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The effects of relocation and level of affectedness on mood and anxiety symptom treatments after the 2011 Christchurch earthquake

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ABSTRACT

In this longitudinal study, we compare the effects of different types of relocation and level of affectedness on the incidence and relapse of mood and anxiety symptom treatments identified by publicly funded care or treatment one year before and one and two years after the '2011 Christchurch earthquake' in New Zealand. Based on a subset of Christchurch residents from differently affected areas of the city identified by area-wide geotechnical land assessments (no to severe land damage) 'stayers', 'within-city movers', 'out-of-city movers' and 'returners' were identified to assess the interaction effect of different levels of affectedness and relocation on the incidence and relapse of mood and anxiety symptom treatments over time. Health and sample information were drawn from the New Zealand Ministry of Health's administrative databases allowing us to do a comparison of the pre-/post-disaster treatment status and follow-up on a large study sample.

Moving within the city and returning have been identified as general risk factors for receiving care or treatment for mood or anxiety symptoms. In the context of the 2011 Christchurch earthquake, moving within the city showed a protective effect over time, whereas returning was a significant risk factor in the first post-disaster year. Additionally, out-of-city movers from minor, moderately or severely damaged Christchurch's plain areas were identified as especially vulnerable two years post-disaster. Generally, no dose-response relationship between level of affectedness and mood or anxiety symptom treatments was identified, but the finding that similarly affected groups from the city's plain areas and the more affluent Port Hills showed different temporal treatment trends highlights the importance of including socio-economic status in exposure assessment. High-risk groups included females, older adults and those with a pre-existing mental illness. Consequently, mental health intervention programs should target these vulnerable groups, as well as out-of-city movers from affected areas in the long run.

1. Introduction

After severe disasters, affected areas can lose many residents in the short-term aftermath of the disaster and the spatial distribution of residential housing often changes due to damage, migration and the recovery process. Examples include Kobe City (Japan) after the 1995 earthquake where it took 10 years to regain the city's pre-disaster population level and the population shifted to less affected suburban wards (Chang, 2010) and Christchurch (New Zealand) after the 2011 earthquake where a population decline of over 2% occurred in the short-term aftermath and another 1.5% in the following year (Statistics New Zealand, 2014), despite the influx of workers seeking employment opportunities in reconstruction (Belcher and Bates, 1983). The within-city mobility was even higher with over 5% of the population redirecting their mail to an alternative address (Newell et al., 2012). Also a population shift from severely affected eastern and central

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city suburbs to the less affected western and northern suburbs occurred (Howden-Chapman et al., 2014; Statistics New Zealand, 2014), which is a common post-disaster observation (Belcher and Bates, 1983; Gray et al., 2009). However, relocation should not be confused with evacuation, although the boundaries can become blurred since evacuation can turn into permanent relocation (Norris and Wind, 2009).

According to the conceptual framework developed by Uscher-Pines (2009), relocated disaster victims face unique challenges including health care disruption, social network changes, living condition changes and psychological stressors along with the stressful primary disaster-experiences. Health care disruptions and psychological stressors like the loss of home, social networks, social/cultural identity and a sense of control when moving into a new neighbourhood or community with different economic, social and cultural attachments showed negative impacts on mental health (Mileti and Passerini, 1996; Uscher-Pines, 2009), whereas changes in social networks and living condition can also have mitigating effects (Uscher-Pines, 2009). Literature suggests that the aggregate effect is negative as high levels of stress and anxiety are commonly observed in relocated disaster survivors with studies reporting an association between permanent relocation and psychological morbidity (Bland et al., 1997; Fussell and Lowe, 2014; Kılıç et al., 2006; Najarian et al., 2001; Lonigan et al., 1994; Uscher-Pines, 2009; Watanabe et al., 2004). On the other hand, results vary with socio-demographic characteristics as low socio-economic groups are more likely to be affected by disaster impacts and relocate due to their higher likelihood of living in hazard prone areas (Mileti and Passerini, 1996; Morrow-Jones and Morrow-Jones, 1991) and less political power to defend their properties (Howden-Chapman et al., 2014).

As a result, disaster-affected movers from low-income groups often have to deal with potentially more stress factors than those with higher socio-economic status, whereas affluent people often relocate by choice due to dissatisfaction with their economic and/or living situation after a disaster (Belcher and Bates, 1983). Study results may also vary by age and type of relocation as Kılıç et al. (2006) associated relocation with depression, but not PTSD in adult survivors after the 1999 earthquakes in Turkey, whereas Lonigan et al. (1994) found an association between PTSD symptoms and continued displacement of children after Hurricane Hugo. After Hurricane Katrina Fussell and Lowe (2014) also identified higher general psychological distress and perceived stress among relocated compared to returned low-income parents and also those living in unstably temporary housing conditions faced elevated perceived stress. On the other hand, there are studies that could not find an effect of post-disaster mobility on psychological distress (Goenjian et al., 2001; Najarian et al., 1996; Riad and Norris, 1996; Thienkrua et al., 2006). Nevertheless, a relationship between the number of relocations and increased psychological distress has been reported (Riad and Norris, 1996) and the general assumption confirmed that disaster movers usually relocate to places with a lower living standard causing frustration, anxiety and stress as movers tend to measure their recovery success by comparing their post- with pre-disaster standard of living (Mileti and Passerini, 1996; Morrow-Jones and Morrow-Jones, 1991). However, stayers can also face high levels of stress and anxiety as the reconstruction of damaged homes can be an uncertain, conflict-prone and long-term process that requires adaptation (Chang, 2010). Furthermore, reconstruction is commonly done at the pre-disaster location, which involves the danger of a recurring disaster and further damage (Mileti and Passerini, 1996).

1.1. Study aims

In summary, there are mixed results for understanding the effects of post-disaster relocation on mental health, because there is a lack of generalizability of events as every disaster is unique. Furthermore, there is a lack of longitudinal studies with quasi-experimental design characterized by pre- and post-disaster comparison, as well as large sample sizes (Uscher-Pines, 2009). Thus, our longitudinal study addresses these issues by using traceable patient information and mood and anxiety treatment data to examine the effects of relocation on mental health before and after the 2011 Christchurch earthquake, which triggered a strong mobility activity in the city. Most relocatees come from the severely affected 'Red Zone' areas, where properties were deemed unsafe/uneconomic to rebuild or repair and residents were encouraged to accept a government purchase offer and leave their homes. This demonstrates the interaction between relocation and the level of affectedness, which has repeatedly been identified as a risk factor for psychological morbidity after severe earthquakes (Bulut, 2005; Dorahy et al., 2015; Goenjian et al., 2001; Norris et al., 2002; Ying et al., 2013). Additionally, secondary stressors like the uncertainty due to thousands of aftershocks that posed an ongoing threat to life and further damage, being reminded of the catastrophe in everyday life, living in a damaged home or dealing with the slow reconstruction and insurance claims processes were contributing factors to the development of adverse stress-related health outcomes (Richardson, 2013). Thus, we hypothesise that residents from severely earthquake-affected areas measured by Canterbury Earthquake Recovery Authority (CERA) land assessments and technical categorisations were more likely to receive care or treatment for mood or anxiety symptoms than residents from less or unaffected ones after the Christchurch earthquake. Furthermore, we hypothesise that those, who stayed in damaged neighbourhoods were more likely of receiving care or treatment for mood or anxiety symptoms than others, who moved to less or unaffected areas.

To our knowledge these questions haven't been addressed by previous research, but give a unique insight into the effect of localised relocation and associated stressors on mood and anxiety symptom treatments based on the level of affectedness after a severe natural disaster. Furthermore, vulnerable groups most likely to receive care or treatment for mood or anxiety symptoms are identified. This should help to better understand and create awareness of the effects of localised relocation on coping and recovery in a disaster-affected city in a developed country, as well as what kind of post-disaster intervention programs should be initiated by governmental authorities and who should be targeted in particular to avoid the development of adverse mental health outcomes. On the other hand, it needs to be kept in mind that we measure adverse mental health effects based on treatment information, which is strongly influenced by treatment seeking behaviour and not only a function of case identification. It has been found that women, ethnic majorities and middle-aged people are most likely to seek help (Livanou et al., 2002), whereas younger, as well as older people, ethnic minorities and uninsured have been found to be undertreated after a natural disaster (Wang et al., 2007). Reasons may be financial strain or structural loss of facilities after a disaster, but there are also attitudinal barriers like low perceived need for treatment, the fear of re-experiencing painful memories, negative attitudes towards mental health treatment due to prior treatment (Brown et al., 2010) or the perceived public stigma attached to utilizing mental health services that may hinder distressed people from seeking help (Wang et al., 2007; Schwarz and Kowalski, 1992).