



Review

# The long-term physical and psychological health impacts of flooding: A systematic mapping



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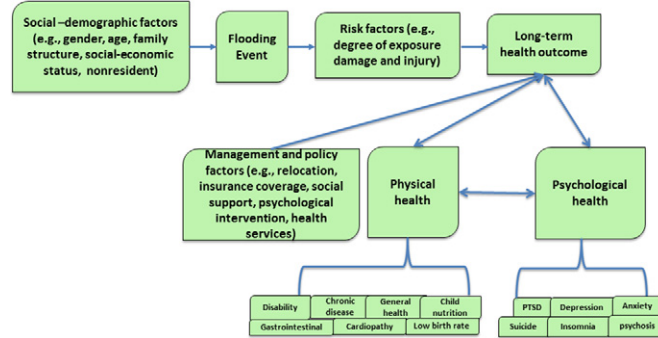
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HIGHLIGHTS

- The final mapping extracted 56 critical articles related to the long-term health impacts of flooding.
- Most long-term flooding studies (68%) investigated psychological impacts; relatively fewer studies investigated physical impacts (16%), including health-related quality of life, cardiology, chronic diseases, and malnutrition.
- The studies showed that the prevalence of psychological diseases had a reversed increasing trend occurred even in the long-term in relatively poor post-flooding environments.
- Social support and interventions were proved to be protective factors that can improve health outcomes in the long-term after flooding.
- Further cohort or longitudinal research focused on disability, chronic diseases, relocation population, and social interventions after flooding, are urgently required.

GRAPHICAL ABSTRACT



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ABSTRACT

**Background:** Flooding has caused significant and wide ranging long-term health impacts for affected populations. However, until now, the long-term health outcomes, epidemiological trends and specific impact factors of flooding had not been identified. In this study, the relevant literature was systematically mapped to create the first synthesis of the evidence of the long-term health impacts of flooding.  
**Methods:** The systematic mapping method was used to collect and categorize all the relevant literature. A study was included if it had a description or measurement of health impacts over six months after flooding. The search

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Physical health

was limited to peer reviewed articles and grey literature written in English, published from 1996 to 2016.

**Results:** A total of 56 critical articles were extracted for the final map, including 5 qualitative and 51 quantitative studies. Most long-term studies investigated the psychological impacts of flooding, including PTSD, depression, anxiety, psychiatric disorders, sleep disorder and suicide. Others investigated the physiological impacts, including health-related quality of life, acute myocardial infarction, chronic diseases, and malnutrition. Social support was proved to be protective factors that can improve health outcomes in the long-term after flooding. To date, there have been relatively few reviews had focused on the long-term health impacts of flooding. This study coded and catalogued the existing evidence across a wide range of variables and described the long-term health consequences within a conceptual map.

**Discussion and conclusions:** Although there was no boundary between the short-term and the long-term impacts of flooding, the identified health outcomes in this systematic mapping could be used to define long-term health impacts. The studies showed that the prevalence of psychological diseases had a reversed increasing trend occurred even in the long-term in relatively poor post-flooding environments. Further cohort or longitudinal research focused on disability, chronic diseases, relocation population, and social interventions after flooding, are urgently required.

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## 1. Background

Flooding can occur for a wide variety of reasons, such as high rainfall, tidal extremes, tsunamis, cyclones, hurricanes, structural failures, and rising sea-levels (Du et al., 2010). It has been reported that flooding can cause physical, psychological, social and behavioural impacts on an affected population that are both significant and wide ranging. As identified by various studies, the physical

impacts of flooding can include: injury, infectious disease outbreaks, malnutrition, lower birth rates, and new or worsening of chronic diseases (Ahern et al., 2005; Du et al., 2010; Fewtrell and Kay, 2008; Reacher et al., 2004). Psychological impacts have also been extensively described and include: post-traumatic stress disorder (PTSD), anxiety, depression, distress, insomnia, nightmares and suicidal ideation (Alderman et al., 2012a; Bland et al., 1996; Leon, 2004; Paranjothy et al., 2011).

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