Tweeting about #Diseases and #PublicHealth:
Communicating Global Health Issues Across Nations

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Study Summary & Method

Twitter is playing an increasing role in health public relations and health communications, but little is known about Twitter use of public health departments in general and across different nations in particular. A quantitative content analysis was carried out of 1,200 randomly selected tweets by 12 public health departments: those of the United States, Canada, Brazil, Chile, Italy, Germany, Nigeria, South Africa, India, Singapore, Australia, and New Zealand.

Twitter, over the past decade, is becoming an important source for health information. Nearly 40% of consumers believe that information they find on social media plays a role in how they deal with their health (Versel, 2015). Studies have shown that Twitter is the most commonly used social media platform by public health departments, but that it is most frequently used as a one-way information channel instead of focusing on their publics' needs and preferences (Thackeray, Neiger, Smith, & van Wagenen, 2012).

RQ1: *How is public health information shared on Twitter across nations?*

RQ2: *Are there differences in the Twitter engagement among public health tweets of different nations?*

About half – 49.7% (n=596) - of the tweets mentioned a specific health issue. Among the most interesting results was the glaring lack of attention to cardiovascular disease in these tweets: the issue is barely mentioned, while it is one of the main causes of morbidity and mortality worldwide (WHO, n.d.). Most tweets that address a specific topic focus on infectious diseases – not surprising with the Ebola outbreak barely behind us and the Zika outbreak still active. Each of the 12 countries mentions infectious diseases in their tweets, but Nigeria, Brazil, and India each dedicate 20% or more of their tweets to this issue. Only three countries (Brazil, India, and Nigeria) mention cardiovascular disease, and each only mention it in one or two tweets; and the U.S. and Canada do not mention it at all. Topics like infectious disease are relevant and should be covered, but the virtually complete lack of focus on cardiovascular disease and its prevention is startling and cause for concern. Half of the countries – Canada, Chile, Germany, New Zealand, Singapore, and the USA – do not address a specific health issue or topic in more than 50% of their tweets; instead often posting more general messages about agency activities like meetings and travels. These messages tend to elicit little engagement, and while they may seem to make sense from a more traditional public relations point of view, they are likely not the most productive type of tweet for the same health public relations professionals.

On social media, connecting with hyperlinks to additional sources often is cause for concern when the associated websites are often lacking in trustworthiness. In this case, most hyperlinks point to either a health department's own site, other related government sites, or associated other social media platforms, which provides a greater level of reliable information through web-based sources.

Engagement variables in social media studies are generally not normally distributed, and the median is a better measure of central tendency than the mean. Chile's health department Twitter account produced the highest median number of retweets (Mdn=29.50) India reached the second highest median number of retweets, and the highest median number of likes.

Risk Perception Model

The Risk Perception Model focuses on how risks are perceived. There are 15 identified risk perception factors - voluntariness, contrability, familiarity, equity, benefits, understanding, uncertainty, dread, trust in institutions, reversibility, personal stake, ethical/moral nature, human versus natural origin, victim identity, and catastrophic potential - that affect level of concern, anger, fear, hospitality, and anxiety. When the environment becomes emotionally charged, such as when a serious threat is perceived, people's ability to process information is impaired and a so-called mental noise that can affect one's ability to engage in rational discourse is often created, therefore altering the traditional rules of effective communicaton (Cairns et al., 2013; Covello et al., 2001).

RQ3: *To what extent are risk perception variables present in public health tweets originating in different nations?*

RQ4: *To what extent does the presence of risk perception variables impact social media engagement?*

Risk perception constructs are not used all that frequently in this study, but there are distinct differences between the twelve nations: Australia, Canada, Chile, Germany, New Zealand, Nigeria, and Singapore use these constructs each in fewer than 10% of their tweets, while Brazil mentions the concept of danger in 19% of their posts and South Africa uses it in 24% of their posts. Danger is the only construct used more than 10% by multiple countries.

The nonparametric Mann Whitney U test was used to compare the medians for retweets and likes per country for risk perception constructs. Mentioning the concept of danger related to health issues and illnesses is most often connected with statistically significant higher retweet medians. In addition, retweet frequency medians were more frequently significantly higher when risk perception variables are included than like frequency medians. All constructs were at least associated with one instance of higher engagement, and none of the constructs' presences were associated with lower median Twitter engagement.

Health Belief Model

The Health Belief Model (HBM) is one of the primary models used to explain why individuals do or do not engage in a variety of health-related actions. The HBM consists

Table 1. Risk Perception Model constructs and median engagement

Country	Engagement variable	RPM variable	Mdn present	Mdn absent	U	Z	p-value
India	Retweets	Danger	42.00	19.00	797.000	2.373	.018
	Likes	Danger	59.00	32.00	803.000	2.435	.015
Italy	Retweets	Danger	9.00	6.00	956.500	2.312	.021
Nigeria	Retweets	Victim	13.00	2.00	248.000	2.100	.034
	Retweet	Irreversible	8.00	2.00	243.000	1.997	.047
South Africa	Retweets	Danger	6.00	3.00	1,253.000	2.768	.006
	Likes	Fear	2.00	1.00	577.000	2.112	.035
USA	Retweets	Credibility	36.00	16.00	855.500	2.974	.003
	Likes	Credibility	33.00	15.00	831.000	2.722	.006

Figure 1. Example of Perceived benefits

Figure 2. Example of cues to action

of six main constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, perceived self-efficacy, and cues to action.

RQ5: *To what extent are HBM constructs used in public health tweets across different nations?*

RQ6: *To what extent does the presence of HBM constructs impact Twitter engagement?*

Compared to risk perception constructs, HBM constructs are used notably more frequently by the twelve public health entities. Still, Canada, Chile, Nigeria, and Singapore used these constructs in fewer than 10% of their tweets. In general, perceived benefits (see Figure 1), cues to action (see Figure 2), and self-efficacy were most frequently utilized.

The nonparametric Mann Whitney U test was used to compare the medians for retweets and likes by country. All HBM constructs were at least associated with a statistically significant increase in median engagement in at least one instance, and only one construct, self-efficacy, was associated with statistically significantly lower median like frequency in the Chilean public health tweets. Cues to action was associated with seven separate instances of higher median engagement, while perceived severity was associated with six separate instances.

There is an increase in focus on using health behavior and other theories in health public relations practice, and this study shows that this strategy is a promising one. While risk perception constructs were less frequently used and less frequently associated with significant higher Twitter public engagement levels, (HBM) constructs are used frequently in this sample and almost always increased public engagement in a statistically significant manner. In general, perceived benefits, cues to action, and self-efficacy were most frequently utilized by the health departments. Their focus therefore seems to be less on perceived threat of health issues (in the form of perceived severity and susceptibility as well as perceived barriers to solutions), and more on the potential for management of threats in the form of perceived benefits, cues to action, and self-efficacy. However, both threat and management of threat seem to increase tweet engagement: Cues to action was associated with seven separate instances of higher median engagement, while perceived severity was associated with six separate instances. On the other end of the spectrum, city-state Singapore, which does not use theory constructs much in their tweets, does not elicit engagement on Twitter, while countries with a deeper and more balanced approach also elicit more engagement.

RECOMMENDED BEST PRACTICES:

- Increase focus on chronic diseases
- Use theoretical constructs, especially ones originating with the HBM
- Use visuals - and use a variety of types of visuals (second part of the study)
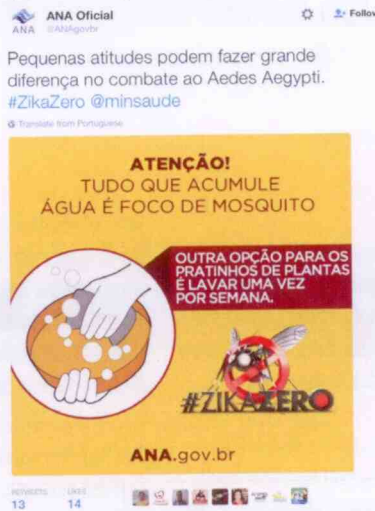- Consider addressing more specific health issues/topics

Limitations:

- Focused exclusively on Twitter
- Focus on twelve nations
- Focus on retweets and likes for public engagement
- More attention needs to be paid to the culture and language differences

References
Available upon request

Figure 3. Example of infographic

Figure 4. Example of perceived benefits

Figure 5. Example of cues to action

Figure 6. Example of self-efficacy

Table 2. Health Belief Model variables and median engagement

Country	Engagement variable	HBM variable	Mdn present	Mdn absent	U	Z	p-value
Australia	Retweets	Severity	15.00	4.00	245.500	2.029	.039
Brazil	Retweets	Benefits	7.00	3.00	911.500	2.665	.008
	Retweets	Severity	7.00	3.00	809.000	2.514	.012
	Retweets	Self-efficacy	9.50	3.00	990.500	3.017	.003
	Likes	Self-efficacy	12.50	5.50	902.;500	2.178	.029
	Retweets	Cues to action	12.00	3.00	1,250.000	4.253	<.001
	Likes	Cues to action	17.00	5.00	1,186.000	3.678	<.001
Canada	Retweets	Cues to action	28.50	11.50	177.000	1.947	.044
Chile	Likes	Self-efficacy	3.00	7.00	112.000	-1.986	.047
Germany	Retweets	Susceptibility	8.00	3.00	513.500	2.554	.011
	Retweets	Severity	10.00	5.00	72,694.500	4.329	<.001
India	Likes	Severity	58.50	31.00	973.500	2.114	.035
	Retweets	Susceptibility	40.00	19.00	827.500	2.241	.025
New Zealand	Retweets	Self-efficacy	3.00	2.00	1,673.500	2.970	.003
	Retweets	Cues to action	3.00	2.00	1,672.500	2.733	.006
Nigeria	Retweets	Severity	13.00	2.00	579.500	3.479	.001
	Retweets	Susceptibility	10.00	2.00	480.000	2.913	.004
	Retweets	Cues to action	8.00	2.00	589.500	2.198	.028
Singapore	Retweets	Cues to action	5.00	0.00	277.500	3.055	.002
South Africa	Retweets	Barriers	9.00	3.00	396.000	2.521	.012
	Retweets	Severity	6.00	3.00	1,389.500	2.945	.003
	Retweets	Cues to action	5.50	3.00	1,496.500	2.488	.013

No significance for any HBM constructs for USA and Italy