Non-specific psychological distress following the Christchurch earthquake: 10 years later - How are they doing now?

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Abstract

Christchurch, Aotearoa New Zealand, had two major earthquakes in 2010 and 2011, with thousands of aftershocks relatively close to each other. Disasters affect peoples' lives in many ways resulting in changes to family and social relationships, employment, education, and other roles in life. Often these impacts are hidden while people struggle to cope with the immediate task of survival and surface later, after the initial reactions have subsided. This study uses in-depth interviews conducted between 2018 and 2020 to explore the longer-term impact of the earthquakes on the mental health and wellbeing of a randomised sub-sample of 60 clients out of the 858 who attended for counselling at the Canterbury Charity Hospital Trust (CCHT). Self-report measures on the 36-Item Short Form health survey (SF-36v2) and the Demoralization Scale (DS-II) were completed to ascertain the participants' current social, physical, and mental health functioning. A comparison of the CCHT SF-36v2 scores with age-specific respondents in the New Zealand 2006/07 national health survey showed that in terms of mental wellbeing the participants in this study had significantly poorer health than the national sample. The ongoing aftershocks and secondary stressors were also causing continual disruptions in their lives. Overall, these findings show that many years later the participants in this study were still recovering from the psychological impact of the earthquakes. This indicates the need for the development of longer-term mental health care strategies that can be better integrated into future disaster planning.

Keywords: *earthquakes, early intervention, SF-36, Demoralization DS-II, subjective incompetence, hopelessness*

Background

Christchurch, Aotearoa New Zealand, had two major earthquakes in 2010 and 2011, with thousands of aftershocks relatively close to each other. The first was a 7.1 magnitude earthquake that occurred at 4.35am on a Saturday morning on 4th September 2010, in Darfield (40 kilometres west of Christchurch City). The second, a M6.8 earthquake, occurred on 22nd February 2011 at 12.51pm, devastating the city of Christchurch and affecting tens of thousands of citizens. There were 186 recorded deaths, 7,171 recorded injuries, and extensive structural damage to property, buildings, and infrastructure. Additionally, the ongoing significant aftershocks caused extreme levels of anxiety and feelings of hopelessness in the population (Potter et al., 2015).

As most disasters triggered by natural hazards are a single event it is important to acknowledge that the Canterbury series of earthquakes is more complex than many other disasters, as the region has experienced more than 10,000 aftershocks since the initial earthquake (Fergusson et al., 2015). These repeated aftershocks exposed people to recurrent acute stress. Earthquakes are extreme events that impact on the mental and physical health of entire communities, shattering people psychologically alongside the loss of homes, social networks, public supports, and employment. Immediately after a disaster the priority is survival, followed by a rapid, effective mobilization of resources to meet day to day necessities (safety, security, food, shelter, and acute medical problems; Trope & Liberman, 2003).

Fergusson et al. (2015), when exploring the impact of both short-term and long-term stressors on an individual's health and wellbeing, found that generally people do experience distress when the disaster first strikes and are

left with feelings of fear, horror, panic, disorientation, and confusion, alongside an inability to integrate information. All of these are considered natural and predictable responses to exceptional circumstances. After the initial reactions subside people may also experience a variety of thoughts and exhibit different behaviours. Common responses to a disaster include anxiety, irritability, isolation, increased interpersonal tension or conflict, sensitivity to environmental factors, loss of sleep, guilt, and stress-related physical symptoms such as headaches, nausea, and chest pains (Bonanno et al., 2010; Ferguson et al., 2014; Foa et al., 2006; Mooney et al., 2011; Norris et al., 2002).

However, given resources and good psychosocial support in the immediate response phase then most people can, and do, demonstrate an innate resilience that enables them to return to a reasonably stable level of mental health over a short time (Bryant, 2007; Mooney et al., 2011). The small minority of people who do experience longer term and persistent psychological distress, including post-traumatic stress disorder (PTSD), depression, anxiety-related disorders, and increased substance misuse, may need more specialized mental health care (Bonanno et al., 2010; Norris et al., 2002). Factors that make it more likely for people to develop mental health disorders may include prior exposure to disasters, significant loss from the disaster, the severity and intensity of the initial trauma, pre-existing mental ill health and social circumstances, gender, and overall resilience (Foa et al., 2006; Locke et al., 2012; Norris et al., 2002).

When exploring the mental health and wellbeing of earthquake survivors, secondary stressors (the follow-on effects) also need to be considered. Secondary stressors include, but are not limited to, repeated aftershocks from the main event, loss of employment, financial difficulties, lack of education opportunities, relationship difficulties, insurance claims, and making decisions about damage, repairs, and relocation. The chronic stress imposed by these ongoing secondary stressors can persist for long periods of time, thereby extending the recovery process (Johal et al., 2014; Locke et al., 2012). For example, high levels of hyper-arousal, re-experiencing of the event, and anxiety and depression were found among 101 people seeking treatment in the first few weeks following the February 2011 earthquake in Christchurch (Duncan et al., 2013). General practitioners reported that following the earthquake patients presented with a range of issues including anxiety, stress, sleep disturbance, panic reactions, and physical symptoms (Johal et al., 2014). The repeated impact of the aftershocks on sleep and cognitive dysfunction, as well as heightened stress, depression, and anxiety among 240 self-reporting members of the public was also highlighted by Kemp et al. (2011). In the 35-year longitudinal Christchurch Health and Development Study, individuals who experienced higher levels of exposure to the earthquakes also reported higher levels of stress and distress (Fergusson et al., 2015). Exploring the psychological functioning of 198 medical students 7 months after the February 2011 earthquake, Carter et al. (2014) found that approximately 10% were experiencing moderate to extreme psychological difficulties at the time of the survey with 70% reporting sleep disturbance, 65% having difficulties with concentration, and 52% with symptoms of anxiety.

Dorahy and Kannis-Dymand (2012) compared two matched Christchurch suburbs, differentially affected by the September 2010 earthquake, and found significantly higher levels of anxiety and symptoms of depression in inhabitants of the more impacted suburb; however, the populations of both showed elevated levels of acute stress resulting from the ongoing aftershocks. While most staff of a Christchurch community outpatient psychiatric service appeared to have coped with the September 2010 earthquake, Beaglehole (2011) found that the ongoing and unpredictable nature of aftershocks appeared to contribute to ongoing anxiety and sleep disturbance for both staff and patients. Relating to longer-term stressors, Fergusson et al. (2014) found that approximately 2 years after the Canterbury earthquakes 57% of the cohort in the Christchurch Health and Development Study exhibited a small to moderate increase in major depressive disorders, PTSD, other anxiety disorders, and nicotine dependence. Eighteen months after the initial earthquake, Spittlehouse et al. (2014) explored the physical and mental health impact of the earthquakes on a random sample of 50-year-olds participating in the Canterbury Health, Ageing and Life Course study (CHALICE; a longitudinal study of ageing) and living in the Christchurch area. This study found significant adverse effects on the mental health, but not on the physical health, of earthquake-affected participants when compared to the pre-earthquake population.

A local Christchurch newspaper reported that there had been an overall increase in demand for mental health services since the 2011 earthquake with a corresponding higher than normal number of prescriptions for depression, anxiety, and insomnia issued (Hogg et al., 2014). Furthermore, when examining the spatio-temporal

change of mood and anxiety disorders in Christchurch between 2009 and 2012 to identify earthquake variables that may have caused such disorders, people living in the widely affected central and eastern parts of the city had a 23% higher risk of developing a mood or anxiety disorder than people living in other parts of Christchurch. These disorders generally increased with closer proximity to damage from liquefaction.

Greaves et al. (2015) used data from the New Zealand Attitudes and Values Study collected between late 2010 and late 2012 across three points in time. The aim of their study was to ascertain changes in psychological distress as reported by 267 residents of six different wards that formed Central Christchurch in three damaged-based groupings (the least, moderately, and most damaged). While psychological distress did not vary across the three groups between 2010 and 2011, by late 2012 the average levels of psychological distress varied as a function of the initial property damage sustained, with the moderately-damaged group faring the worst.

The initiatives, response, and recovery of Māori communities in Canterbury emphasised the resilience of Māori cultural values and skills. In Christchurch, a recovery assistance centre was established to assist with housing enquires, the Red Cross, and Work and Income New Zealand, while *marae* (communal and sacred Māori meeting grounds) were opened throughout the country to accommodate dislocated Māori and to provide places of support (Kenney et al., 2015).

Until the earthquakes occurred, Christchurch had been one of New Zealand's main resettlement centres for people coming from refugee-like backgrounds. Of the people killed or injured in the earthquakes, some were from the local refugee community. This contributed to high levels of worry and anxiety, challenging personal resilience and coping resources among the refugee population, to the extent that some fled the city (Osman et al., 2012).

The aftershocks that followed the Christchurch earthquakes continued with no way of knowing when they would end. The literature on demoralization suggests that stressful external conditions (such as the ongoing aftershocks) can lead to assumptions about self and *subjective incompetence,* a state of "unexplained ongoing non-specific psychological distress" (de Figueredo & Frank, 1982, p. 353). Demoralization is a useful concept for explaining non-specific psychological distress; it is represented by a self-perceived incapacity to perform tasks and express feelings and is seen as an appropriate reaction to stressful situations that result in pervasive uncertainty and doubts about the future (Briggs & Macleod, 2010; Clarke & Kissane, 2002; de Figueiredo, 1993, 2013). Thus, people affected by disasters where considerable human and material losses occur, especially in prolonged conditions such as the Christchurch earthquakes, are vulnerable to experiencing demoralization (Briggs & Roark, 2013).

In and of itself, demoralization does not require pharmacological treatments as, much like bereavement, it is now recognised as a natural response to adversity and loss and is part of the human experience (Briggs & Fronek, 2019; Griffith & Gaby, 2005). Demoralization is now generally understood to be an enduring state of suffering that is a normal part of the human condition rather than an abnormal state.

Nevertheless, as Tecuta et al. (2015) point out, although demoralization differs from depression, anxiety, or adjustment disorders by its persistent experience of hopelessness, powerlessness, and existential distress, health professionals can still mistake it for the above disorders. This can lead to misdiagnosis and the use of ineffective interventions that can cause further harm. Thus, it is important that health professionals, particularly in the context of disasters, can distinguish demoralization from mental illness. This allows for the implementation of timely, and appropriately targeted, psychosocial interventions that can assist vulnerable people who are at risk of becoming demoralized (Briggs & Fronek, 2019).

A few studies have found demoralization in the context of disasters. Erikson (1976) undertook 570 survivor interviews 18 months after the 1972 Buffalo Creek flood in West Virginia, USA, and found that most of the survivors were still suffering from identifiable emotional distress. The authors concluded that the continual experiencing of a sense of loss and disorientation so many months after the flood had passed was more consistent with demoralization than a psychiatric disorder. In a longitudinal follow-up study of the 1998 Hurricane Mitch disaster that impacted people in Honduras, 800 adult survivors were interviewed 2 months following the hurricane, and 640 were reinterviewed 2 years later (Kohn, 2013). Demoralization was a predictive and useful concept to examine the long-term impact of this disaster and could be measured using a simple screening questionnaire to identify individuals who may be at increased risk for PTSD.

Distress reactions can quickly appear following a disaster and common reactions, such as insomnia and anger,

can increase the risk for other psychosocial difficulties (Morganstein & Ursano, 2020). These factors, alongside the loss of faith in social institutions, distractibility, and decreased perceptions of safety can lead to people becoming demoralized.

Other studies used the Short Form health survey (SF-36) to measure self-reported health status and explore the impact of earthquakes on mental health and wellbeing. The Spittlehouse et al. (2014) sample from the CHALICE study consisted of 295 participants drawn from the electoral rolls. Self-report participant responses on the SF-36v2 from 50-year-olds were compared with same-age participant scores in the 2006/07 New Zealand Health Survey (NZHS). The CHALICE participants had significantly lower scores on the mental health, role-emotional, social functioning, and vitality scales indicating poorer overall mental health and wellbeing than the participants in the 2006/07 national survey.

Liang and Wang (2013) explored the impact of post-earthquake rescue policies on survivor management from a series of earthquakes in Sichuan, a province of China. They found survivors in the post-disaster areas needed assistance to restore pre-earthquake production to improve their living conditions. Based on these needs, Liang and Wang (2013) used the SF-36 to measure the health-related quality of life of the survivors and their satisfaction with the post-earthquake rescue policies in five hard-hit disaster areas in Sichuan. The mental health of the survivors was poor and there was limited satisfaction with the post-earthquake rescue interventions.

Three years after the 1999 Chi-Chi earthquake, Wu et al. (2006) used the Taiwanese version of the Medical Outcomes Study Short Form-36 (MOS SF-36) to assess and compare the quality of life of 405 survivors aged 16 years or older with the general population of Tong-Chi who were exposed to the earthquake. The same respondents were interviewed by psychiatrists with an adjusted response rate of 70.2%. Compared with the initial investigations conducted in 1999, the Chi-Chi survivors had a higher percentage of various psychiatric disorders than the participants in the general population of Tong-Chi.

All of the above studies found participants' scores generated from self-reported responses on the SF-36 were generally lower relative to their respective general populations. This indicates that the participants in these studies experienced poorer mental health overall with some requiring psychological intervention. Although little research has been conducted on therapeutic and community practices in the recovery phase of disasters, such as the Canterbury earthquakes, it is recognized that a timely and sustained early intervention can help avoid stress reactions becoming chronic while allowing for people experiencing more extreme reactions to be identified and referred on for more assistance if required (Bryant, 2007). This involves undertaking psychosocial assessments and implementing short term interventions aimed at reducing the initial trauma and distress until the crisis is resolved, or until a referral for more in-depth interventions can be actioned.

Short-term interventions require setting realistic and manageable goals that can reduce the risk of people becoming overwhelmed by the enormity of the tasks occurring due to the loss of homes, employment, and communities. Boyd et al. (2010) recommend setting short term goals as they provide a firm foundation for dealing with the demands posed by the disaster over the medium to long term. Focusing on short-term goals initially reduces the preoccupation of dealing with long-term tasks, thereby assisting the affected population to gain a sense of control over their immediate environment (Trope & Liberman, 2003). When working with children and adolescents, the core actions employed are modified accordingly to ensure interventions are appropriate developmentally.

One week after the February 2011 earthquake, the Canterbury Charity Hospital Trust (CCHT) trustees, recognising how the sudden and potentially massive unmet need for counselling could overwhelm the local health services, established an early intervention service with 56 qualified health professional volunteers (Bagshaw et al., 2013; Briggs et al., 2016). In the main, the CCHT counsellors offered a triage service. Although there is considerable variation in clinical settings where mental health triage services may be operating and service delivery models vary (Sands, 2007), the essential function for the counsellors at the CCHT was to ascertain the nature and severity of the presenting problem and to determine whether an urgent referral to mental health services was required. All the counsellors were experienced senior health professionals who were able to undertake assessments and, if necessary, action a referral to another service. Following the initial assessment at the CCHT most clients were offered one or two follow-up sessions.

The initial phase of the service lasted for approximately 6 weeks with the demand for acute stress counselling declining by the middle of May 2011. Over the next few

months clients still attending the counselling service were reassessed and, where appropriate, people with existing mental health problems were referred onto the local health and community services. Some clients continued to attend the CCHT until their issues were resolved.

During 2011 and 2012, a total of 858 patients (23.2% male, 76.8% female; mean age 48 years; *SD* = 19.2; range 4 to 93 years) attended 1,784 counselling sessions (Bagshaw et al., 2013). The main interventions employed consisted of cognitive strategies to deal with stress, anxiety, and sleep disturbance alongside some specific training in the use of relaxation methods.

This paper presents the quantitative findings of a mixed method study exploring the longer-term impact of the earthquake on the mental health and wellbeing of a randomised sub-sample of the clients who attended the CCHT counselling service. The three main aims of the study were to:

1) ascertain the participants' current social, physical, and mental health functioning using self-report measures on the 36-Item Short Form health survey (SF-36v2) and the Demoralization Scale (DS-II);
2) to compare the CCHT participant SF-36v2 scores with age-specific participant scores in the New Zealand 2006/07 national health survey in terms of mental health and wellbeing;
3) determine the degree of demoralization among the sample.

Methods

Participants

This study is based on the data collected from a sub sample of clients attending the CCHT counselling service between 2011 and 2012. A search of the CCHT patient data base in 2018 identified 858 clients who had attended the counselling service between 2011-2012. A further search revealed 510 of the 858 client files contained contact telephone numbers. Deidentified study numbers were allocated to each file with a contact telephone number. A randomization tool (Urbaniak & Plous, 2013) was used to generate four sets of 25 clients per rotation until all the allocated study numbers had been though the randomization tool. Lists were drawn up and members of the research team telephoned each client to invite their participation in the study.

As other researchers found (Fergusson et al., 2015; Goldmann & Galea, 2014; Knack et al., 2006), recruiting participants following this disaster was challenging as the only way of contacting potential participants was from the information held on the CCHT database. Three hundred and eighty five (76%) of the client telephone numbers on the hospital data had either been discontinued in the months following the earthquake or, despite ringing at different times of the day, the phones were never answered. Messages were left on each unanswered call inviting a call back. After three attempts on different days and times if the calls were not returned the researcher moved onto the next rotational set of numbers. A further 95 (19%) of the clients contacted declined participation, five (1%) reported they were too young at the time to remember attending the CCHT, and 25 (5%) were unable to attend for an interview as they had left the city.

Recruitment was further complicated by the occurrence of the COVID-19 pandemic from February 2020 as participation in the study required attending an in-depth interview. After several delays of planned interviews the last few were undertaken later in 2020. These challenges limited the final number of participants who were able to be recruited to the study. In total 60 clients were able to be contacted, recruited to the study, and interviewed by members of the research team between 2018 and 2020. All the researchers were qualified and experienced mental health social workers.

Instruments and Procedures

Data collection consisted of two parts. A questionnaire consisting of two sections specifically designed for this study was used in part one to collect socio-demographic characteristics (sex, age, education, living situation, employment status), referral source, and dates and numbers of sessions attended. In the second section a set of open-ended prompt questions was used to guide the discussion and collect information about participant experience of the counselling received and any factors that may have impacted on their mental health and wellbeing. All the interviews were digitally recorded. The findings from these interviews will be reported elsewhere, so further details are not provided here.

Part two involved completing two self-report instruments to determine the degree of any social, physical, and mental health issues among the sample. The first was the SF-36 (v2) short form health survey. This standardised, multi-purpose, generic 36-item self-report questionnaire has a past 4-week recall (Ware et al., 1994, 2000).

The eight-subscales in the SF-36v2 are physical functioning, role limitations due to physical problems (role-physical), bodily pain, general health perception, vitality, social functioning, role limitations due to emotional problems (role-emotional), and mental health.

The first scale (physical functioning) is primarily focussed on the state of a person's physical health and the eighth scale on their mental health. The subscale items are scored, coded, summed, and transformed to a scale of 0 to 100 (0 = worst health state and 100 = best health state). This process generates an eight-scale profile of functional health and wellbeing scores as well as a psychometrically-based physical and mental health profile (Ware et al., 2007). The SF-36v2 survey has high internal consistency; Cronbach's α coefficients range between .83 for physical health to .95 for mental health and the survey has good test-retest reliability (Ware et al., 2007).

The second instrument used was the Demoralization Scale (DS-II). This scale, originally developed by Kissane et al. (2004), was later revalidated and psychometrically strengthened by Robinson, Kissane, Brooker, Hempton et al. (2016). The DS-II is a self-report scale comprising two 8-item subscales (Meaning and Purpose and Distress and Coping Ability). The total DS-II measures the extent to which a person may be experiencing existential distress and despair along a spectrum from disheartenment (a sense of failure) to dysphoria, despondency, despair, and a loss of hope (Kissane et al., 2004). The Meaning and Purpose subscale combines and measures items relating to the loss of meaning, purpose, and helplessness, whereas the Distress and Coping Ability subscale combines items that measure the degree of dysphoria, disheartenment, and sense of failure (Robinson, Kissane, Brooker, Michael et al., 2016).

Responses are rated on a 3-point scale (0 = never; 1 = sometimes; 2 = often) where a higher score on the DS-II indicates a higher level of demoralization. The DS-II demonstrated high internal consistency (α = .89 for the total scale, α = .84 for the Meaning and Purpose subscale, and α = .82 for the Distress and Coping Ability subscale; Robinson, Kissane, Brooker, Michael et al., 2016), making it a practical measure of demoralization in clinical and research settings to ascertain the degree of non-specific psychological distress among a sample. Given the prevalence of demoralization in the studies reviewed above it was important to include a measure to determine the degree of demoralization in this sample.

Analysis

The quantitative data was analysed using IBM SPSS Statistics (Version 26) predictive analytics software. Participants' responses from the subscales within the SF-36v2 were compared with age-specific published scores on the SF-36 v2 in the 2006/07 NZHS (Ministry of Health, 2008). The 2006/07 NZHS survey was selected for comparison as subsequent New Zealand national population-based health surveys used different measures. Total scores and subsample scores on the DS-II were also entered into the SPSS dataset and analysed accordingly. The qualitative data collected in section two of the questionnaire will be reported separately as the focus of this paper is on the quantitative findings.

Ethical Considerations

Ethical approval for the study was granted in January 2018 by the New Zealand Ethics Review Committee (NZEC: 2017-34) and Griffith University (GU Ref No: 2018/074). All the participants gave informed written consent for the study. A 14-year-old participated in the study with signed parental consent and was interviewed with a parent present. The researchers were aware of the heightened vulnerability of study participants that can occur following a disaster. To minimise harm the interview was stopped if participants became too distressed during the interview, and they were offered a referral to the CCHT Counselling Service.

Results

Descriptive Analysis

Descriptive statistics were used to analyse the sociodemographic features of the sample. The sub-sample consisted of 51 (85%) females aged between 14 and 91 years (M = 52 years; SD = 15.59) and 9 (15%) males aged between 43 and 71 years (M = 63 years; SD = 11.98). Ethnicity was recorded as 96.6% Aotearoa New Zealand Pākehā and 3.4% Aotearoa New Zealand Māori.

Although many of the participants had experienced issues with ongoing employment immediately following the earthquake, at interview 53.3% of the total sample reported they were in full or part time employment (female employed = 55%; male employed = 45%), a further 35% were either retired, receiving a benefit, or a homemaker, 5% were students, and 3.3% were unemployed and still seeking work.

Of the referrals to the CCHT counselling service for the subsample, 86.6% came from medical centres and health services, 8.3% had self-referred, and 5% came from community agencies. The presenting problems were low mood (23.3%), high levels of anxiety (31.7%), acute stress disorders (23.3%), and sleep disturbance, symptoms of PTSD, bereavement, and grief (15%).

Relationship issues, substance misuse, and employment accounted for another 6.7%.

In terms of attendance for counselling, 96.7% attended CCHT during 2011 and 3.3% in 2012. The number of sessions attended ranged from one to 20 (*M* = 3.28; *SD* = 3.23) with anxiety, low mood, sleep disturbance, earthquake trauma, stress, and difficulties coping as the main presenting problems. Following assessment at the CCHT, 31.7% were referred to other services. A small number (3.3%) were later readmitted to the CCHT counselling service for further intervention. Most of the participants reported finding the counselling helpful.

Statistical Analysis

Age adjustment is important to consider in the SF-36v2 as comparison of unadjusted scores can be misleading. To determine whether the SF-36v2 scores in this study were different from the general Aotearoa New Zealand population the most appropriate method (Stevenson, 1996) was to subtract the age-specific SF-36v2 results from the NZHS (2006/07) to normalise the data as age significantly affected some SF-36 categories. Another way could have been to use a one-sample *t*-test to compare the CCHT cohort with the NZHS (2006/07) SF-36v2 average scores but that would have been biased as the CCHT ages did not proportionally reflect the population measure. As a result, the best option was to subtract each participant's SF-36 from their reference age national SF-36 value and then determine whether the mean difference was significantly different from zero. The SF-36v2 subcategories were deemed statistically significant (α level = .05) if the mean difference was different from zero.

Table 1
Characteristics of the CCHT Participants' SF-36 Items and DS-II Total and Subscales Scores

Variable	Mean ± *SD (N = 60)*
SF-36 Categories (range 0-100)	
Physical Functioning	75.3 ± 26.0
Role-Physical	67.6 ± 39.8
Bodily Pain	66.7 ± 23.1
General Health	62.9 ± 22.0
Energy-Vitality	48.7 ± 20.1
Social Functioning	74.1 ± 25.8
Role-Emotional	58.6 ± 44.0
DS-II Items Total Sample and Subscales	
DS-II Total Sample Score (range 0-32)	8.5 ± 6.8
Purpose (range 0-16)	3.0 ± 3.5

While no cut-off scores have been established for the DS-II using an extreme group design (Preacher, 2015), interquartile ranges have been used to determine severity with low scorers being in the 0-25th percentile, middle scorers the 25th-75th percentile, and high scorers above 75th percentile; higher scores indicate higher levels of demoralization.

Initially, the means and standard deviations for the eight-subscales in the SF-36v2 described above and for the DS-II total score and subscale scores for the CCHT sample were calculated; these are presented in Table 1. The CCHT SF-36v2 scores were then used for a comparison with the age-specific SF-36v2 participant scores in the NZHS (2006/07).

Comparison of CCHT SF-36v2 subscale scores with NZHS (2006/07) national figures. As Table 2 shows, in the eight SF-36v2 sub-categories the CCHT participant mean scores were significantly lower ($p < .001$) than the participants in the NZHS (2006/07) sample. The one exception to this was the CCHT physical functioning score where, while still lower than the NZHS survey control age-normalised participant scores, no significant difference was found ($t = -1.96$, $p = .054$).

The largest difference between the two studies was seen in the role-emotional subscale which was significantly lower in the CCHT sample (mean difference = 35.2; $p < .001$) than the control age-normalised participant scores in the national study. Other significant differences ($p < .001$) in the mean subscales scores (mental health, vitality, and social functioning) were also found (see Table 2). In terms of general health, the CCHT participants scored lower (mean difference = 10.7; $p < .001$) than the participants in 2006/07 NZHS. These findings indicate that overall the CCHT sample had significantly poorer mental health and wellbeing scores on the SF-36v2 subscales when compared with age-normalised participants in the New Zealand population in 2006-2007.

Demoralization. The scores on the DS-II generate ordinal data that is not normally distributed. As Velanovich (2007) suggests, to allow for skewness, nonparametric bivariate correlations Kendall's tau-b were computed to examine associations between demoralization and the other social demographic characteristics collected in part one of the study questionnaire. Kendall's tau-b was selected for this analysis as significant results can range in either direction from -1 = inverse correlation to +1 = positive correlation with 0 = indicating the variables are not correlated (Allen et al., 2019).

Table 2
CCHT SF-36v2 Subscale Scores Compared to NZHS (2006/07) National Figures

SF-36v2 Category	Mean Difference (95% CI)	*p*
Physical Functioning	-6.3 (-12.8 to 0.1)	.054
Role-Physical	-15.0 (-25.5 to -4.6)	.006
Bodily Pain	-6.8 (-12.8 to -0.9)	.025
General Health	-10.7 (-16.5 to -4.9)	< .001
Energy-Vitality	-15.4 (-20.6 to -10.2)	< .001
Social Functioning	-14.1 (-20.9 to -7.4)	< .001
Role-Emotional	-35.2 (-46.5 to -23.7)	< .001
Mental Health	-16.9 (-22.1 to -11.7)	< .001

Note. Differences were calculated as the individual's score minus the age-normalised national figure. The range for all subscales is 0 - 100.

No significant correlations were found between age, ethnicity, or relationship status and the DS-II scores. Significant positive correlations were observed between employment and both demoralization (DS-II total score; τ_b = .311, p < .001) and the DS-II subscale scores (Meaning and Purpose; τ_b = .378, p < .001; Distress and Coping Ability τ_b = .310, p <.01).Education was negatively correlated with the DS-II total score (τ_b = -.218, p < .05) and the DS-II Meaning and Purpose subscale score (τ_b = -.234, p < .05), but not with the Distress and Coping Ability subscale (τ_b = -.188, p = .058).

Associations between DS-II and SF-36v2. The third aim of this study was to ascertain the prevalence of demoralization among the sample. As this study used both the SF-36v2 and the DS-II it was important to determine whether the self-report scales were measuring the same, or different, factors of mental health and wellbeing among the participants.

As the data collected in the SF-36v2 is also not normally distributed, nonparametric bivariate correlations with Kendall's tau-b were used to ascertain any significant associations between the SF-36v2 categories, the total DS-II scores, and the DS-II subscales. The results are presented in Table 4 below and show highly significant ($p \leq .01$) and significant ($p < .05$) negative correlations between the total DS-II total score, the DS-II subscales, and the SF-36v2 categories. Of all the categories in the SF-36v2, pain is the only one that was unrelated to the DS-II total score or either one of the DS-II subscales.

The significant correlations found between the SF-36v2 and the DS-II, alongside the comparison of the age specific participants in the NZHS (2006/07) indicating that the CCHT sample have poorer mental health overall, suggests that the participants in this study would also be more demoralized than people in the general population.

Table 3
Bivariate Correlation Coefficients Between SF-36v2 Categories, the DS-II Total Score, and DS-II Subscales

SF-36v2 Categories	DS-II Total Score	DS-II Meaning and Purpose	DS-II Distress and Coping Ability
Physical Functioning	-.211*	-.189	-.223*
Role-Physical	-.272**	-.199	-.301*
Role-Emotional	-.432**	-.376**	-.423**
Energy-Vitality	-.484**	-.414**	-.532**
Mental Health	-.530**	-.490**	-.533**
Social Functioning	-.506**	-.526**	-.520**
Bodily Pain	-.169	-.120	-.150
General Health	-.267**	-.220*	-.294**

Note. N = 60. * p < .05. ** $p \leq .01$

Discussion

This study, undertaken between 2018 and 2020, a full 7 to 9 years after the 2011 earthquake in Christchurch, New Zealand, explored the longer-term impact of the earthquake on the mental health and wellbeing of 60 clients who had attended the CCHT counselling service. As this was a New Zealand study, finding that most of the sample self-identified as New Zealanders was not unexpected. Furthermore, across the helping professions it is common knowledge that there are gender disparities in people seeking help; therefore, finding that more females attended the Charity Hospital Counselling Service is not unusual.

Two validated scales (SF-36v2 and the DS-II) were employed to ascertain the participants' current social, physical, and mental health functioning. The findings were then compared with age-specific participant scores in the New Zealand 2006/07 national health survey in terms of overall mental health and wellbeing. While there was no control group and the participants' prior mental health and wellbeing was unknown, the findings from the SF-36v2 and DS-II scales are consistent with the literature reviewed in terms of the long-term impact of disasters on the mental health and wellbeing of a population (Fergusson, et al., 2014; Greaves, et al., 2015; Hogg, et al., 2014; Norris, 2006; Norris et al., 2002; Spittlehouse et al., 2014).

This finding was supported by a comparison between the SF-36v2 scores from the CCHT sample and the specific age-controlled normalised scores for participants in the NZHS (2006/07) survey. Except for physical functioning, the CCHT sample SF-36v2 scores were significantly (*p*s .025 to < .001) lower indicating that, despite the passing of time, the participants in this study had poorer physical

and mental health overall in comparison to same-aged people in the general population.

Examination of associations between the DS-II scores and the socioeconomic factors arising post-earthquake also showed that secondary stressors (loss of employment, education, damaged homes, issues with insurance companies) can impact on participants' mental health. Finding strong, significant associations between the factors on the SF-36v2 and the DS-II in this study suggests there was a degree of demoralization among the CCHT sample.

It cannot be confirmed that the observed differences between the CCHT sample and the age-specific participants in NZHS (2006/07) accurately reflect the differences in the health status 7 to 9 years later as the items in the SF36v2 are not anchored to questions around the earthquake. However, it is worth noting that in this study, as has been found in other studies where the SF-36 or a similar measure was used to compare the mental health of people following a disaster with the general population (Spittlehouse, et al., 2014; Wu et al., 2006), the results do indicate that the CCHT participants had poorer mental health overall and there was a degree of demoralization across the sample.

Limitations

Three big challenges were encountered in this study. One was recruitment as following the earthquake many of the clients had to leave their damaged homes and phone numbers were discontinued, which made contacting them difficult and sometimes impossible. The second was the COVID-19 pandemic lockdown as the imposed restrictions delayed completion of recruitment which resulted in a smaller sample than envisaged. It also needs to be noted that the impact of the COVID pandemic may have compounded the impacts on the mental wellbeing of the participants which, in turn, could have been reflected in their responses to the study questionnaires. Together, these factors potentially limit how representative the subsample is of the total number of clients who had attended the CCHT counselling service. Finally, as this was a follow up study there were no pre and post measures available for comparison.

Despite these challenges, the findings are important as they signal that for some people recovery from a disaster can take a long time. In this study, it was also found that both primary and secondary stressors can impact on mental health and wellbeing. This needs to be taken into consideration for the development of longer-term mental health and wellbeing strategies that can be better integrated into future disaster planning.

Conclusion

This paper has presented the quantitative findings of a study that examined the long-term psychological impact of the Christchurch earthquake on the mental health and wellbeing of 60 clients who attended the CCHT counselling service. The SF-36v2 scores from the CCHT participants were compared with age-controlled normalised scores in the 2006/07 New Zealand National Health Survey. With one exception (physical functioning), this comparison showed that despite the passing of time, the CCHT participants had poorer physical and mental health than same-aged people in the New Zealand general population. Finding strong significant associations between the factors on the SF-36v2 and the DS-II in this study suggests the CCHT participants were also demoralized. It was also found that both primary and secondary stressors need to be considered when developing individual and community disaster recovery plans.

Overall, this study highlights that, although most people can return to pre-disaster levels of mental health, for some the impact of the disaster and the associated issues means recovery can take a lot longer. This has implications for clinical practice as it indicates the need for the development of longer-term mental health care strategies that can be better integrated into future disaster planning.

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