

We are thankful to the Referee for providing meaningful and constructive feedback. We are hopeful that the amendments we offer in this round improve the quality and clarity of the manuscript.

Comment: Line 35 onwards: Do you have any information for comparison - years before the event or the situation one year later?

Reply: Yes, we agree that adding comparison information will benefit this section. Little could be found regarding follow on studies beyond the one-year mark after Hurricane Michael's landfall. However, data one year after the storm as well as data from previous hurricanes can provide context to the long-term effects of the hurricane on mental health. The following will be added:

Additionally, one year after Hurricane Michael's landfall, one-third of the affected population, in both Bay and Gulf counties, is expected to have worsening anxiety, depression, or insomnia (Rodriguez et al. 2021). In attempt to estimate the long-term effects of the hurricane, historical context can be applied. For example, 20 months after Category 4 Hurricane Irma made landfall in Florida, 17% of those in the storm's path reported being anxious while 11.3% reported signs of depression (Torres-Mendoza et al. 2021). Due to the continued prevalence of disaster-induced mental health illnesses, Torres-Mendoza et al. 2021 recommend that emergency preparedness plans emphasize mental health services especially in the context of long-term recovery.

Comment: Section 2.1: I recommend including further recent reviews and meta-analysis studies in this context to provide a wider overview and more details in your study. E.g.: to name only a few important articles:

Reply: We agree that additional detail can be added to Section 2.1 to further explain the relationship between disasters and mental health. The following will be added to section 2.1:

The relationship between disasters and mental health is further analyzed through a series of systematic reviews and meta-analyses. In a 6-year, longitudinal study of PTSD after the Indian Ocean earthquake and tsunami, the onset of PTSD was found to be one month post-disaster while the majority of those impacted recovered within three years (Arnberg, Johannesson, and Michel 2013). Interestingly, higher rates of depression and alcohol abuse were not associated with natural disaster exposure as in other studies; however, Arnberg et al., 2013 still bring attention to the persistent nature of disaster-induced negative mental health impacts.

In attempt to determine the relationship between exposed and non-disaster exposed individuals, a meta-analysis was conducted to compare psychological distress and psychiatric disorder rates post-disaster. Compared with non-exposed populations, those with exposure experienced a higher degree of psychological distress, as much as 1.84 times that of those with no exposure to a natural disaster (Beaglehole et al. 2018). Additionally, some experience even higher rates of mental health illness than others. For example, older

adults are 2.11 times more likely to experience PTSD and 1.73 times more likely to develop an adjustment disorder (Parker et al. 2016). This is consistent with other findings in the literature review that indicate the elderly are at risk in terms of disaster-induced mental health illness (Ursano et al., 2003; USGCRP 2016).

Exploring the efficacy of medical interventions to treat those affected by a disaster are imperative in rehabilitation activities. This efficacy can be used to help determine which treatments are best suited for disaster-response activities. Medical interventions ranged from community-based psychosocial programs, Neuro Emotional Technique (NET), school-based intervention, and social group work (Khan et al. 2015). One study did not show a significant improvement in mental health with the introduction of Institution-based rehabilitation therapy for earthquake survivors; however, the remaining studies did show significant improvement in mental health outcomes due to the medical intervention (Khan et al. 2015). Specifically, Beger and Gelkopf found that 82% of probably PTSD cases improved when a school-based intervention was used to reduce stress-related symptoms of Tsunami exposure (Khan et al. 2015).

Comment: Section 2.2: please provide also scientific literature in this context. What is the difference to SoVI developed from Susan Cutter and her team and widely used in the U.S.? Why did you not apply this scientifically proofed approach? see: <http://artsandsciences.sc.edu/geog/hvri/publications>

Reply: We agree that a comparison between Cutter's SoVI and the CDC's SVI is needed to provide a clearer picture of the current state of the field. Below is our addition to Section 2.2.

A second method of measuring social vulnerability aims to provide more context to nation-level vulnerability risk by accounting for social attributes such as socio-economic status, race, gender, age, employment, and housing considerations (Cutter and Morath 2013). Cutter and Morath 2013's Social Vulnerability Index (SoVI) uses United States Census variables, which were down selected via statistical methods designed to remove multicollinearity. Both Cutter and Flanagan et al., 2011 emphasize that social vulnerability is not derived from one demographic, but from interactions among demographic categories. Additionally, both authors agree that the level of analysis must be geographically granular enough to distinguish demographical differences. The primary difference between the two methods is that the CDC's SVI can be operationalized as a toolkit, capable of informing decision-makers with easily accessible and understandable data. While SoVI's underlying algorithms have been updated, the SVI improves based on user feedback. User feedback is an integral component of product design. The SVI becomes more useful as decision-makers see how the toolkit adapts to their needs and provides actionable data.

Comment: Section 2.3.: Please provide a short input about other possible models in this context.

Reply: We agree that additional input into other treatment methods is required. The following will be added to Section 2.3.

Other possible models in addition to traditional treatment through primary health-care providers includes community-based programs and task shifting (Kakuma et al. 2011). Task shifting aims to provide some level of care to those without access to specialists. Clinicians with fewer qualifications will receive more specific training to account for the needs of the at-risk populations (Javadi et al. 2017). The case study we explore in this research focuses on providing treatment through psychologists and social workers. Given that these resource pools are limited, incorporating community-based programs and task shifting could expand the pool of available resources to better aid the affected population in their recovery.

Comment: Section 2.4.: Please check if you can find more recent estimations for this part or provide a methods to adapt this to the current situation (indexation of the costs, ...)

Reply: Yes, we were able to find more information that can be applied to the context cost estimates, but also provide insight into how the model parameters can be changed to account for changing wage loss estimations. The following is our response:

In addition to individualized economic loss, poor mental health can negatively impact economic growth via direct and indirect costs where direct costs include the treatment of the illness while indirect costs include income loss (Trautmann, Rehm, and Wittchen 2016). Between 2011-2030, cumulative economic output loss due to mental health illness is projected to total \$16.3 trillion globally (Trautmann, Rehm, and Wittchen 2016).

While this study does not provide a direct estimation for an individual's average indirect cost due to mental health, it provides support for the coupling of Birnbaum et al's estimation of hours lost and Zahran et al's wage loss estimate due to poor mental health to provide an economic loss metric that informs optimal mental health clinician allocation for wage restoration purposes). As research advances, the methodology in accounting for economic loss due to mental health illnesses can be modified through changing the inputs to the EL_M , EL_{Mod} , and EL_S variables. This will account for both wage changes and changes in the estimation of how many days away from work an individual will experience.

Comment: Line 498: please provide citations. Do which studies to you refer to?

Reply: This is our synthesis of the information gathered in the literature review rather than a new idea with a direct citation.

Citations

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<https://dx.doi.org/10.15252%2Fembr.201642951>.
- Torres-Mendoza, Yaritbel, Alison Kerr, Amy Schnall, Carina Blackmore, and Summer Hartley. 2021. "Community Assessment for Mental and Physical Health Effects After Hurricane Irma - Florida Keys" 70 (26): 937–41.
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