

Article

The Impact of Earthquakes on Apartment Owners and Renters in Te Whanganui-a-Tara (Wellington) Aotearoa New Zealand

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Abstract: Apartment dwelling is on the increase in many cities in Aotearoa New Zealand, including those in earthquake-prone regions. Hence it is important that people working in disaster management and housing improve their understanding on how the living situations of apartment dwellers influence their disaster management practices. This knowledge is crucial for efforts to promote safety and preparedness. This paper explores what enables and constrains apartment dwellers in their ability to prepare for an earthquake. Eighteen people were interviewed who resided in Te Whanganui-a-Tara (Wellington) two years after the 2016 7.8 magnitude (Mw) Kaikōura earthquake. Of central concern was people's ability to prepare for disasters and access knowledge about building and structural safety and how this knowledge mattered to what apartment dwellers were able to prepare for. We found that the agency to prepare was dependent on whether people owned or rented their dwellings. We report on participant accounts of dealing with body corporations, landlords, emergency kits, other emergency items, and evacuation plans.

Keywords: evacuation; apartments; disasters; emergency management; owners; renters; city dwellings

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1. Introduction

With the growth of inner-city living, especially in earthquake-prone areas, calls have been raised for cities to make crucial adjustments to prioritize the safety of people who live and use city spaces [1]. Legislation, standards, and codes aim to ensure that buildings are constructed to withstand earthquake shaking, yet they translate only to the possibility of buildings not collapsing and they do not protect people from the effects of non-structural or content damage, damage to adjunct buildings, and critical infrastructure or lifelines [2]. Other initiatives are equally necessary, such as revising building strategies with more functional designs, housing recovery, and sensible hazard planning [3,4]. While some of these factors (i.e., non-structural damage) may be addressed by resilient design, others may be more difficult to address, particularly the impacts that arise from external influences. As argued by Tierney [5], the ability of a building to function and be habitable during and after an earthquake will always be questionable.

Within Aotearoa New Zealand, there are also various resources that focus specifically on earthquake disaster preparedness. These encourage preparedness planning to promote personal safety and shield apartment dwellers, in particular, from harm during an earthquake and during the aftermath. They include information on immediate actions that should be taken when an earthquake occurs, such as 'drop, cover, and hold', knowing tsunami evacuation routes, and having a household plan. A good plan means having insurance, knowing where the utility services are in your dwelling (gas, water, and electric),

and agreeing on a meeting place with family and friends. Being earthquake prepared requires having enough food, water, and medicine supplies [4,6,7]).

Despite the emphasis on generic planning strategies, there is a paucity of research that explores earthquake experiences and preparedness planning for apartment dwellers, particularly in Aotearoa. Of the research that exists, it mostly attends to the structural engineering aspect of risk reduction (for example see [8,9]). Research into the human aspect of apartment or high-rise dwelling and risk reduction is largely founded in the US because of their customary use of tall buildings. This includes work by Horney, Snider [10] and Murti and colleagues [11] who found that space and storage limitations prevent multi-dwelling units from stowing preparedness items.

While it is accepted that urban structures influence the manner in which cities function during disasters [1], the present research contributes to knowledge about the experiences of people residing in earthquake-prone cities following a significant earthquake and the implications this has for their future preparedness. We explored how participants reduce potential harms from a future earthquake by becoming informed about physical risks in their buildings, drawing on legislation, building codes, and seismic strengthening standards. We were also concerned about the actions people took to prepare for an earthquake, including storing water, food, and other survival items.

2. The Research Setting

The present study is situated in Te Whanganui-a-Tara (Wellington), the capital city of Aotearoa New Zealand. Wellington is home to a range of divergent ethnic and socio-economic communities and a substantial number of professional, managerial, clerical, and administrative workers and students. According to the Wellington City Council, the population forecast for Wellington City for 2021 is 216,505 [12]. Recently crowned the 'Coolest Little Capital in the World' [13], the rhetoric is that Wellington is a lively city offering people easy access to social locales and engaging experiences that are cultural, trendy, and stylish. The city offers a vibrant art and museum culture and is considered a culturally diverse cosmopolitan city [14,15].

During the past ten years, Wellington has seen a marked increase in redeveloped and new dwellings within the city (Figure 1) and the number of people residing in housing within the Central Business District (CBD). The figure below depicts inner city Wellington dwellings.



Figure 1. Wellington Central Business District with apartment dwellings (image courtesy of Victoria University of Wellington).

The city's 2043 housing plan aims to increase the number of low-density (25%), medium-density (35%) (range from stand-alone, townhouses, and smaller apartment dwellings usually three stories or less), and high-density dwellings (40%) [16]. According to Wellington City Council [16], the dwelling type is relevant to the city's residential functioning, with higher density dwellings enticing younger adults and smaller households and with many students living in the CBD. The city aims to remain compact with an increase in good quality medium-density stock near the CBD. The CBD has a range of accommodation types, including smaller apartment dwellings (e.g., several units) and larger multi-story buildings. There are also a variety of buildings ages (historic to modern) and styles (e.g., masonry, concrete, and steel). Within Wellington, there are also varying ratings in relation to how a building might perform in an earthquake as per the 2004 Building Act and subsequent amendments of the Building (Earthquake-prone Buildings) Amendment Act 2016. An earthquake prone building is a building that would collapse (wholly or partially) in a moderate earthquake, causing injury, death, or damage to other property [17]. In terms of a building's rating, an earthquake-prone building means the building meets less than 34% of Aotearoa's New Building Standard (NBS). Other ratings include 'earthquake risk' buildings which are between 34% and 67% of NBS and buildings with medium to very low risk that align with 67–100% of the NBS. Territorial authorities are required to identify which buildings are earthquake-prone and impose timeframes within which building owners need to undertake seismic work to ensure these buildings are not earthquake-prone. Following the Canterbury earthquakes, for example, an earthquake-prone building had 15 years from the date of issue to be brought up to a rating above 33% NBS.

Buildings that are designated Earthquake Prone or require further investigation display colored notices or 'stickers'. Prior to 2017, 'yellow' stickers indicated a building rating below 34% NBS. Following a revision in 2017, notices with an orange and black striped border indicate an earthquake rating of 0% to less than 20% NBS; with a white and black striped border for buildings with an earthquake rating of 20% to less than 34%; with a solid orange border for buildings that were confirmed as earthquake-prone prior to 2017 and where the earthquake rating is not known; with an orange and white striped border for buildings that have been granted an exemption from having to carry out seismic work; and with a solid red border for buildings where the Council has restricted access due to safety concerns [18–20].

The earthquake rating notices is particularly relevant because Wellington sits atop several active earthquake faults, including the well-known Wellington Fault. Wellington is further exposed to risk from other local earthquake faults, as well as faults in the Cook Strait and the top of the South Island. Additionally, with the Hikurangi subduction margin located to the east and subducting below the city, there is the possibility of a rupture that could cause a significant earthquake at any moment (>9.0 Mw) [21,22].

It is also necessary to contextualize the Kaikōura earthquake as a backdrop to this study. On the 14 November 2016, Aotearoa experienced a magnitude 7.8 (Mw) earthquake at 12:02 a.m. The epicenter was situated inland close to Kaikōura in Te Waipounamu (South Island) but felt widely throughout the country (Figure 2). The ground shook for almost two minutes [23], with Wellington's CBD experiencing the Lower North Island's most intensive ground shaking (between 3–7 on the Modified Mercalli Intensity Scale). There were ongoing and relentless aftershocks [24]. An estimated 23,000 people were living in the wider Wellington CBD [25] at the time of the earthquake and this includes both renters and owner-occupiers. In Wellington, nearly 30 CBD buildings were seriously damaged [26], with Cubrinovski et al. [27] reporting that as of mid-2020, 13 buildings had been demolished and five remain unoccupied. Seismologists initially thought that the inland earthquake epicentre would be unlikely to trigger a tsunami. However, the nature of the complex fault rupture extending offshore meant that one did occur. Fortunately, in this instance, the tsunami waves were small (up to 60 cm maximum in Wellington) and did not cause significant harm to life or critical infrastructure.

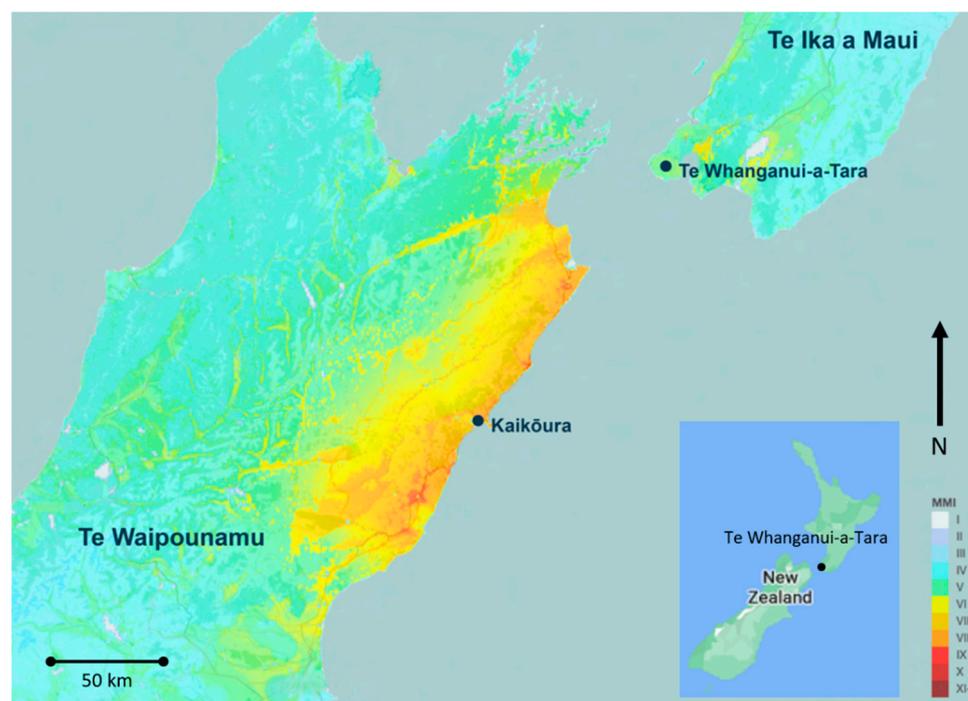


Figure 2. Location of the 2016 Kaikōura Earthquake in Aotearoa New Zealand by using ShakeMap data (Modified Mercalli Intensity (MMI) data) to show levels of shaking for different locations [28].

It is predicted that Wellington will experience a significant earthquake in the near future and, as such, numerous preparedness campaigns (for example see [29]) aim to encourage residents of Wellington to be earthquake ready. Tasked with addressing the vulnerability of city residents, Wellington City Council’s Chief Resilience Officer identifies that ‘juggling growth in a city with an earthquake risk and growing population is a major challenge’ [30]. Each time an earthquake occurs, people’s ontological security and/or sense of safety and continuity in a predictable world are severely shaken [31,32]. A sense of ontological insecurity can contribute to people’s decisions about preparedness and the actions they take during and after an earthquake.

3. Research Design and Method

According to Tierney [5], underlying social forces that produce and perpetuate risk will continue unabated and influence how people respond in disasters unless they are understood and, if necessary, challenged. Drawing on an interpretive perspective, we explore what constrains people’s agency to prepare for an earthquake and the ability to respond. This research recognizes power as a complex and vibrant set of relationships between people and institutions that shift and change according to context and time. Power is both a force for action and resistance and affects how we perceive the world; it is pervasive [33–35]. It is necessary to unpack power to discern how vulnerability unfolds in natural hazard and disaster settings [36]. We were interested in how people made sense of their experiences of their lives in the context of the Kaikōura earthquake. As this is an under-researched area, this work recounts the tensions, ambiguities, and distinctions in people’s experiences [37].

This qualitative project builds on a previous survey of responses from 769 inner-city apartment dwellers from Wellington approximately one year after the Kaikōura earthquake. The 50 item survey aimed to address general experiences, evacuation and return, earthquake preparedness actions, and communication processes (see [38]). The current study was conducted approximately two years after the Kaikōura earthquake and one year after the survey data were collected. In the survey, we asked participants to indicate whether they were willing to be part of future research, to which 47% responded “Yes”. To narrow

down a selection of interviewees, we first created a random sample from 20% of cases from our total sample of 769 participants using the random sampling feature of the SPSS software programme. We then identified those who said they were happy to be contacted for future qualitative research and who had provided contact details (45 participants) and organized these people into tables showing whether they owned or rented their apartment (to ensure a cross-section of both). These people were then sent requests for voluntary participation in our qualitative research.

Eighteen people agreed to participate in semi-structured face to face interviews. Participants included eight renters, eight apartment owner-occupiers, and two owners in this research. At the time of the earthquake ages ranged from 22–76. All participants were European New Zealanders working in professional roles who had access to financial and material resources and social support. We understand this represents a particular group of apartment dwellers. There was a range of apartment types with the highest being 15 stories and the lowest being 3 stories. The number of apartments in each building ranged from 12 through to around 40. There was one townhouse with four units. The ages of the buildings varied between the early 1920s and 2010. The older buildings had all been converted to residential dwellings, while the newer buildings were built specifically as apartments. Some of the buildings were in tsunami risk areas.

As a collaborative process between the interviewer and each participant, our interview schedule covered the following topics: preparedness, actions at the time of the earthquake and aftershocks, tsunami experiences, evacuation and return, coping, apartment building earthquake rating, and the ongoing lived effects. Interview times ranged from 20–90 min and were conducted either at a personal residence, such as the high-rise apartment or the university. In the home interviews, participants were able to provide tours of the apartment and indicate where they were at the time of the Kaikōura earthquake. Interviews were audio-recorded and transcribed verbatim—this research adhered to the Massey University Ethical Code of Conduct for research.

This research is framed by the four ‘phases’ (Reduction, Readiness, Response, and Recovery) that circumscribe emergency management in Aotearoa New Zealand [39], although we appreciate that the movement through these ‘phases’ is not sequential, linear, nor mutually exclusive. The analysis below focusses specifically on disaster Reduction and Readiness aspects of emergency management (i.e., preparedness) actions and experiences for the apartment dwellers we interviewed.

We interpreted the interview accounts by looking for instances of how people living in apartment settings prepare and what resources they need to support that preparedness by drawing on the social vulnerability paradigm commonly used in disaster research (for example, see [40]). This paradigm attends to the complexity of social agency, relationships and internalized responses to events, and the networks of relationship between people [41]. Four overriding topic areas were found, including ‘accessing building ratings and variations in how these matter’, ‘the burden of retrofitting buildings’, ‘body corporations and landlords and information sharing’, and ‘emergency kits, other items and evacuation’.

4. Accessing and Understanding Building Ratings and Variations in How These Matter

This section outlines how participants navigated aspects related to building safety, including whether structural safety was a key concern when deciding where to live. We document whether owners’ or renters’ knowledge about hazards, building ratings, and structural safety is important to them in experiencing agency with being prepared. We do not judge if their narratives are ‘accurate’ or official representations of NBS ratings rather than the code per se. However, participants expressed knowledge of the NBS as being ‘up to code’ or ‘not within code’ as the following excerpts demonstrate. Thus, for example, a participant might express a building of below 34% NBS rating to be ‘not within code’. We also discuss participants’ accounts about tenanting properties that were identified as being below 34% rating of the NBS, purchasing properties that might be earthquake-prone, and not being concerned by earthquake risk at all. Further considerations are the material,

psychological, and emotional responses of having to deal with strengthening buildings and being governed by Body Corporate organizations.

When residing in an earthquake-prone city, information about building ratings and structural safety is supposed to inform people of building risk so they have the agency to act. Physically placing ‘stickers’ on buildings aims to highlight risk while assigning responsibility to building owners for rectifying any safety issues. All of the participants were aware of the earthquake rating system, which had various effects on how they engaged with where to live in the city. Some reported that it helped them to rationalize where to reside. For example, when a building failed to meet an acceptable rating, Francie was deterred from renting that apartment:

“There was, when we were looking to move to Wellington, a really nice apartment that we wanted to move into and then we found out it wasn’t up to earthquake code so then, no—we’re not going to stay there.” (Erin)

While unclear what ‘earthquake code’ meant for Francie, the excerpt demonstrates how safety from building harm during an earthquake can be more important than residing in ‘nice’ surroundings. It also represents how people can have agency to choose safety. Safety, in this sense, becomes a privilege in that these participants knew about building ratings and had the resources to be able to select where to live.

It has long been known that education provides particular forms of social advantage [42], which in a disaster setting can transpire into disaster preparedness [43]. Yvonne talked about how important it was to her sense of wellbeing that her partner had an architectural degree and understood structural engineering when deciding where to live. Similarly, during his interview, Samuel explained that ‘understanding science’ enabled him to interpret safety reports to increase his security in the event of an earthquake:

“I can read the scientific literature and understand what they’re actually saying. I also, on the building front, my Father used to renovate buildings so I actually had a bit of a background on that front as well.” (Samuel)

As well as having scientific expertise, Samuel had social support from his father who renovated buildings and offered Samuel advice regarding structural safety. These forms of social capital or networks of human relationships featured regularly in participant accounts as they talked about the connection between knowledge and financial capital. Participants were able to utilize any knowledge they had about building safety alongside the financial resources to purchase properties with higher safety ratings. This in turn increased participant experiences of ontological security and sense of safety (Giddens, 1991), whether real or imagined. Jane’s excerpt below exemplifies how financial capital contributed to a sense of ontological security and ‘peace of mind’:

“I think at my price point, being in an earthquake, high code, highly compliant building was much, much, better for my peace of mind . . . ” (Jane)

Jane exemplifies how possessing the wherewithal to purchase a dwelling with less risk can alleviate undue worry when living in an earthquake-prone city. This did not mean that there was no risk, as buildings can still be damaged, but it represents the experience of safety. For Xavier, a property that appeared to have a ‘solid’ earthquake rating factored into whether it would be purchased:

“We were buying it for life. So we go out of here in a box, so I wanted a good solid building, built on rock. We chose a car park above rather than down in the basement so that if we did get a tsunami or something it would be less likely to have flooding than right in the basement so, yeah, I did think about that.” (Xavier)

Concern about tsunami flooding also caused Xavier to think about protecting other material possessions, such as a car. Tracey’s excerpt below highlights what can happen if people do not have comprehensive knowledge about building safety. In these instances, people can be subject to increased risk. Tracey depicts how for ordinary people, the ‘average Joe Bloggs’ might be uninformed about building safety:

“ . . . if you don’t know what [a code] means. Like an average Joe Bloggs walking out of the apartment is probably not going to know.” (Tracey)

Concerns about a lack of knowledge are not simply attributable to people such as Tracey. People can be rendered uninformed when local government and councils shift building codes based on new data about structural integrity following earthquakes. Apartment owners, such as Elizabeth and Jane talked about the frustration of building codes being updated each time an earthquake occurred. For example, Jane said the following:

“That the councils keep changing the code due to knowledge about risk I mean it will be less than that now because you know they keep changing the code and apparently every time we go through a big earthquake like that it lessens... the code of the building.” (Jane)

Although Elizabeth and Jane were upset, they realized it made sense that codes would be amended because they understood that each earthquake provided ‘lessons’ about building safety or had compromised the structural integrity of a building. Even so, meeting updated building code requirements is financially challenging. Jane describes how in her building the owners remedied only the basics to get a building ‘back over’ the line.

The danger posed by buildings during earthquakes was etched into the landscape and memories of many New Zealanders [44] and also contributed to how people viewed preparedness and building safety risk. For example, participants were aware that during the 2011 Christchurch earthquake the CTV and PGC buildings collapsed and contributed to the death of 133 people [45,46]. Some participants realized that participants purchasing safety was not a guarantee of safety because of ‘unforeseeable’ structural problems. Jane talked about the CTV building collapse:

“ . . . but it doesn’t mean anything when you look at the CTV building for example. Everyone thought that that would have been, you know it was built up what they thought was the standard at the time. A lot things that are not visible to the naked eye when its being inspected by a structural engineer. Everything’s hidden away, they can’t get to things like foundations very easily and they don’t really know. It is a bit of a worry.” (Jane)

Such accounts reflect uncertainty about compliance to codes and issues that were considered as ‘unseen’ by experts according to Jane. While increased safety preparedness is possible, the ongoing trauma of previous events served to lessen experiences of ontological security although it did not eliminate attempts to purchase safety through, for example, due diligence. It also reflects how wealth can have its liabilities and does not inevitably protect people from danger [5].

5. The Burden of Retrofitting Buildings

Following the 2011 Christchurch earthquake and just prior to the 2016 Kaikōura earthquake, the Aotearoa New Zealand 2004 Building Act was amended to ensure a nationally consistent framework that addressed earthquake-prone buildings. Changes in that legislation stipulated that owners had to be notified about their building’s earthquake rating and any remedial work required to bring that building up to 34% of the NBS. The forms of seismic compliance work include strengthening or partially or fully demolishing buildings [17]. Directly following the 2016 Kaikōura earthquake, there was no financial support for apartment owners to earthquake strengthen or improve buildings. However in 2019, a member of parliament, Grant Robertson, announced a hardship fund for those apartment owners who could not finance strengthening work or if doing so will put them under hardship [30]. This section highlights the importance of and responsibility for the process of ensuring that buildings were safer. It outlines the experiences of the participants, including the financial and psychological impact of needing to strengthen buildings to ensure personal and public safety:

Many of the owners in this study expressed stress at having ‘*financial burdens Government—Central or Local . . . placed*’ on them (Elizabeth). This was particularly apparent for people who may be retired, without financial capital, or who cannot afford to retrofit or repair their dwellings, even if legally required to do so. Elizabeth discussed some of these

financial and psychological effects associated with retrofitting and meeting building codes, such as depression and anxiety, when managing a large retrofitting project:

“This person went to the doctor and the doctor said you’re depressed, you’re anxious, and gave him some medication, and that’s solely because of the stress of trying to progress a construction project on behalf of other owners.” (Elizabeth)

The physical and psychological effects are significant enough that some participants needed to seek medical help, highlighting how retrofitting a building has more than a dollar cost. For those who purchased apartments either before the amended building act or without the knowledge of the importance of structural safety codes, it came as a shock for them to realize that they had to also invest in building retrofit works. Samuel talked about finding problems with an investment property after it was assessed for earthquake safety:

“I have one investment property and that was worse off because once we had the engineer looking through it, they didn’t find quake damage, what they found was there was something wrong with the building the way it was built. It’s an apartment building and that needs to be remedied and of course because it’s not quake damaged, EQC will not pay, no one will pay. It’s the engineers that have made an error in their plans when the building was planned, which we didn’t know about. It’s beyond the statutes of limitations; there’s nothing we can do about it. You just have to pay. Which turned out to be costing everyone about two million dollars overall for to do the fix.” (Samuel)

The process around ascertaining the structural safety of the building conducted by engineers also presented as problematic. Samuel looks for fault in the engineer, although it is not clear if the problems in his building were due to previous design standard. Nevertheless, it is a large apartment block and costs were shared amongst owners; the building was not earthquake damaged so all rectifications are at the owners’ expense. It is not uncommon for owners of large apartment buildings to face various and ongoing problems, including expensive repairs and insufficient cash flows and equity to carry additional debt [3].

Before the 2011 Christchurch and 2016 Kaikōura Earthquakes, many people purchased buildings without adequately ascertaining the structural risks. In this context, Elizabeth felt fortunate when she found out that her building had been strengthened prior to purchase:

“We were lucky actually because we hadn’t done that, and we’d just gone to a lawyer and he hadn’t, we hadn’t even done a LIM, and so we were really lucky in that the building had been strengthened when it was converted.” (Elizabeth)

While ‘luck’ in this quote denotes safety from harm, it also signals avoidance of the financial burden for retrofitting a building as it is the responsibility of building owners. Elizabeth’s account also implies that prior to property purchases, lawyers should be responsible for information on structural soundness and, in this sense, accountability for not checking prior to purchase becoming a shared event. Other participants also suggested that safety should be a collective process in that agents of the state and other professionals should have responsibility for acquiring knowledge of a building’s earthquake rating.

Similar to Elizabeth, Samuel argued that some people do not undertake due diligence around building safety because of capitalist forms of purchasing ‘pressure’ when buying apartments and the complex nature of official reports about building engineering and codes:

“There’s a lot of pressure from the property people that’s enacted on the people buying. So they want to make the sale, they try to push people to, oh we’ve got these and these offers in, you need to act fast . . . I mean people are always busy working of course . . . it is a lot of effort and you have to sacrifice sleep to actually read all these things and a lot of it will not necessarily be easy to understand.” (Samuel)

Samuel’s account signifies the opportunity for coercive actions in Aotearoa New Zealand despite the requirement for real estate agents to disclose everything. It also demonstrates that building assessments are not easily interpreted or understood by the general public.

6. Body Corporations, Landlords, and Information Sharing

The body corporate system in Aotearoa New Zealand mandates building owners with collective powers to manage shared areas in apartment or housing units. This includes general building maintenance, updating a register of users, insurance, and setting operational rules [47,48]. When renting an apartment, in addition to a visible safety rating sticker, tenants are reliant on tenancy agents and landlords or body corporations for information about earthquake ratings or remedial work prior to and after an earthquake. This section discusses the impact of that on experiences of preparedness for apartment renters.

Tracey said she had been informed about her building's safety because her landlord had "*flagged that the building was going to be earthquake strengthened*". Being told that her building would be made safer was positive for Tracey, although it meant disruptions to her lifestyle because of the construction work. Tracey described the details about the building codes and appeared very knowledgeable. She further explained not being included in the discussions due to being a tenant:

"... the apartment that I live in . . . has a big parapet on the front of the building facing the street, which I'm sure is not earthquake strengthened. And it has been yellow stickered . . . I'm not involved in those discussions because I'm a tenant. My landlord tells me about that kind of stuff because she is on the body corp." (Tracey)

As a renter Tracey was 'not involved' and therefore had no agency in any decisions about the dwelling. Fortunately, Tracey had a landlord that shared important information with her, as did Harriett who asserted having a '*really helpful landlord*'. Isabelle had rented for 10 years and found some landlords 'good' while others were 'shocking about safety and care of tenants generally'. As a current owner and landlord, Isabelle appreciates the new '*rental thing like warrant of fitness coming out*'. In 2016, Aotearoa New Zealand amended its Residential Tenancies Act to require people to have smoke alarms and insulation [49].

Conversely, other tenants were not kept informed about structural problems or any potential building works. Erin did not know her building's structural safety, therefore, when the Kaikōura earthquake occurred, she decided to evacuate because she had '*no idea*' about the safety rating of her building:

"We didn't actually know what the structural earthquake [rating] of our building was. We sort of felt that it was quite a good building, but we had no idea, so it was just like let's get out." (Erin)

Without such knowledge, Erin had to rely on her 'senses' to judge the robustness of her building. Depending on a '*feeling*' about a building's safety does not engender a strong sense of ontological security. Lacking agency to access knowledge about safety and security in order to be disaster prepared is concerning. For these renters, it can be assumed that limited social power increases psychological distress and fear. As discussed in our earlier work, emotions influence people's responses to disasters. Our survey research found that 39% of respondents evacuated after the Kaikōura earthquake because of feeling cautious, afraid, and/or too scared to be in their apartments [38].

The participants highlight how little attention is paid to emergency planning in body corporate or Annual General Meetings unless it is specifically raised. Ingrid, a building owner, talked about their body corporate meeting and stated that the body corporate as a rule did not discuss emergency planning:

"[I] don't think there was an item [about emergency planning] as such unless somebody brings it up in general conversation, unless something has happened or specific, but not generally, no its not on it." (Ingrid)

Supporting this assertion, Grant, as an apartment owner-occupier, argued it is not the role of the body corporate to run safety drills; however, he '*hoped*' that they would provide information to all tenants via a newsletter.

“The body corp doesn’t initiate, for example, evacuation drills or things of that nature, or certainly not that I’m aware of and I would hope that they would make that, would give people sort of pre-warning, like you know a newsletter and things of that nature.” (Grant)

Grant’s excerpt suggests that body corporates might not have a clear directive on how to disseminate information to apartment dwellers. Despite the failure of some body corporates to introduce preparedness planning, many of the participants referenced the body corporate specifically as the administrator of emergency planning. Indeed, body corporates can oversee health and safety issues with regard to common property rules [48].

Similarly, the Wellington City Council also considered body corporates responsible in these roles. When Scott tried to obtain information on what to do in an earthquake as a tenant, he was informed by the Wellington City ‘Council’ to ‘check with the body corporate’ about evacuation plans:

“I think what the Council was saying was like, you know, check with your body corp on what their evacuation plan is, what their emergency plan is, on top of, you know, what do they have? Have they got a setup for water, sewage etc. And I’d never actually thought of it before. And I thought, okay.... I’d seen the usual information they put out around having emergency packs for home—having some water, having some food, batteries, all those sorts of things, but I’m in a bit of a different situation from other people or how they’d look at it. I don’t own the apartment.” (Scott)

In this account, ‘not owning’ again signifies a lack of agency and ‘difference’ with regard to the ease of access to information. However, this was not the case for owners; Ingrid reported that she belonged to ‘an excellent body corporate’ that has ‘been very well run and the communication is top-rate’. It seems that not all body corporates operate in the same manner.

Having just moved into an apartment before the Kaikōura earthquake, Barbara said she had not received any additional information from her body corporate about preparedness planning:

“... Not, consciously from the body corporate, like there was no okay let’s have a meeting, let’s be clear about evacuation processes, let’s be really clear about what the plan is if we’re tipped out of the building and can’t get back in or everyone was left to their own devices.” (Barbara)

Being ‘left to their own device’ reflects how responsibility for disaster preparedness is predominantly promoted as an individual issue [50]. It can be argued that these forms of preparedness practices occur across many sectors because of the dominance of small government and free-market driven policies. With regards to earthquake preparedness, the state asserts that individuals have social and economic responsibility to care for themselves and others by bringing buildings up safety standards [51].

7. Emergency Kits, Other Items, and Evacuation

Due to the high risk of a significant earthquake in the Wellington region, various emergency management organizations warn individuals to be prepared and provide information on how to best prepare. In addition to knowledge of building codes and structural safety, preparedness includes having appropriate supplies, an emergency plan, and securing furniture (for example see [29]). However, both owners and renters know that preparing is not enough since resourcing and spacing constraints made it difficult to prepare. The biggest issue identified by participants was water storage:

“Some of the items that came through in the Council pamphlet was like I need to have like say two weeks’ worth of water supply, and because it’s an apartment, I’ve got two bedrooms, and in the middle is like your bathroom toilet area, so... there’s actually nowhere that I can think of that would be out of the way. It’s probably more the annoyance factor of where would I store a twenty or fifty-litre big gallon drum of water?” (Scott)

Along similar lines, Astrid also speaks to a lack of focus on the practicalities of preparedness for apartment dwellers by entities such as the city council:

“... we only have received the same thing everyone receives on the news, about storing water, which... and having a go bag, but if you think about it those messages aren't fit for purpose for apartment dwellers because, 1) as soon as people are able to leave you're not going to cart thirty litres of water each out of a building down the stairs, and if there's damage you're not going back in, so your stored water is just going to sit there... I think the City Council that we currently have doesn't pay attention to apartment dwellers. I think they kind of ignore them and brush them off, and I think that's a real problem.” (Astrid)

Astrid explains that the preparedness information provided by authorities (e.g., Wellington Regional Emergency Management Office, National Emergency Management Agency) is not *'fit for purpose'* for apartment dwellers. As such, she proposes that the plight of an apartment dweller is overlooked.

Yvonne was able to store water *'in the cupboard'*. However, her ability to prepare was equally hindered by *'limited space'*:

“I think there are some limitations to being prepared, definitely in [our] building because they are small and cosy. You see the ads for the emergency kits and... they're actually quite big. You're wanting like a tent. You're wanting cooker. You're wanting 'X' amount of supplies. Water. All these things which, when you've got limited space... so I think that's definitely something that's an issue with living in smaller places is... and there's limited car parks meaning if you actually wanted to get out of town and drive away.” (Yvonne)

A dilemma that potentially results in preparedness inaction stems from apartment dwellers being told to be prepared while being constrained from taking action because of residing in *'small and cosy'* dwellings. This can also be a stressful situation that affects wellbeing. Another barrier to effective preparedness are the dynamics of renting or sharing with others. For example, Harriett spoke about having even less room to store materials in shared rental accommodation and how this made *'emergency preparedness difficult'*. Both Yvonne and Harriett typify the interpersonal *'dynamics'* of a renting situation and how that constrains agency.

An often-overlooked issue for renters is the inability to affix furniture because the landlords prohibit this. Research on earthquake related injury (e.g., [52,53]) indicates that anchoring furniture is an important preventative and protective action as displaced or falling furniture can cause harm. Haraoka et al. [52] established that lower numbers of renters than owners had affixed furniture in Japan (39.9% vs. 28.9%). Akin to this, we found that fewer renters affixed furniture than owners prior to the Kaikōura earthquakes (40% of Owners vs. 17% Renters) and following the Kaikōura earthquake (21% of Owners vs. 16% Renters). When we asked participants in the wider study who planned to secure furniture, fewer owners than renters stated they would (20% vs. 40%).

To be denied this potential safety and preparedness action is a human rights issue. Jane and Yvonne proposed that their lack of rights as renters prevented preparedness and protection from harm:

“Under the terms of our lease, we weren't encouraged to do anything that would make marks on the walls like anything that you use to hang stuff, you couldn't make holes, it had to be those removable things. So yeah, so they're not all that great for fixing things to the wall.” (Jane)

Whilst raising the same issues, Yvonne also demonstrates an imperfect agentive response by placing items lower down in a freestanding pantry:

“Because we were flatting obviously we can't stick nails into the walls or anything like that so we had very limited resources to actually be able to affix anything properly. So what we tried to do was keep, you know, we had a free-standing pantry sort of thing and we tried to keep the heavier stuff down the bottom and tried to fill the top with like plastic container sorts of things, so if something did fall it wouldn't be, well, unless you're under it, but, you know, in terms of actual damage to everything in it wouldn't be quite as bad hopefully.” (Yvonne)

In such accounts, we can see how difficult it is to prepare for earthquakes in rental apartment situations even for persons motivated to do so. Yvonne's account of pragmatic actions to minimize the impact of insecure furniture also functions to cultivate some sense of ontological security or safety even though she knows that risks have not been fully mitigated.

Renting participants expressed 'frustration' at the lack of power they had to shape their dwelling in preparation for disasters so as to protect themselves. For example, Yvonne positioned this more generally as a lack of 'opportunity' to inhabit space in a manner she wants to because she is a renter:

"It does annoy me a little bit, like obviously because, well, putting aside safety, you know, even just knocking something could cause something to collapse and, you know, I put all the stuff that I like in there. I do have breakables, you know, and I would like to actually have the opportunity to have actually do stuff to a place that I'm living in." (Yvonne)

Likewise, Tracey stated that she was 'pretty well prepared'. However, she also speaks to the taken-for-granted trope of 'hope and trust' placed on the institutions of the state for protection and support:

"And so much depends on where you are at a given time. And you can't control all of that . . . I feel I am pretty well prepared in my apartment, I'm sure we'll get to that question, but beyond due diligence then there is hoping and trusting that the civil defence emergency management, that the City Council, and your employer and your landlord do the things that they should do." (Tracey)

Implicit in Tracey's talk is a classic argument that disasters are an 'act of god' and, therefore, uncontrollable [54]. Such tropes can function as self-justifications for inaction. For example, akin to Tracey, Nick was also philosophical that while people might prepare, the unexpected could still happen:

"You don't know what is going to happen. You can be as prepared as buggery and then the meteor falls on that corner of the apartment where your emergency kit is, so I'm prepared to ride a certain amount of risk because we just don't know what's going to happen, but it makes sense to have some water and, and food and whatever else." (Nick)

As both a renter and owner, Nick's account demonstrates that preparedness is complex and that the unpredictability of disasters and the surrounding context influences how issues unfold. Again, uncertainty justifies not fully preparing. Participants understood the importance of storing water, which for Nick was 'split up between two areas' and a 'blanket or something to drag into the corner' if he needed to 'just cower there'. He knew he had the necessary items in his house to be okay. These statements are supported by Wellington Regional Emergency Management Office [7] who advised that blankets, clothes, and bathroom items are useful emergency items.

Another notable preparedness consideration was the height at which an apartment was located. Yvonne preferred 'living on the 2nd floor of a 15 storey apartment' because she thought lower levels were easier to evacuate. Likewise, Erin and Tracey's feelings of safety were related to the height of their apartment. Tracey made a comparison between the safety of her fourth floor apartment and her eighth floor workspace, where she claimed it took approximately 10 min to evacuate the 8th floor during fire and safety drills.

All of the participants reported having some type of evacuation plan. This ranged from going to friends and family homes to having contact phone numbers. However, participants also realized any plan was contingent on where they were at the time of an earthquake. For example, Barbara said the following:

"God, where would you go? You can't go that way. You can't go that way. The Terrace would be out. Where would you go? Actually, honestly, if we were home, we chuck our gym shoes on and run up Mount Vic, cos' what else would you do? Cos' that way would be utter carnage in terms of building damage and glass and stuff like that, you'd be better

to go Mount Vic and its much closer, like its only, be at the foot of Mount Vic at two hundred metres and we're all reasonably fit and could probably run it." (Barbara)

Barbara raises the difficulty of having a definitive evacuation plan due to the unpredictability of a disaster event. However, having experienced the Kaikōura earthquake, they did have some form of plan in place, highlighting the importance of disaster experience in motivating future preparedness [55]. The uncertainty over what a future event might appear as, however, in combination with confusion over whose role it is to develop evacuation plans as discussed earlier shows that evacuation planning for many is still a work in progress.

8. Discussion

With little or no research that explores disaster preparedness, the present research explored the complexities associated with how inner-city apartment dwellers enact disaster reduction and readiness (i.e., preparedness), paying particular attention to the experiences of owners and renters to be prepared for future disaster events. We found that knowledge about codes and structural safety were recognized as important. A number of owners and renters suggested that their knowledge of and belief of the risk of an earthquake happening and how safe they thought a building was influenced their decisions. Some had been fortunate enough to have access to expertise (whether it was their own, or a family members) about structural engineering and earthquakes. Some used this knowledge to 'purchase safety', highlighting the importance of ontological security in major life decisions such as buying a home. However, access to structural engineering knowledge was not common across all participants, emphasizing that such knowledge is a privilege.

Participants shared how social and financial capital mattered to their agency to prepare. Regarding purchasing an apartment, there was debate about the role of the purchaser, versus lawyers, and versus real estate agents in understanding and highlighting the risk to potential owners. Despite checks and balances being in place via legislation and best practice codes, participants highlighted the power imbalances in the purchasing process that perhaps result in owners feeling pressured into making quick and ill-informed decisions.

Owners spoke to the personal financial burdens and stress of bringing their dwellings up to the building code. An additional concern highlighted by owners was the manner building codes and standards evolved after earthquakes. They accepted that it was important to learn lessons from events and to improve standards accordingly. Renters were largely exempt from the direct financial burdens of fixing or retrofitting a building and they also had no direct input into decision-making process for emergency management procedures or structural safety decisions for their buildings. Moreover, while it was not discussed, they would also potentially carry the burden of increased rents so landlords could absorb those costs. These decisions were usually undertaken through mechanisms via the body corporate structure that involved owners. There was also little information about building plans or safety enhancements being fed back to renters aside from a few instances where renters had a good relationship with their landlord. The differing manners that both owners and renters experienced lack of agency did in some instances result in 'hope' and 'trust' that others were doing something, thereby transferring responsibility back to the authority. This transfer of responsibility has been seen in other studies and can result in an overall decline in preparedness for future events due to assuming that the 'State' would take care of them during adverse events [50,56].

Most participants argued that body corporate organizations could play a significant role in disaster preparedness, although it was not their responsibility to do so. A common preparedness concern for both owners and renters of apartments was little indoor space to store preparedness items (particularly water) and limited accessible outdoor space to gather following an emergency. In general, when owning an apartment, there is more agency to address potential risk (e.g., can affix items to walls and can provide input into body-corporate decisions).

Practical strategies could involve new or redesigned buildings requiring space for emergency kits, either in apartments or in a shared space. It could also involve amending policies so that tenancy laws mandate renters with the power to secure items to walls for safety. Our policies on disaster management should reflect how preparedness can be a result of pragmatic compromises.

With respect to whose responsibility it might be for advocating preparedness actions, official emergency management organizations were mentioned as one avenue and body corporates as another, but it appeared that there was some confusion over that. There was also discussion of preparedness being an individual responsibility. Correspondingly and mirroring a neoliberal milieu, personal responsibility has been the primary focus for emergency management education campaigns over many decades. However, it is clear, particularly in the apartment context, that risk reduction and readiness is a collective issue which requires a collective approach and shared responsibility. This includes more collaborative acknowledgement of all parties and the roles they play. Becker et al. [50] have recognized the importance of this for citizens in their previous studies in Aotearoa New Zealand). There should be a requirement for bringing a building up to safety standards. No longer should we continue to devolve responsibility to a contextually devoid individual—as part of a wider ecosystem everyone should play a part in helping to understand the risk and manage, plan, and prepare for the next event.

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