification of areas with high *Aedes* mosquito activities, frequent area inspections for mosquito breeding and fogging was introduced to contain the spread of the deadly virus.

THEORETICAL FRAMEWORK

ROLE OF FRAMING

Framing is one of the dominant communication and organization tools used by journalists to structure their news coverage. Framing reflects how different topics or events are assessed, endorsed and communicated, thereby influencing the public's understanding and opinions (Scheufele & Tewksbury, 2007). According to Entman (1993), "to frame is to select some aspects of a perceived reality and make them more salient in a communicating text [...] to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (p. 52). Hence, the analyzing of frames presented in the news article would offer a window for the study on how it contributes to the public's understanding of the epidemic crisis and the risk involved and how they in turn respond through risk management. The framing theory coined by Entman (1993) suggests how the news media makes use of the technique of framing to mold the readers' thought process and thus influence their perception and attitudes towards the topic. The use of different frames in the news article such as the diction, specific images, recommendations, guidelines, would trigger the readers' existing schema and therefore lead them to generate certain responses (Scheufele, 1999).

The notion of framing has been used frequently as an empirical approach in mass media communication literatures (Scheufele, 1999). Many of these literature investigations of media coverage of issues such as

politicals (Cappella & Jamieson, 1996; Scheufele, 2000; Semetko & Valkenburg, 2000), natural disasters (Devitt & O'Neill, 2016; Escobar & Demeritt, 2012), climate change (Gordon, Deines, & Havice, 2010), scientific issue (Nisbet, Brossard, & Kroepsch, 2003) and health-related issues such as SARS (Beaudoin, 2007; Tian, 2005); H1N1 Influenza (Lee, 2014; Lee & Basnyat, 2013); HIV/AIDs (De Souza, 2007; Wu, 2006), etc.

Even though, there are a significant number of well-developed literatures on the framing of health-related issues, many of these literature either focuses on a long existing health-related issues in isolation (Wallis & Nerlich, 2005) or portrayal of a health-related issues from news media belonging to different countries whereby it focuses on cross-cultural context (Sandell, Sebar, & Harris, 2013). In that sense, the literature as mentioned above, do not undertake the evaluation of a newly identified health-related issue and the relations in which the stories are framed is dependent on the magnitude of the issues such as risk, or to more general specifications such as the journalistic practices.

RISK-RELATED NEWS MEDIA CONTENT

Due to the highly event-based nature of the epidemic, health and government boards are likely to communicate the progress of the crisis in a non-periodical pattern. According to Shih et al. (2008), the frequency and amount of news coverage is based on occurring events such as newly identified cases, announcements by globe agencies such as WHO, interventions by global or local government and health boards, the discovery of new vaccinations, etc. Considering the epidemic's uncertainties and assumptions on the communications of risk, the study of the framing of risk-related news coverage needs to be evaluated differently for different category of risks issues. According to the study conducted by Freudenburg (1988), The communication of different risks, would result in the generation of the different magnitude of emotional stress. The categories of risk could include the reports of deaths, the severity of the consequences, ease of transmission, the degree of individual's control over the risk, level of uncertainty over specialized treatments such as vaccinations, etc. According to Freudenburg (1988), there are two contributors that can influence individual's emotional stress. Firstly, the individual's lack of control over the risk. Secondly, the severity of the consequences contributed by the risk. As a result, the need for quality information is vital for individuals to make true judgments on the potential risks.

Scholars had argued that effective communication of health and risk-related news coverage can aid in the facilitation of a better and well-informed population on the risk magnitude, therefore allowing the population

to respond readily in both the individual and the societal level (Covello, Peters, Wojtecki, & Hyde, 2001; Evensen & Clarke, 2012). According to Evensen and Clarke (2012), the degree of risk and individual perceive is very much based on their confidence on their capability to allay the potential risk. Therefore, with the presentation of efficacy risk-related information, individual can decide on the best cause of action to reduce the risk and most importantly providing them with confidence that they are in-control and have the ability to take charge and be in control (Evensen & Clarke, 2012).

QUALITATIVE CONTENT ANALYSIS

The use of content analysis has been employed by many scholars for the analysis of contextual data. Some scholars make use of content analysis to study the news media content over a period of time, while others focus on content from a single or specific events (Wimmer & Dominick, 1994). According to Entman (1993), content analysis is vital in the determination of the contextual meaning, as well as, identifying the frames used in the news article. In the study conducted by Hsieh and Shannon (2005), they suggest three different qualitative content analysis approaches, the conventional, the directed and the summative approach. This study employs the directed content analysis approach which looks at the process of identifying of key frames and to develop of coding schemes which is derived directly from the news articles.

STUDY AIM

This study is driven by two research questions:

1. What are the key frames present in the news release of the Zika virus in the ST?
2. What is the relationship between the volume and the frequency of the news articles with regards to the number of letter to editors pertaining to the risk factor of the Zika virus?

METHODOLOGY

CHOICE OF SAMPLE

The English language daily broadsheet ST was selected for this study. ST is Singapore's greatest and most highly circulated broadsheet, with a daily paper circulation of about 360,000 and daily digital circulation of about 113,000 (Audit Bureau of Circulations Singapore, 2016). Broadsheet newspapers were specifically chosen due to its reliability in terms of quality news information and its greater influential potential (Lee, 2014). The news articles from ST were retrieved from Lexis-Nexis, an online newspaper archive database, based on a keyword search for "Zika" or "Zika virus." According to previous epidemic

research, the media coverage of a new virus is identified by three stages. Firstly, the raising of the alarm, followed by preparatory and lastly, the initiation of crisis (Nerlich & Halliday, 2007; Ungar, 1998, 2008; Wallis & Nerlich, 2005). Following the focus of this research, all articles related to the Zika virus during the raising the alarm, and preparatory stage were collected. These include articles that may only provide brief descriptions of the Zika virus.

The volume and frequency of new coverage is very much linked to the successive stages during an epidemic. According to the studies conducted by previous scholars, the successive stages are categories into three time frames: The sounding of alarm, preparatory stage and lastly, the containment stage (Nerlich & Halliday, 2007; Wallis & Nerlich, 2005). This study aim to analyse the Zika virus during the first and second stages. The first stage, looks into the initial news coverage published in the ST, from January 1 through May 12, 2016, which covers fearful claims such as the severity and the spreading contagion of the Zika virus. The second stage of preparation runs from May 13 through June 30, 2016, when the first case of Zika was detected in Singapore. The new articles from this stage focus on the combination of both fearful claims and assuring messages. A total of 93 articles were collected over the time frame from January 1 through June 30, 2016.

CODING OF ARTICLES

According to Semetko and Valkenburg (2000), there are two approaches to the coding of frames namely, the induction and deduction approach. The use of inductive approach begins by analysis a news article through a general lens in attempt to discover other possible frames. The process would usually take place with loosely defined coding variable whereby the final frames are determined through the coding process (Semetko & Valkenburg, 2000). Conversely, the deduction approach looks at the use of predetermined frames that are established based on past literature. This approach, requires the researcher to have a concrete idea of the frames that would be mostly likely be present in the news article (Semetko & Valkenburg, 2000). Due to the nature of the study, the researcher has decided to take on an induction approach as it would allow the researcher to detect a variety of ways in which the collected news articles can be framed.

After a series of thorough analysis of the news articles collected, a total of four frames were identified: Information on risk-magnitude, citizens as risk managers, sensational content, and comparison of risk scenario. Nine coding categories were identified, with each category representing one of the four frames identified (Table 1).

For instance, information on risk-magnitude is assessed through the coding theme of uncertainties, whereby the stories includes information on the symptoms, cure, mode of transmission, and portray the virus as something unknown. According to Roche and Muskavitch (2003), the measure of risk-magnitude through qualitative representations (e.g. extremely Dangerous), lack contexts and value. Hence, its inability to be used as an accurate indicator of risk representation. However, quantitative representation (e.g. more than 1,400 cases of microcephaly were detected) would allow for a more informed, assessment of risk-magnitude (Roche & Muskavitch, 2003). Citizens as risk managers is assessed through the coding theme of self-efficacy, whereby stories stresses on descriptions of symptoms and providing information on self-protection. According to Witte (1995), self-efficacy refers to the degree of control of the situation in which the citizens feels that they are in control in altering their exposure to the risk. Sensational content evaluates stories that are framed to induce feelings or emotions such as fear. According to Covello et al. (2001), the technically of sensationalism in news media tends to act as a mental noise in influencing that public's perception of the risk magnitude. Comparison of risk scenario evaluates whether stories refers to known virus or disease to help readers better understand and related to the unfamiliar virus or disease present at the moment. According to Dudo, Dahlstrom, and Brossard (2007), the comparison of risk scenario, can help the public to better understand and relate to the risk in relations to a scenario that they are already familiar with. Examples from the ST for each of the nine coding statement are identified (see Table 2).

Table 1. Coding Typology for News Coverage of Zika

Frames	Definitions
Information on Risk-Magnitude	
Quantitative	Quantitative risk information with no contextual denominator represents the middle range of the contextual precision continuum, but also lacks context and, therefore, also lacks value as an accurate indicator of risk. This type of risk information is apparent in numerator-based risk phrases (e.g., "At least 40 of the infants have recently died").
Qualitative	Qualitative risk measures represent the low end of the continuum of contextual precision and are apparent when risks are discussed by using imprecise and therefore valueless phrases like "large threat" or "extremely bad".
Consequence	This frame is characterized by the consequences of the virus, such as loss of human life (victims), birth defects, sickening of the nervous system, social impact, or economic impact (cost), are the focus of the story. Furthermore, stories also includes any phenomenon, social/political issues, events, or discussion generated by the occurrence or spread of the virus (e.g., "linked to severe brain damage in infants may also be causing another serious health crisis").
Uncertainty	This frame is characterized by uncertainties in any aspect(s) of the epidemics including the symptoms, the cure, the mode of transmission, etc. It also includes stories that portray the virus as something unknown. Therefore requires more research and studies to be conducted by the researchers or government agencies (e.g., "There is no preventive vaccine or treatment").
New evidence	This frame refers to new findings/ results of research efforts or discovery of new evidence that help advance the understanding of the diseases or the ability to quell the diseases. Included in this frame are: discovery of new strains of the disease, new way of spreading/transmitting, new methods to prevent/cure/treat the disease, development of new medicine, and so on.
Citizen as Risk Managers	
Self-efficacy	The story stresses descriptions of symptoms and examples of personal protection. For example, the use of mosquito repellent or the performance of the five-step Mozzie wipe-out.
Sensational Content	
Action	The story stresses any action(s) against the virus, including prevention, potential solutions, or strategies (e.g., "El Salvador government urging women not to get pregnant until 2018").
Reassurance	Stories expresses the idea that citizens/public should not be worried about the effects of the virus. Stories usually emphasize on the readiness and/or successes of authorities (e.g., WHO/Singapore government) in combating the virus.
Fear	The story expresses the idea of agitation or anxiety caused by the outbreak of the virus. Stories emphasize on fear that is reflected or portrayed by individuals/public figures (e.g., celebrities, athletes etc.) resulting certain precautions. For example, the discussion on the withdrawal of the 2016 Olympics.
Anger	The story expresses the idea of displeasure or hostility with the government's or major health agencies commitment to the Call to Action. Stories emphasize on the government's slow reaction and incompetency and foresight.
Comparison of risk scenarios.	
Comparison	This frames refers to the use of known virus or disease to help readers better understand and related to the unfamiliar virus or disease present at the moment. For example, the comparison of dengue to the Zika.

INTERCODER RELIABILITY TEST

The test was assessed through the coding of, 20% of the total sample which was selected randomly. The final amount of 20 articles was appraised by two coders. The two coders were briefed on how to conduct the analysis base on the Coding Typology in Table 1. Frame that were not prevalent in the news article were coded as (0). Major and minors frames present in the news articles were coded as (1) in the respective column. This tabulation of the data for each variable is calculated through Scott's *pi* coefficient. According to Scott (1955), the intercoder reliability provide an outlet for corrections and chance agreement between the two coders. This process would, therefore, result in a relatively reliable measurement. Table 2 lists the *pi* coefficient for each of the frames analyzed in this study.

Table 2. Intercoder reliability Test

Themes	Scott's pi coefficient
Uncertainty	0.79
New evidence	0.93
Consequence	0.87
Self-efficacy	0.86
Action	0.74
Reassurance	0.81
Fear	0.88
Anger	0.74
Comparison	0.77
Mean	0.82

RESULTS

ZIKA COVERAGE IN THE STRAITS TIMES BROADSHEET

Figure 1 presents the number of Zika-related broadsheet news coverage over the six months period of January 1 to June 30, 2016. The estimated number of local news coverage and wire services were somewhat proportionate with the reportage of 55 percent news articles and 45 news articles respectively. The ST covered the Zika epidemic with a varying degree of interest. News related to Zika has received much attention from the ST. However, many of the stories covered were often brief and non-exhaustive in terms of quality scientific information on the virus. This is very much apparent especially in during the initial stage of Zika coverage. The articles often relied heavily on human interest, government and health board sources. The volume of news coverage on the Zika virus was very much correlated to the risk magnitude involving the public. This phenomenon could be observed during the months of January, February and May which received particularly extensive coverage. Much of the stories coverage during these months includes preventions, number of suspected cases, updates on new evidence and WHO directed efforts in researching and containing the virus. Other news themes include Zika's effect on tourism, sports, and the economy.

For example, the preventions appeal in ST news headline "Call for vigilance as Singapore is 'vulnerable' to the virus" (January 24, 2016), "Zika Virus Countries urge women not to get pregnant" (January 25, 2016), etc. was transferred into the corresponding news story "Virus found in more tourists returning to Europe" (January 28, 2016), "US officials confirm sexually transmitted Zika case in Texas" (February 4, 2016), "Brazil finds Zika virus in Saliva and Urine Samples" (February 6, 2016), "First case of Zika virus in Philippines since 2012" (March 7, 2016), etc. ST news articles that include government agencies efforts in researching and containing the virus "WHO meets to decide if Zika is global emergency" (February 2, 2016),

“Singapore ready to tackle mosquito-borne diseases” (May 20, 2016), etc. News themes that include Zika’s effect on tourism, sports, and the economy “Zika fears: WHO rejects call to shift Olympics” (May 29, 2016), “Very low risk of further Zika spread due to Olympics: WHO” (June 16, 2016), etc.

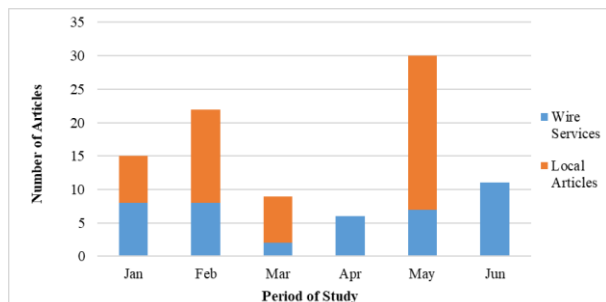


Figure 1. Number of Zika articles in sections of The Straits Times’ from January 1 to June 30, 2016.

ZIKA COVERAGE NEWS COVERAGE AND LETTERS TO EDITOR

Figure 2 show the relationship between the volume and frequency of new coverage as compared to the number of letters to editors. The collection of Letter to Editor includes the submission of options and discussions from the members of the public directly to ST. Based on the data collected, an estimated 13 percent of Letters to Editor were collected as compared to the total 87 percent of new-related articles. This is an interesting finding as it reflect the how ST’s efficacy information regarding the Zika virus had influence the readers’ perception of risk magnitude regarding the Zika virus. An estimated 50 percent of Letter to Editor indicated that that severity and risk magnitude of dengue in Singapore is still more prevalent as compared to the Zika virus. Some of the statements include, “The alarming increase in dengue cases here is more worrying than the threat of the Zika virus” (May 24, 2016). “Historically, the illness caused by the Zika is mild” (January 28, 2016), etc.

INFORMATION ON RISK-MAGNITUDE

Figure 2 shows the extent to which newspaper stories include qualitative and quantitative-level risk information to help in the framing of the consequences of Zika. Stories include information such as the loss of human life, birth defects, sickening of the nervous system, social impact, economic impact, etc. Quantitative risk information is determined based on the use of non-contextual denominator that is usually represented by a numerator-based risk phrases such as, “25 people died”. In contrast, qualitative risk information is represented by imprecise contextual phrases such as “large threat” or “extremely bad”. The estimated qualitative risk of Zika-related risks appeared in more than 40 percent of the stories, having a major presence of 19 percent, and a minor presence of 22

percent of news coverage respectively. Conversely, quantitative estimates of Zika-related risks appeared in 25 percent of the stories, a major presence of 13 percent and minor presence of 12 percent of the news stories respectively.

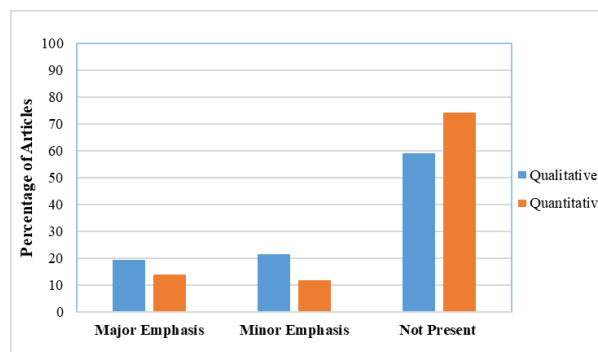


Figure 2. Qualitative and Quantitative Risk Measurement

Figure 3 shows the extent to which newspaper stories channels levels of uncertainty and new evidence. The estimated level of uncertainty of Zika-related risks appeared in more than 25 percent of the stories, a major presence in 2 percent of the stories and the minor presence in 23 percent of the news coverage. News coverage statements include “[...] more testing is needed to prove the link between the virus and brain damage, leaving the full extent of the threat to the country unclear. “Why this may have happened in Brazil and not elsewhere is at this stage difficult to answer,” said Zika expert Alain Kohl [...]” (Da Silva, 2016) Conversely, the amount of new evidence provided appeared in an estimated 20 percent of the stories, having a major presence of 15 percent and the minor presence of 3.5 percent of the news coverage. Example of such article included headline such as “Virus linked also to autoimmune disorder warn Brazilian docs” (January 31, 2016), “Climate change linked to Zika outbreak” (February 8, 2016), etc.

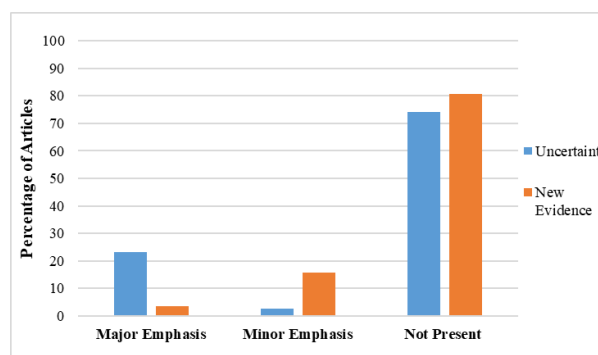


Figure 3. Levels of Uncertainty and New Evidence

CITIZENS AS RISK MANAGERS

News stories in ST provided a substantial amount of information on the symptom, personal protection information and how one could reduce the risk of contracting Zika (see Figure 4). Information describing the symptoms of Zika appeared in more than 30 percent of the stories having the major presence of 18 percent and the minor presence of 8 percent. Information including the descriptions of symptoms includes, “The disease starts with a mosquito bite and normally causes little more than a fever and rash” (February 6, 2016), “Zika symptoms are similar to dengue, but milder, and include fever, rashes and joint and muscle aches” (May 15, 2016), etc.

Additionally, information describing how individual could protect themselves from contracting Zika appeared in more than 19 percent of the stories having a major presence of 5 percent and the minor presence of 11 percent. Content describing how individuals could decrease their likelihood of Zika infection appeared in 42 percent of the stories having a major presence of 32 percent and the minor presence of 9 percent of the news stories. News stories which have a major presence include information such as, “Pregnant women, whose sexual partners live in or travel to areas with Zika virus outbreaks, should ensure safe sexual practices or abstain from sex for the duration of their pregnancy,” (March 10, 2016). News stories which have a minor presence include information such as “[...] advised pregnant women to protect themselves against mosquito bites” (February 3, 2016).

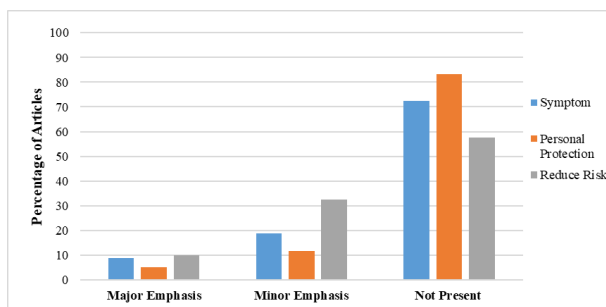


Figure 4. Measures of Citizen as Risk Managers

SENSATIONAL CONTENT

45 percent of the stories studied, were found to include at least one intervention proposed by the health or government agencies (see Figure 5). More than 38 percent of the stories studies focus on providing the readers with a sense of reassurance with emotionally charged phrases such as “low risk” or “less concerned”. “[...] mosquitoes also are less efficient at carrying Zika than dengue” (June 8, 2016). “Latest data indicates low risk of Zika at Games” (June 8, 2016), “For most

people, Zika is not dangerous, and some of them will not even have symptoms [...]” (June 8, 2016).

Conversely, 41 percent of stories studied, brings about the emotion of fear. Many of these articles included emotionally charged adjectives and/or adverbs appeared such as deadly, alarming, overwhelming, etc. “[...] the Zika virus was spreading “explosively” in the Americas, causing an “extremely high” level of alarm” (January 31, 2016), “[...] defences against the mosquito-borne virus, which has spread extensively in the Americas, where up to four million cases are expected this year” (February 3, 2016). Sensational content that somewhat promote the emotion of anger appeared only in an estimated 1 percent of stories studied. Clearly, content that triggers the emotion of anger is almost insignificant in ST’s news coverage.

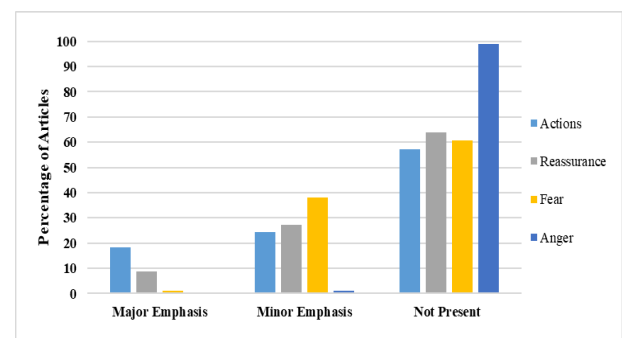


Figure 5. Measures of Sensational Content

COMPARASION OF RISK SCENERIOS

Figure 6 shows the extent to which newspaper stories provide known risk for comparison purposes. The estimated level of risk comparison information that contained at least one separate risk comparisons makes up to 60 percent of the stories evaluate. Examples of commonly used risk comparisons included references to other mosquito-borne viruses (e.g., dengue, chikungunya, yellow fever, etc.). Nearly 55 percent of the newspaper stories made reference to dengue, a mosquito-borne virus. News coverage statements include “Zika symptoms are similar to dengue, but milder, and include fever, rashes and joint and muscle aches” (May 15, 2016), “Zika, which can cause birth defects, can be introduced to a region when a local mosquito picks it up from an infected human” (May 29, 2016).

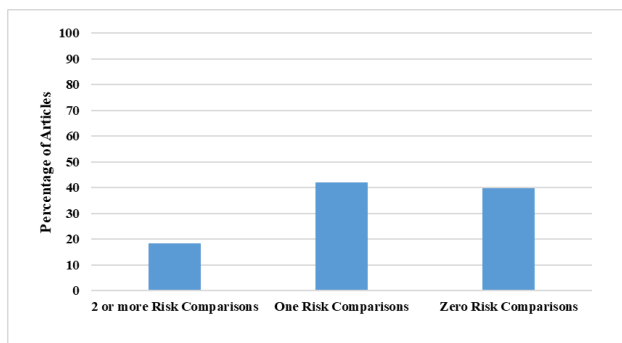


Figure 6. Measures of Risk Scenarios Comparison

DISCUSSION

This study analyzes how the news coverage of Zika was framed in sections of a Singapore broadsheet news media.

Four frames were identified: Information on risk-magnitude, citizens as risk managers, sensational content and the comparison of risk scenarios. The Information on risk-magnitude in the news media complements findings from Roche and Muskavitch (2003) and Dudo et al. (2007). Similarly, the framing of the citizen as risk manager is in line with the self-efficacy measures in the study conducted by Dudo et al. (2007).

In order to evaluate the effects of framing, the content and the source of information have to be analyzed and categorized. The Singapore mass media is known to be close partners with the governmental boards. Its main purpose is to help in the contribution of nation building (Bokhorst-Heng, 2002). According to Bokhorst-Heng (2002), mass media is seen as a powerful platform that could influence the public's opinion and perception on national issues, therefore it is of utmost importance for journalists to subscribe to the journalistic model of objectivity and fairness during the facilitation of communication between the governmental agencies to the public.

Local news media such as the ST relies on wire services as the major source of international news. As seen in the 93 articles collected for this study, an estimated 45% of the news articles were from wire services. This, maybe due to the limited number of correspondence around the world. In an international epidemic such as Zika, the news stories tend to be globalized in terms of its scope and focuses on its impact on other countries and how it may, in turn, impact the local communities. Moreover, due to the uncertainties surrounding the virus, local journalists are predisposed to reply on influential wire services for information pertaining to the Zika virus. This, maybe due to the fact that health-

related news coverage requires expert knowledge and source expertise in order to disseminate precise and accurate information to the public.

The findings of my study, seem to suggest that the dissemination of risk-related information through the use of framing is significant and that it could achieve a positive outcome in terms of influencing the public's perceptions, understanding, and attitudes towards their formation of risk judgment. Four main dominant frames were identified: Information on risk-magnitude, citizens as risk managers, sensational content and the comparison of risk scenarios. A lot of mass media attention was received from the Zika virus. Over three-quarters of all Zika-related articles were located in the first section, Top of The News, and over 20 percent of the articles were published as front-page news. In addition, the word length of Zika-related articles mounts up to an average of 400 words. This reflects in a somewhat substantive reporting on the related issues. These findings seem to indicate the extent to which the public is exposed to information on the Zika virus and its magnitude in terms of ability to influence the public's risk perception, understanding, and attitudes.

According to Stallings (1990), the notion of risk is not an objective condition to which the public is seen to be actively involved in the perceiving of risk-magnitude. Additionally, risk-related issues are often assembled and distributed by journalist to create a media discourse in which the public is given the opportunity to able to deconstruct complex issues and, therefore able to make inform risk assessments. Based on the findings of this study, it was found that the percentage of the risk-magnitude information in Zika-related stories is comparable to the study of the West Nile virus coverage by Roche and Muskavitch (2003). Both studies found that the news coverage consists of primarily qualitative risk-magnitude information. Qualitative risk-magnitude information was represented with null phrases such as "large threat", "extremely bad" or "spreading explosively". Much of the quantitative information found in the article was mostly numerator-based risk phrases without the present of a contextual denominator. Quantitative information includes, "more than 1,100 cases of microcephaly", "404 confirmed cases of microcephaly", etc.

However, while West Nile virus and Zika virus are both infectious diseases, their gravity in term of their risk-magnitude may result in the differences in the quality of risk information. Unlike the West Nile virus, the Zika is a top priority of the WHO as it declared an international public health emergency on the latter on February 1, 2016. The declaration of the Zika virus marks the fourth time in which WHO has declared a global health emergency since such the outbreak of other infectious epidemic such as influenza, Ebola and polio. Since the

beginning of December 2015, WHO has released reports providing readily available quantitative information that could be integrated into the news articles by the mass media. Other governmental and health boards such as the CDC, MOH and NEA have reiterated many of these quantitative statistics, therefore, providing more numerical-context for the public. Due to the dubiety nature of Zika, the statistics themselves frames the public's perception of risk involved (e.g., At least 40 of the infants have recently died).

The second frame which is also one of the most apparent frames, looks at the how citizen are encouraged to be responsible for managing their risk of contracting the Zika virus. The news articles focus on the consistent expectation that individuals are responsible for managing the risk of contracting Zika. An estimated of more than 40 percent of the stories comprise of articles that emphasize on prevention and precautions. Articles include recommendations from health or government boards advising the public on how individual could reduce their risk of contracting Zika such as the application of insect repellent, wearing of long-sleeve and preventive to stop mosquito breeding. Additionally, the news articles also provide information on the symptoms and emphasis on how individual ought to seek medical help if they were to observe such symptoms.

ST's coverage of Zika was mired in sensationalism. The articles focus on the sensational frame where almost one-quarters of the articles were loaded with context that reflects the extreme negative outcomes (e.g., most alarming health crises, condition could be fatal, nightmarish health crisis, etc.). The framing of fear mostly focuses on the impacts Zika has on pregnant women how it could lead to the birth defect of newborn babies, as well as, GBS which could result in the weakening of the nerve cells that may lead to paralysis. In terms of risk communication, the framing of fear provides the public with a discursive framework of risk-magnitude and expectations in terms of the severity of the virus. Through the reporting of fear, the public would be able to better understand the how Zika could impact them and therefore increasing their sense of responsibility to avoid it. The overemphasis of the sensation of fear would, therefore, influence women who are pregnant and women who want to be pregnant to take more precaution and pay more attention to the symptoms and preventive steps.

Another prevalent theme found within the framing of sensational content is reassurance. 65 percent of the stories famed under the sensational content of reassurance were written by local journalists. According to a study conducted by Griffin, Dunwoody, and Gehrman (1995), journalists tend to focus more on

the reassurance of hazardous issues that directly impact their own community instead of focusing on the risk involved. Stories include phrases such as (e.g., people should not be overly worried about Zika, dengue is actually more dangerous, very low risk, etc.). The reassurance frame aimed to reassure the public's confidence that Zika is less of a concern as compared to the other fatal mosquito-borne diseases such as dengue.

This study found a significant percentage of risk comparisons regarding Zika. Over 60 percent of articles made reference to at least one previously encountered disease. 60 percent of which made a comparison with dengue. According to Washer (2004), individuals tend to cognitively create an understanding of the newly encountered disease, based on the past experience or knowledge. Therefore through the uses of comparison and representations of past diseases, the public is able to construct and understand the risk involved. The linkage of past risk scenarios would also make the new disease more familiar and therefore appear less threatening (Washer, 2004).

Referring to the findings of this study, the use of framing in the news coverage an epidemic crisis such as the Zika virus plays an important role in influencing the public's risk perception. Much of these risk perceptions are linked to the public's sensational responses such as the feeling of fear, anger and the want to seek for more information on the virus.

Based on the findings, an insignificant amount of Letter to Editor. This may indicate how the public perceive the Zika virus in terms of it severity and risk factor. 50 percent of the Letters, focuses that that severity and risk magnitude of dengue in Singapore is still more prevalent as compared to the Zika virus. The other 50 percent of the letters focuses on the Zika virus as a threat and how the government and health boards are responsible in minimizing the potential risk and to expedite the formation of a vaccine for the virus.

CONCLUSION

Frames are the presumed communication tools that journalist use to help readers make sense of the social world, and is essential for effective communication between the agencies and the public. Due to the effects of framing, the broadsheet news media is able to communicate the selected issues through with a degree of salience attached, therefore able to influence their citizens. This, in parallel, reflects back and transmits government narrative and the scheme of social interpretation that individuals rely upon to make sense of the risk involved. Considering the complex association between the news media framing and public's perceptions, attitudes, and reactions towards risk management, this study suggests the role and

influence of framing with regards to risk communication

According to Nucci, Cuite, and Hallman (2009), the measurement of risk is dependent on the effective communication on effects of the epidemic and how future transmission could be prevented. Therefore, depending on frames presented in the news coverage, the mass media can amplify or dampen the public's measurement of risk. The findings have shown evidence that the framing of epidemic information is primarily quantitative in nature. This is especially so for the information on the risk-magnitude of the Zika virus. This information includes important contextual denominator such as the number of babies found to have suffered from microcephaly, number of people diagnosed with Zika, the number of pregnant women detected with the virus, worst-case scenarios etc. The presence of these mediated risk information in the news coverage of Zika virus, as reflected in my findings, therefore, provides the public with the ability to construct their own risk analysis of the situation and therefore increase the public's self-efficacy in dealing and reacting to the epidemic.

The findings of this study are limited to the content analysis of news stories on the Zika virus in only one news media outlet. Future research could include a more diverse sample from different news media outlet so as to better understand the influence of framing of epidemics and health-related news and how it impacts and influences the public's the attitudes and behaviour. Suggestions for future studies could include the framing patterns that are adopted by journalists to help its readers to understand the risk magnitude of the epidemic and therefore securing the public's engagement and cooperation to contain and limit the exposure of an outbreak.

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