Knowledge and risk perceptions of the Ebola virus in the United States

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Introduction

On September 30, 2014, the Center for Disease Control and Prevention (CDC) confirmed the first Ebola case in the United States (US), with three further cases being widely reported thereafter (Centers for Disease Control and Prevention (CDC), n.d.a). The diagnosis of the Ebola virus in the US followed shortly after the World Health Organization (WHO) declared the Ebola outbreak “a public health emergency of international concern” (World Health Organization, n.d.). As part of its precautionary steps, the CDC devoted an entire website to the Ebola outbreak providing information about the disease signs and symptoms, transmission, prevention, diagnosis, and treatment (Centers for Disease Control and Prevention (CDC), n.d.b).

While the risk of contracting the virus in the US is small, the Ebola epidemic has received extensive media coverage in the US media, with close to 1000 segments about the virus aired between October 7 and November 3, 2014 (Gertz and Savillo, 2014). On the one hand, media focus on emotive topics can give rise to biased public perceptions that exaggerate the risk of rare events (Combs and Slovic, 1979; Frost et al., 1997). On the other hand, availability of the internet and the freedom to search among web-based sources affords easy access to health information (Berland et al., 2001; Rolison et al., 2012). News websites are a particularly popular source of new information during outbreaks of infectious diseases (Van Velsen et al., 2012).

Relevant disease knowledge, such as of SARS, has been linked to less worry about personal risk (Brug et al., 2004; Voeten et al., 2009). For example, knowledge that a SARS outbreak has not affected one’s geographical region is linked to lower perceived personal risk of contracting the disease (Jiang et al., 2009).

In the current study, we assessed risk perceptions of Ebola among individuals living in the US and measured their knowledge of the virus. We hypothesized that (a) better knowledge of Ebola would be linked to lower perceived risk of contracting the virus and that (b) the internet would be one of the major sources of information about Ebola among knowledgeable individuals.

Methods

Two hundred twelve respondents were recruited via Amazon’s Mechanical Turk (AMT) to complete an online survey (conducted 14–18 November 2014) of their knowledge and perceptions of the Ebola virus. AMT is an online recruitment service on which research surveys can be advertised to more than 100,000 individuals. The reliability of the AMT participant sample has been validated elsewhere by comparisons with national samples and other recruitment methods (Paolacci et al., 2010; Berinsky et al., 2012). In line with US census norms (Ewert and Kominski, 2012), almost all respondents (95%) had completed at least lower secondary or vocational education and a majority (64%) had completed higher vocational or university education. All were US residents and all except one respondent was born in the US. Respondents’ internet protocol (IP) address was used to identify
their geolocation to confirm their presence in the US. Most identified they were living either in a city (51%) or a town (37%). Table 1 provides the sample demographics.

Total Ebola knowledge scores (Table 2; Section A) were calculated by summing correct responses across item 1 (correct = [a]), item 2 (correct = [d]), item 3 (correct = [b] and not [a]), item 4 (correct = [c] and [d]), and item 5 (correct = [a]), generating a maximum possible score of five. Seven items (Table 2; Section B) measured sources of new information about Ebola in the past year, trust in information sources, perceptions of preventive measures, and willingness to pay for an Ebola vaccine. Six items (Table 2; Section C) assessed perceived risk, seriousness, and worry about Ebola, and fourteen items (Table 2; Section D) measured perceptions of risk and seriousness for other medical conditions (Brug et al., 2004).

Results

Most respondents (90%) were familiar with the Ebola concept. A remaining 9% had heard of it, and only three had not heard of it. More than half (67%) correctly identified Ebola as a fatal illness transmitted to people from wild animals and many (65%) were aware that the virus is contracted via direct contact with bodily fluids and not via contact with airborne droplets. Most respondents associated Ebola as a fatal illness transmitted to people from wild animals. Most identified it is possible to die from the Ebola virus. A mean of 53 people (standard deviation [SD] = 27.8) were estimated by respondents to die among 100 infected with Ebola. The mean total knowledge score was 3.9 (SD = 1.0; 1 correct = 1%, 2 correct = 9%, 3 correct = 21%, 4 correct = 36%, 5 correct = 32%).

The internet (92%) and media (86%) were identified as the major sources of new information about Ebola in the past year. The internet was rated as the most trustworthy source (mean [M] = 6.2, SD = 1.9), followed by the government (M = 5.9, SD = 2.34), and the media (M = 5.4, SD = 2.2). Respondents believed they were moderately informed about protective measures against contracting Ebola (M = 6.3, SD = 2.2) and the majority believed that it was either quite possible (37%) or definitely possible (39%) to take preventive actions in the event of an outbreak in the US. If a vaccine against contracting Ebola were to be made available, respondents were willing to pay a median of $25 (modal amount = $100; 16%). A minority (14%) were not willing to pay for a vaccine.

The respondents provided low ratings of worry (M = 2.3, SD = 1.9) and personal risk (M = 1.7, SD = 1.4) with regard to contracting Ebola. Their personal risk was perceived as lower than that of others in the US (M = 2.6, SD = 1.9; t(212) = 8.46, p < .001; Fig. 1). Europe was perceived as more at risk (M = 3.0, SD = 2.0) than the US (t(212) = 4.33, p < .001), with Africa most at risk (M = 6.5; SD = 1.9). Perceived personal risk of contracting Ebola was lower than for other medical conditions (Fig. 1), except for HIV (M = 1.4, SD = 1.0; t(212) = 3.90, p < .001) and malaria (M = 1.5, SD = 1.1; t(212) = 3.55, p < .001). Conversely, Ebola was perceived as more serious (M = 8.5; SD = 2.2).
than all other medical conditions, except for HIV (M = 9.2, SD = 1.6; \( t(212) = 5.39, p < .001 \)) and heart attack (M = 9.3, SD = 1.7; \( t(212) = 5.56, p < .001 \)).

Total Ebola knowledge scores predicted less worry about contracting the virus (r = −.22, p = .001), lower perceived personal risk (r = −.26, p < .001), and lower risk faced by others in the US (r = −.15, p = .026) and in Europe (r = −.16, p = .021), but higher ratings for the seriousness of contracting the virus (r = .32, p < .001). More knowledgeable respondents were more likely to believe that preventive actions could be taken against contracting Ebola in the case of an outbreak (r = .17, p = .016) and felt more informed about protective measures (r = .21, p = .002). The internet (MSE = 3.2, \( M_{RS} = 4.0; \ t(210) = 3.25, p = .001 \)) and no other sources of information were associated with better knowledge of Ebola.

**Discussion**

In light of international concern and the mass media focus on the Ebola virus, the present study assessed knowledge and risk perceptions of the virus among people living in the US. In possibly the first study of its kind, it was revealed that knowledge of Ebola was strongly implemented in people’s risk perceptions of the virus. Here, it was found that more knowledgeable individuals perceived less risk of contracting Ebola for themselves and for others. Further, they were less worried about contracting the virus, and perceived greater control over preventive actions against contracting Ebola in the event of an outbreak in the US. Yet, they also regarded contracting Ebola as more serious compared to other sources of information, as being more serious compared to their less knowledgeable counterparts. These findings provide a tentative suggestion that the provision of accurate health information about Ebola could be effective in informing the general public about the risks of Ebola and of preventive measures without curtailing the seriousness of the virus.

The current study has a number of limitations. Our sample size may not necessarily reflect characteristics of the general population. The sampling method may also have biased our sample characteristics. A key finding of the current research is the relationship between Ebola knowledge and worry, awareness of preventive measures, and perceptions of perceived personal risk, which should apply to other samples.

Individuals who were knowledgeable of Ebola identified the internet as one of the major sources of new information about the virus in the past year. Moreover, respondents rated the internet as the most trustworthy source of Ebola information. The internet provides on-demand access to health information (Berland et al., 2001; Rolison et al., 2012). With the internet playing such an important role in providing information about Ebola, it is crucial that accurate and reliable information is made available online. Our current findings, in support of other studies (Berland et al., 2001; Rolison et al., 2012; Van Velsen et al., 2012), suggest that policymakers may seek to further exploit the internet as a means of delivering information about the Ebola virus in the US and worldwide.

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**Conflicts of interest**

The authors declare that there are no conflicts of interest.

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