

## A review of telemental health in international and post-disaster settings

Eugene F. Augusterfer<sup>a</sup>, Richard F. Mollica<sup>a,b</sup> & James Lavelle<sup>a</sup>

<sup>a</sup>Harvard Program in Refugee Trauma, Cambridge, Massachusetts, USA, and <sup>b</sup>Department of Psychiatry, Harvard Medical School, Cambridge, Massachusetts, USA

### ABSTRACT

Telemental health (TMH) is an important component in meeting critical mental health needs of the global population. Mental health is an issue of global importance; an estimated 450 million people worldwide have mental or behavioural disorders, accounting for 12% of the World Health Organization's (WHO) global burden of disease. However, it is reported that 75% of people suffering from mental disorders in the Developing World receive no treatment or care. In this paper, the authors review global mental health needs with a focus on the use of TMH to meet mental health needs in international and post-disaster settings. Telemedicine and TMH have the capacity to bring evidence-based best practices in medicine and mental health to the under-served and difficult to reach areas of the world, including post-disaster settings. The authors will also report on the mental health impact of the Haiti 2010 earthquake and on the limited use of telemedicine in post-disaster Haiti. The paper will underscore the point that published papers on the use of TMH in post-disaster settings are lacking. Finally, the paper will review considerations before working in TMH in international and post-disaster settings.

### ARTICLE HISTORY

Received 2 July 2015  
Accepted 10 August 2015  
Published online  
17 November 2015

### Introduction

Telemental health (TMH) is an important component in meeting critical mental health needs of the global population. TMH refers to the provision of mental health care from a distance, which can include direct patient care, assessments, peer collaboration and education (ATA, 2009). Mental health is an issue of global importance; an estimated 450 million people worldwide have mental or behavioural disorders, accounting for 12% of the World Health Organization's 'global burden of disease' (WHO, 2010). Depression is a common illness worldwide, with an estimated 400 million people affected (WHO, 2014a). Many of those suffering from mental and behavioural disorders are in remote medically underserved areas. Telemental health has the capacity to bring much-needed specialist expertise to remote and difficult to reach areas, including post-disaster settings. Telehealth (including TMH) provides a virtual surge capacity, enabling physicians and other health professionals from around the world to assist overwhelmed local health and medical personnel with the increased demand for services (Simmons et al., 2008).

### Mental health needs in international settings

As stated above, mental health is an issue of global importance, with the burden of mental disorders continuing to grow, with significant impacts on health and major social, human rights and economic consequences in all countries of the world (WHO, 2014a). Specifically; depression is a common mental disorder and one of the main causes of disability worldwide. Globally, about 400 million people of all ages suffer from depression with more women being affected than men (WHO, 2014a). However, it is reported that 75% of people suffering from mental disorders in the Developing World receive no treatment or care (WHO, 2008). While there are many reasons for the inequity of mental health care globally, it is the opinion of the authors that this inequity must be addressed, including by increased use of TMH.

Examining global mental health issues more closely, an important area to examine is mental health needs in post-disaster settings, including natural, man-made and technological disasters. The need for mental health services to address the trauma caused by disasters is

well documented. Over 1 billion people (1 in 6) worldwide have been affected by disasters (Mollica, 2014).

In recent years the scale and scope of disasters have increased markedly. Since 1990, natural disasters have affected about 217 million people every year with the immediate and longer-term effects of these disruptions on the population constituting humanitarian crises (Leaning & Guha-Sapir, 2013). Additionally, natural disasters are on the rise and as a consequence, humanitarian, health and mental health needs for post disaster relief are on the rise as well (Centre for Research on the Epidemiology of Disasters, 2010).

### **Mental health needs in post-disaster settings**

As stated above, many survivors of disasters go on to develop health and mental health problems related to the trauma (WHO, 2014b). However, there remains a global inequity in mental health care favouring developed nations. Recognizing this imbalance, Saxena of the WHO stated 'Sustainable healthcare, including mental health, in the Developing World is critical' (Saxena, 2010). As stated in the literature, TMH has the capacity to address the need for sustainable mental healthcare by bringing evidence based best practices in mental health care to those in need, regardless of location. Or, as Frances Cairncross stated, 'what matters most about new technology is not how it works, but how people use it, and the changes it brings to human lives' (Cairncross, 2001).

Global disasters have impact increasingly large numbers of people. The Office of the United Nations High Commissioner for Refugees (UNHCR) reported that by the end of 2014, 59.5 million people were forcibly displaced by natural or man-made disasters, constituting the largest number of displaced persons ever recorded (UNHCR, 2015). 'Disasters, whatever their source or scale, bring with them the potential to cause distress. Every person who is directly or indirectly involved in such an event may be affected and many may need psychosocial support' (NATO Joint Medical Committee, 2008).

In a systematic review of post-traumatic stress disorders (PTSD) related to disasters, Neria et al. examined 284 peer-reviewed published studies of PTSD following disasters, natural, man-made and technological, and concluded that 'PTSD among persons exposed to disasters is substantial with the rates of PTSD correlated to exposure to the disaster' (Neria et al., 2008). In a study of survivors of the Wenchuan earthquake (China), Hong and Efferth found that adolescents and adults had high prevalence rates of PTSD (Hong & Efferth, 2015). In a study of survivors of

the Great East Japan Earthquake, tsunami and nuclear disaster of 2011, a mixed natural disaster and technological disaster, in which over 15,000 people died and over 300,000 people were displaced, Tsujiuchi et al. studied the mental health impact on survivors and found PTSD rates in excess of 35% (Tsujiuchi et al., unpublished). In another study of earthquake survivors, Sezgin and Punamaki examined social relations of 1253 women exposed to earthquake trauma in Eastern Anatolia, Turkey and found that 'severe earthquake trauma was associated with deteriorated social relations, especially neighbourhood and marital relations. Deteriorated marital and child relations were associated with increased levels of psychiatric distress' including PTSD (Sezgin & Punamaki, 2014).

In addition to the mental health impact of natural disasters, one must examine the mental health impact of man-made disasters. In a study of a man-made disaster, the armed conflict in Syria, Alpak et al. studied 352 Syrian refugees living in a refugee settlement camp in Turkey, and found a frequency rate of 33.5% for PTSD. However, when they examined female refugees who had a previous psychiatric disorder, a family history of a psychiatric disorder and experienced two or more traumas, the probability of developing PTSD jumped to 71% (Alpak et al., 2015). In another study of a man-made disaster, Mollica et al. studied the mental health sequelae of traumatic head injury (THI) in ex-political detainees who survived torture, and found that those who had suffered THI were much more likely to suffer depression and PTSD (Mollica et al., 2014). The *MS Estonia* ferry disaster in the Baltic Sea in 1994 is another tragic human-made disaster. Arnberg, Eriksson and Hultman performed a prospective longitudinal study and found prolonged PTSD remained 14 years after the disaster, with a mean IES-R score of 33, and probable PTSD was 27%. In their study, they suggested the prolonged uncertainty regarding the salvation of the deceased after the event might partially account for the prolonged PTSD found (Arnberg et al., 2011).

Finally, in a review of the mental health impact of technological disasters, Contis and Foley studied depression, suicidal ideation and thyroid tumours among Ukrainian adolescents exposed as children to the Chernobyl disaster. A total of 115,191 adolescents were screened for depression, suicidal ideation, and psychological problems using the Children's Depression Inventory; depression was diagnosed in 15,399 adolescents (13.2%), suicide ideation in 813 (5.3%), and attempted suicide in 354 (2.3%). Underlying components of the participants' depression were negative mood, interpersonal difficulties, and negative self-esteem (Contis & Foley, 2015). In a study of the mental health

impact of the Piper Alpha oil rig disaster in 1988, Hull, Alexander and Klein reported on the rates of PTSD and found 10 years after exposure that 73% of the survivors still showed PTSD, and a complex psychosocial inter-relationship was described in the study (Hull et al., 2002).

Based on a review of the literature on the mental health impact of disasters, both natural and man-made, disasters leave in their path physical injury, but also hidden scars of emotional trauma (Mollica, 2006). Additionally, Boscarino found that a major factor in the mental health recovery of disaster survivors is the availability of mental health and psychosocial resources (Boscarino, 2015). However, in most disasters emergency responders are often being asked to move to the next disaster leaving a gap in much-needed mental health services. However, TMH can help address the availability of post-disaster mental health care.

### **Telemental health and telemedicine in international and post-disaster settings**

This section reviews the literature on the use of TMH in post-disaster settings. As stated by Garshnek and Burkle, use of telemedicine in post-disaster settings has been reported relatively infrequently (Garshnek & Burkle, 1999). However, despite the relative infrequency of published reports on the use of telemedicine in disaster settings, Wootton et al. state that telemedicine has been used for many years to support doctors working in low-resource settings (Wootton et al., 2014).

One of the first documented uses of telemedicine in disaster response was the joint US, NASA, and Union of Soviet Socialist Republics telemedicine collaboration on joint activities in medicine, known as 'Spacebridge', in response to the 1988 earthquake in Soviet Armenia. Nicogossian and Doarn looked at lessons learned following the earthquake in Armenia and found that psychological, physical, and social sequelae persist years after the events. Teleconsultations used Internet-based technology in support of 240 clinical cases of post-earthquake victims. Further, the programme generated important lessons that would apply to later telemedicine efforts including meeting technical challenges such as establishing a multi-site video connection across multiple time zones, identifying personnel in both countries with appropriate technical skills; and finding the best forms of media to securely transmit complex patient information (Nicogossian & Doarn, 2011). In a study of survivors of a major bushfire disaster in Australia, Reifels et al. examined the use of telemental health and found that despite the lack of quantitative data, all three telemental health services which were utilized (Kids Helpline,

MensLine Australia and Lifeline Australia) 'experienced significant increases in overall service uptake levels in the wake of the bushfires' (Reifels et al., 2012).

In an armed conflict setting, Jefee-Bahloul, Moustafa, Shebl and Barkil-Oteo surveyed 354 Syrian refugees and report that 41.8% had scores on HADStress that correlate to PTSD. However, only 34% of the whole sample reported a perceived need to see a psychiatrist, and of those only 45% were open to telepsychiatry (Jefee-Bahloul et al., 2014). In war-torn Somalia, Zachariah et al. found that with the use of tele-consultations 'there was a progressive improvement in the capacity of clinicians to manage complicated cases' and that 'the introduction of telemedicine significantly improved quality of paediatric care in a remote conflict setting and was of high added value to distant clinicians' (Zachariah et al., 2012). Walters performed a retrospective study of consultations from deployed military medical units in Somalia, Haiti, Croatia, and Macedonia to determine the clinical utility of telemedicine consultations, and found that physicians in many different specialities, including mental health, employed telemedicine consultations in a wide range of patients and illnesses. Telemedicine consultations significantly affected the diagnosis in 30%, the treatment in 32%, and the overall patient status in 70% of cases (Walters, 1996). In a study of international telepsychiatry, Mucic examined patient acceptability of telepsychiatry in a cross cultural context. Specifically, Mucic examined the international telepsychiatry service that was established between Denmark and Sweden for cross-cultural patient groups, such as asylum seekers, refugees and migrants. Over an 18-month period, 30 patients (21 men and 9 women) were treated by telepsychiatry via videoconferencing from providers who spoke the patients' own language. The patients who completed the end of treatment questionnaire ( $n = 23$ ) reported a high level of acceptance and satisfaction with telepsychiatry, as well as a willingness to use it again or recommend it to others (Mucic, 2008).

And finally, in a study to examine telehealth response in disaster response, Simmons et al. stated that telehealth has the potential to significantly improve the response to natural or anthropogenic disasters. Telehealth technologies and methods can be used to remotely assist with medical triage and transportation decision-making and provide access to primary and specialist medical care expertise (Simmons et al., 2008).

#### **Case example: Haiti earthquake**

On 12 January 2010 a 7.0 magnitude earthquake hit Haiti with the epicentre only 10 miles from Port-

au-Prince, the capital of Haiti. The earthquake reduced buildings to rubble, instantly taking lives and destroying homes. The US Geological Survey (2010) estimates that 316,000 people died, 300,000 were injured, and over 1.3 million were displaced after their homes. In addition to the large death toll, injuries, and displacement of a large population, much of the infrastructure such as hospitals, schools, and the telecommunications network were badly damaged or destroyed. However, shortly after the disaster first-aid posts were set up by the Haitian Red Cross and the International Committee of the Red Cross, providing basic health in field hospitals and make-shift operating theatres (International Committee of the Red Cross, 2010).

To better understand the impact of the 2010 earthquake, it is important to understand the overall picture of Haiti. The World Bank (2015) lists Haiti as the poorest country in the Americas and one of the poorest in the world (a low-income country). Haiti is ranked 161 out of 187 countries on the UN's Human Development Index, which is the lowest in the Western hemisphere (UN, 2013). Access to healthcare was more difficult following the earthquake. Only 30% of healthcare facilities were public and most of them were in urban areas. In rural areas, 70% of health services were provided by nongovernmental organizations (NGOs) and include mainly primary health care. A 2010 WHO/Pan American Health Organization (PAHO) survey reported approximately 2500 physicians in Haiti, the majority being in primary care (WHO/PAHO, 2010). Additionally, the majority of mental health care is provided by these primary care doctors and nurses; however, the majority of these doctors and nurses have not received official in-service training in mental health within the last 5 years. Further, the mental health system has very few professionals; the *WHO Mental Health Atlas 2011* (post-earthquake) reports 0.2 psychiatrists per 100,000, or approximately 20 psychiatrists, 0.26 mental health nurses per 100,000, or approximately 25 trained mental health nurses (WHO, 2011). As a result, when the earthquake hit, the Haitian healthcare system was overwhelmed.

However, as with most global disasters, the international response was rapid. Bailey et al., reported that the 'need for food, shelter, health care, and psychological support among these displaced and devastated people was brutally obvious' (Bailey et al., 2010). McShane, reporting about her experience as a psychiatric resident serving in a field hospital, stated, Haiti lacked a coordinated mental health care system and that 'hundreds of patients presented to triage and emergency rooms daily with symptoms related to psychiatric disorders, such as heart palpitations, sweats, headaches,

and memory problems' (McShane, 2011). Cenat and Derivois examined the prevalence and determinants of PTSD and depression symptoms in adult survivors of the earthquake in Haiti and found of the 1355 adults (660 women), the prevalence rates of PTSD and depressive symptoms were 36.75% and 25.98% respectively (Cenat & Derivois, 2014). In a study of the prevalence of PTSD and depression in children one year after the 2010 earthquake, Blanc et al. (2015) stated that while more than 500 studies were conducted in Haiti following the earthquake, very few assessed the mental health impact on the population. In their study they found that, using the Child Behavior Checklist, more than 50% of the children tested had severe PTSD symptoms. Blanc et al. went on to say that serious attention should be paid to the mental health aspects in the reconstruction programme for Haiti (Blanc et al., 2015).

### **Telemedicine response to the Haiti earthquake**

As stated above, the international response to the Haiti earthquake was rapid. However, a review of the literature yielded limited reports on the use of telemedicine or telemental health. Thus, the reports below are limited. As reported by Loudon in *Medscape Medical News*, Marttos, of the University of Miami School of Medicine, reported everything was destroyed, but his team used satellite phones to connect to the University of Miami for triage and video consultations. Marttos went on to say what was most exciting was that telemedicine and technology would enable Haiti to be connected to the rest of the world (Loudon, 2010). In a study of mobile health (mHealth) in post-earthquake Haiti, Tenq et al., used GPS-enabled mHealth to manage the data of 50,000 participants in two isolated communities. In doing so, they were able to document the vaccination of 45,417 people receiving at least one dose of oral cholera vaccination and 90.8% received a second dose of the oral cholera vaccination. As such, mHealth technology allowed for the creation of an electronic registry with specific population census data and a specific location, thus saving time and energy in the future (Tenq et al., 2014). Doarn and Merrell (2014) report on the use of telemedicine, including telemental health, in disaster response. Specifically, they report on the deployment of US military forces in a humanitarian role in post-disaster settings such as the 2010 Haiti earthquake. 'The United States deployed assets to ensure communications, air traffic control, and a host of other capabilities' including telemedicine support in collaborative partnerships with non-governmental organizations and other organizations (Doarn & Merrell, 2014). In a unique 'telemedicine' system, a fisherman from St Petersburg, Florida, used his



on-board ham radio to connect the US Navy hospital ship, *USS Comfort*, with doctors in Haiti to provide medical support, including the transfer of an imperilled 1-day old infant to the *USS Comfort* for urgent medical care (Freudenheim, 2010).

### Summary and conclusions

As stated above, mental health is an issue of global importance with an estimated 450 million people worldwide having mental or behavioural disorders, thus accounting for 12% of the WHO's 'global burden of disease'. And, the percentage of the global population suffering from mental health disorders and not receiving treatment is disproportionately concentrated in the Developing World. In low- and middle-income countries, between 76% and 85% of people with mental disorders receive no treatment for their disorder. A further compounding problem is the poor quality of care for many of those who do receive treatment (WHO, 2014b). However, telemedicine and TMH have the capacity to bring evidence-based best practices in medical and mental health care to these remote and difficult to reach populations. While telemedicine and TMH have been deployed in post-disaster settings, they remain under-utilized. Further, published articles on the use of telemedicine and TMH in these settings are lacking. Making this point, Latifi and Tilley reviewed the literature and found that 17,565 disasters were reported between January 1980 and September 2013, and while 878 articles, books, for example, reported on the disasters, only 19 articles reported on the use of telemedicine in disaster response (Latifi & Tilley, 2014). In the case example of the 2010 Haiti earthquake, there were very few articles published on the use of telemedicine or telemental health in the recovery effort.

As stated in the introduction, mental health is an issue of global importance, with an estimated 450 million people worldwide having mental or behavioural disorders, accounting for 12% of the global disease burden (WHO, 2010). Yet, as stated earlier, access to care on a global level is skewed in favour of Western developed nations. Telemedicine and TMH bring the promise of evidence-based best practices in medicine and mental health to the under-served and difficult to reach areas, including post-disaster settings. The Haiti case example sheds light on the gap in the use of TMH on the global stage. Disasters like Haiti continue to contribute to increased morbidity and mortality, with significant economic impacts worldwide. Psychological, physical, and social sequelae persist years after the events. Using new technologies such as telemedicine (and TMH) to manage and organize events and disasters could be very

useful; however, there has been limited use of telemedicine in disasters (Ajami & Lamoochi, 2014). Further, a global forum on telemedicine recommends the integration of telemedicine into disaster response programmes (Pak et al., 2008).

### *Considerations regarding telemental health work in international and post-disaster settings*

The authors have witnessed first-hand the overwhelming mental health needs in post-disaster settings, including natural disasters such as Haiti and Japan, and man-made (post-conflict) disasters such as Cambodia, Liberia and Bosnia. While natural, man-made and technological disasters differ in their individual impact, they all share the tragic consequences of health and mental health impact on survivors. TMH can support much-needed mental health capacity building in low resource and post-disaster settings.

It is also worth noting that in international TMH, the full range of mental health services, including clinical care, case consultations, education and the important area of peer support are possible. However, it is the experience of the authors that one of the most effective uses of TMH is in support of distant on-site colleagues for education, training and case consultations. Specifically, as mentioned above, in low resource settings, providers in these settings are mostly for primary care and therefore in need of specialist case consultations, including mental health. Secondly, this form of TMH is from professional to professional, therefore, licensing and legal issues are minimal. However, it would be prudent for a provider considering international TMH to consult with both their malpractice insurer and legal counsel. A very important consideration in international TMH is the need for understanding the distant culture. This important factor would be addressed by working with the on-site provider so the knowledge and understanding of the distant culture would be through the 'eyes' of the on-site professional. Additionally, an added benefit is the learning that takes place bi-laterally, that is, the distant professional brings evidence-based best practices in mental health care to the on-site provider while the on-site provider brings knowledge of the culture, including how the culture expresses pain and suffering. If one is working in another language, the use of an interpreter may be necessary. If so, one must establish a relationship with the interpreter prior to any clinical encounter. Misunderstandings due to language differences can lead to clinical failure. However, once a trusting relationship is established, the work can progress as normal. Another aspect of international telemental

health to consider is time zone differences across the globe. Time differences can be a challenge, but the authors have found ways to address these, such as asynchronous communication, store-and-forward technology, and secure email servers.

When considering international TMH work, the authors encourage those interested to consider working with an established group, such as, Medecins Sans Frontieres (Doctors Without Borders), Oxfam or others. Working as a 'lone ranger' in international or post-disaster settings is strongly discouraged.

### Limitations

As stated by Latifi and Tilley, there is a relative lack of peer-reviewed published papers on the use of telemedicine in post-disaster settings, and fewer yet on the use of TMH in post-disaster settings (Latifi & Tilley, 2014). Therefore, the authors regret the lack of data to report on the use of TMH in the Haiti case study. However, as the authors learned while visiting post-earthquake Haiti, there were some uses of TMH in the post-earthquake response. As such, the authors make a plea for careful documentation of one's work and strong consideration of both the increased use of TMH and the publication of one's work.

**Declaration of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

### References

- Ajami, S., & Lamoochi, P. (2014). Use of telemedicine in disaster and remote places. *Journal of Education and Health Promotion, 3*, 26.
- Alpak, G., Unal, A., Bulbul, F., Saqaltici, E., Bez, Y., Altindaq, A., ... Savas, H.A. (2015). Post-traumatic stress disorder among Syrian refugees in Turkey: a cross-sectional study. *International Journal of Psychiatry in Clinical Practice, 19*, 45–50.
- ATA. (2009). Evidence-Based Practice for Telemental Health. American Telemedicine Association. Retrieved from <http://www.americantelemed.org/docs/default-source/standards/evidence-based-practice-for-telemental-health.pdf?sfvrsn=4>
- Arnberg, F.K., Eriksson, N.G., Hultman, C.M., & Lundin, T. (2011). Traumatic bereavement, acute dissociation, and posttraumatic stress: 14 years after the MS Estonia disaster. *Journal of Traumatic Stress, 24*(2):183–190.
- Bailey, R.K., Bailey, T., & Akpudo, H. (2010). On the ground in Haiti: a psychiatrist's evaluation of post-earthquake Haiti. *Journal of Health Care for the Poor and Underserved, 21*(2), 417–421.
- Blanc, J., Bui, E., Mouchenik, Y., Derivois, D., & Birmes, P. (2015). Prevalence of post-traumatic stress disorder and depression in two groups of children one year after the January 2010 earthquake in Haiti. *Journal of Affective Disorders, 172*, 121–126.
- Boscarino, J.A. (2015). Community disasters, psychological trauma, and crisis intervention. *International Journal of Emergency Mental Health, 17*, 369–371.
- Cairncross, F. (2001). The death of distance: how the communications revolution is changing our lives. Cambridge, MA: Harvard Business School Press, p. ix.
- Cenat, J.M., & Derivois, D. (2014). Assessment of prevalence and determinants of posttraumatic stress disorder and depression symptoms in adult survivors of earthquake in Haiti after 30 months. *Journal of Affective Disorders, 159*, 111–117.
- Contis, G., & Foley, T.P. (2015). Depression, suicide ideation, and thyroid tumors among Ukrainian adolescents exposed as children to Chernobyl radiation. *Journal of Clinical Medicine Research, 7*(5), 332–338.
- Doarn, C., & Merrell, R. (2014). Telemedicine and e-Health in disaster response. *Telemedicine Journal and E-Health, 20*(7), 605–606.
- Freudenheim, M. (2010). In Haiti, practicing medicine from afar. *The New York Times*, February 9, 2010, p. D5 Health Section.
- Garshnek, V. & Burkle, F. (1999). Applications of telemedicine and telecommunications to disaster medicine: historical and future perspectives. *JAMA, 6*, 26–37.
- Hong, C., & Efferth, T. (2015). Systematic review of post-traumatic stress disorder among survivors of the Wenchuan earthquake. *Trauma, Violence and Abuse. PMID: 26028651.*
- Hull, A.M., Alexander, D.A., & Klein, S. (2002). Survivors of the Piper Alpha oil platform disaster: long-term follow-up study. *British Journal of Psychiatry, 181*, 433–438.
- International Committee of the Red Cross. (2010). *Haiti earthquake: medical aid for the survivors*. Retrieved from <https://www.icrc.org/eng/resources/documents/audiovisuals/video/01047w3-haiti-medical-aid-survivors-video-2010.htm>
- Jefee-Bahloul, H., Moustafa, M.K., Shebl, F.M., & Barkil-Oteo, A. (2014). Pilot assessment and survey of Syrian refugees' psychological stress and openness to referral for telepsychiatry (PASSPORT Study). *Telemedicine Journal and E Health, 20*(10), 977–979.
- Latifi, R., & Tilley, E.H. (2014). Telemedicine for disaster management: can it transform chaos into an organized, structured care from the distance? *American Journal of Disaster Medicine, 9*, 25–37.
- Leaning, J., & Guha-Sapir, D. (2013). Natural disasters, armed conflict, and public health. *New England Journal of Medicine, 369*, 1836–1842.
- Louden, K. (2010, February 18). Telemedicine connects earthquake ravaged Haiti to the world. *Medscape Today*.
- McShane, K.M. (2011). Mental health in Haiti: a resident's perspective. *Academic Psychiatry, 35*, 8?10.
- Mollica, R. (2014). *Global mental health: trauma and recovery*. Lecture, Orvieto, Italy.
- Mollica, R.F. (2006). *Healing invisible wounds*. Orlando, FL: Harcourt Books.
- Mollica, R.F., Chernoff, M.C., Megan Berthold, S., Lavelle, J., Lyoo, I.K., & Renshaw, P. (2014). The mental health sequelae of traumatic head injury in South Vietnamese ex-political detainees who survived torture. *Comprehensive Psychiatry, 55*, 1626–1638.

- Mucic, D. (2008). International telepsychiatry: a study of patient acceptability. *Journal of Telemedicine and Telecare*, 14(5), 241–243.
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological Medicine*, 38, 467–480.
- Nicogossian, A.E., & Doarn, C.R. (2011). Spacebridge to Armenia: a look back at its impact on telemedicine in disaster response. *Telemedicine Journal and E Health*, 17(7), 546–552.
- NATO Joint Medical Committee. (2008). *Psychosocial care for people affected by disasters and major incidents*. North Atlantic Treaty Organization. Retrieved from [https://www.coe.int/t/dg4/majorhazards/ressources/virtuallibrary/materials/Others/NATO\\_Guidance\\_Psychosocial\\_Care\\_for\\_People\\_Affected\\_by\\_Disasters\\_and\\_Major\\_Incidents.pdf](https://www.coe.int/t/dg4/majorhazards/ressources/virtuallibrary/materials/Others/NATO_Guidance_Psychosocial_Care_for_People_Affected_by_Disasters_and_Major_Incidents.pdf)
- Pak, H.S., Brown-Connelly, N.E., Bloch, C., Clarke, M., Clyburn, C., ... Sullivan, B. (2008). Global forum on telemedicine: connecting the world through partnerships. *Telemedicine and e-Health*, 14(4), 389–395.
- Reifels, L., Bassilios, B., & Pirkis, J. (2012). National telemental health responses to a major bushfire disaster. *Journal of Telemedicine and Telecare*, 18(4), 226–230.
- Saxena, S. (2010, March). Lecture: *Can developing economies afford to ignore mental health?* Bloomberg School of Public Health, Johns Hopkins University, Maryland.
- Sezgin, A.U., & Punamaki, R.L. (2014). Earthquake trauma and causal explanation associating with PTSD and other psychiatric disorders among South East Anatolian Women. *Journal of Affective Disorders*, 141(2), 432–440.
- Simmons, S., Alverson, D., Poropatich, R., Di'Orio, J., & Doarn, C. (2008). Applying telehealth in natural and anthropogenic disasters. *Telemedicine and eHealth*, 14, 968–71.
- Spence, R., So, E., & Scawthorn, C. (2010). *Human casualties in earthquakes, progress in modelling and mitigation*, Springer, Dordrecht, Heidelberg, London and New York, p. 36.
- Tenq, J.E., Thomson, D.R., Lascher, J.S., Raymond, M., & Ivers, L.C. (2014). Using mobile health (mHealth) and geospatial mapping technology in a mass campaign for reactive oral cholera vaccination in rural Haiti. *PLoS Neglected Tropical Diseases*, 8(7), e3050.
- UN. (2013). *Human development report*. United Nations Development Programme. Retrieved from <http://hdr.undp.org/en/2013-report>
- UNHCR. (2015). *Global Trends: Forced Displaced in 2014*, United Nations High Commissioner for Refugees. Retrieved from <http://www.unhcr.org/cgi-bin/texis/vtx/home/opendocPDFViewer.html?docid=556725e69&query=forcibly%20displaced%20persons,%202014>
- U.S. Geological Survey. (2010) *Earthquake Hazards Program, Haiti Earthquake Summary*. <http://earthquake.usgs.gov/earthquakes/eqinthenews/2010/us2010rja6/#summary>
- Walters, T.J. (1996). Deployment telemedicine: the Walter Reed Army Medical Center experience. *Military Medicine*, 161(9), 531–536.
- WHO. (2008). *Millions with mental health disorders deprived of treatment and care*. Geneva: Media Centre, World Health Organization.
- WHO. (2010). *World health report*. Geneva: World Health Organization.
- WHO. (2011). *Mental health atlas, Haiti*. Geneva: World Health Organization,
- WHO. (2014a). *Mental disorders. Fact sheet N 369*. Geneva: World Health Organization.
- WHO. (2014b). *Mental health report*. Geneva: World Health Organization.
- WHO/Pan American Health Organization. (2010). *Culture and mental health in Haiti: a literature review*. Geneva: World Health Organization.
- Wootton, R., Liu, J., & Bonnardot, L. (2014). Telemedicine network – long-term monitoring taking into account difference between cases. *Frontiers in Public Health*, 2, 211.
- World Bank. (2015). *Country data, Haiti*. Retrieved from <http://data.worldbank.org/country/haiti>
- Zachariah, R., Bienvenue, B., Ayada, L., Manzi, M., Maalim, A., Engy, E., ... Harries, A.D. (2012). Practicing medicine without borders: tele-consultations and tele-mentoring for improving pediatric care in a conflict setting in Somalia. *Tropical Medicine and International Health*, 17(9), 1156–1162.