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Earthquake Disasters and the Long-Term Health of Rural Men in Chile: A Case Study for Psychosocial Intervention

*Oscar Labra, Robin Wright, Danielle Maltais,
Gilles Tremblay, Ray Bustinza and Gabriel Gingras-Lacroix*

Abstract

The article focuses on the long-term health of a rural male population exposed to a major earthquake event in Chile, in 2010. The results show that a majority of the male study participants considered that their physical and mental health had deteriorated over a 7-year span following the earthquake and that these impacts were strongest in men aged 65 years or more. In considering potential lessons for intervention, the results must be interpreted within the context of the construction of male identities in a rural community, informed by generally conservative values and binary male-female gender roles. The article concludes that health and social services workers and administrators providing interventions to male populations following earthquake must work to reduce the gap between the service offer and men's real needs, which are frequently insufficiently understood and inadequately coded.

Keywords: helping professionals, men, rural community, natural disaster

1. Introduction

The present article aims to describe the long-term health impacts of a earthquake on men in a rural community. Survivors of natural disasters experience traumatic effects, whose intensity and gravity can vary in relation to risk factors present before, during and after the disaster event [1]. Previous studies have found that individuals exposed to a disaster event exhibit comparatively high incidences of depressive and somatic symptoms, emotional distress, memory impairment [2–7]. For example, in a study of 302 adults living in rural Australian communities, he was demonstrated that psychological distress levels were higher in individuals exposed to a disaster event than in those who were not [8]. Lazaratou et al. [9], for their part, found that over half of survivors exhibited post-traumatic stress (PTS) symptoms during a 6-month period following an earthquake and that, in some cases, the symptoms could persist up to 50 years after a disaster. Within populations of male disaster survivors, elderly individuals appear to be the most vulnerable [10–14], due to such factors as the presence of various health problems, reduced physical and cognitive autonomy, and hearing loss [15–18]. Other studies have also confirmed that the elderly are at higher risk of injury and death during and following exposure to a disaster event [13, 19–23].

A number of the health impacts of disasters identified in previous studies of rural populations appear to be linked with socio-demographic trends specific to these communities. According some studies, the stress levels of rural community residents in Canada are higher than those of individuals living in other types of communities [24]. This finding appears to be associated with the growing exodus of younger rural populations towards urban centres, resulting in such changes as economic restructuring and loss of social capital. Studies conducted [25, 26] found also that men living in rural regions in Québec, Canada exhibited rising levels of stress and depression. These results parallel those of similar studies conducted in Australia and Norway, which also demonstrate high levels of stress and depression in rural populations [27, 28]. In the case of Chile, although the overall number of suicides is higher in urban centers than in the less populous rural zones, the proportional suicide rate is higher in rural communities [29].

In terms of differences between the sexes, studies conducted in Australian rural communities show that men's suicide rates are significantly higher than women's [30–32]. As certain authors have argued, higher suicide rates among men than among women point to high levels of mental anguish and greater difficulties in facing changing circumstances, such as those linked with social, economic, and environmental crises [30, 33, 34]. Moreover, suicide rates appear to be particularly high for men involved in specifically rural professions, such as fishing, agriculture, and forestry [35, 36].

In terms of the physical health of men living in rural communities, a study carried out in the United States has shown that the prevalence of diabetes and mortality linked with coronary diseases was higher in rural than in urban communities [37, 38]. It appears also that residents of rural regions exhibit higher rates of chronic illnesses than do their urban counterparts [39–43] and that obesity is a major contributing factor in these disparities [44]. In addition, rural men exhibit higher rates of oral health problems [45], a trend that seems particularly pronounced among men with low levels of education [46, 47]. The health risk factors most commonly identified with men residing in rural regions are poverty, obesity [37, 44, 48] and tobacco use [49, 50].

Based on the results noted in the available literature, research suggests that men living in rural regions present higher incidences of physical and mental health problems than do men living in urban centers; the same finding also holds for rural men when compared with both rural and urban women. Although the impacts of natural disasters on survivors have received attention in the literature, little has been discerned as to long-term health outcomes for men exposed to natural disasters specific to rural contexts. The present article seeks to bridge that gap in the research.

2. Natural disaster management in Chile

On 27 February 2010, at 03:45 AM local time, one of the strongest earthquakes ever recorded (magnitude 8.8 Mw) occurred off the coast of Chile's Maule region (United States Geological Survey—USGS). The earthquake affected three of Chile's administrative regions, with a total population of 4 million people, or 23% of the country's population.

The earthquake caused enormous damages: 81,444 homes were destroyed and another 108,914 were severely damaged [51]; public infrastructures also suffered significant damages. The destruction most severely affected those most vulnerable, highlighting and often exacerbating pre-existing socioeconomic inequalities.

Public health infrastructures were affected, as well: of the 132 hospitals located in the disaster zone, between The Santiago Metropolitan Region in the centre and Araucanía to the south, 18 were rendered unusable, 31 sustained significant damage but remained functional, while 83 were largely unaffected [52].

The Chilean earthquake of 2010 prompted countries such as Australia, New Zealand and China to develop comprehensive earthquake response initiatives. The Chilean response was to adapt the scope of certain institutions in the event of natural disasters. Most notably, before 27 February 2010, natural disasters were the purview of the National Office of Emergencies, created in 1974. Following the earthquake, however, a separate National Civil Protection Agency was formed and tasked with, among other responsibilities, disaster preparedness under the National Civil Protection System, with aim of improving the country's disaster response capacity. However, the highly centralized administration structures of these state institutions results in substantial delays in terms of resource management, communications, and collaboration with other federal, provincial, and community actors. Chile's position remains precarious in terms of governance indices and public policy on risk and disaster management [53]. The author concludes that, when faced with major emergencies, the Chilean state has been more preoccupied with strengthening its communications system and maintaining the operational continuity of its institutions, rather than with investing in human capital. It is worth noting, as well, that the organization of Chile's public health system as a decentralized network produced both benefits and drawbacks in the aftermath of the earthquake: hospitals and health centres were able to react quickly at the local level, but the system lacked an integrated, inter-sectorial approach through which to reduce social inequalities affecting the delivery of care [54].

3. Conceptual framework

The present study's conceptual framework, which guided the collection and analysis of data, is informed by the salutogenic approach developed by Antonovsky [55]. The majority of explanatory theories of the male gender fail to acknowledge its positive aspects, which can be harnessed preventively to counter concomitant negative aspects, salutogenic approach provides a way of rectifying this lacuna [55]. The salutogenic approach is predicated on two key elements: the first is a focus on positive environmental factors conducive to health, rather than those that engender illness [56]; the second is termed the sense of coherence [56], that is, each individual's personal understanding of the surrounding world as consistent [57, 58]. According to the salutogenic model, an individual who perceives life as a coherent and meaningful whole is more likely to respond positively to difficulties than someone who perceives life as ruled by random events and, consequently, considers challenging situations to be the result of uncontrollable misfortune [55]. Salutogenesis has become a widely adopted concept in public health, particularly in health promotion.

Applying the ideas of some authors [55, 59] to men's health, Macdonald [59] argues against a focus on pathologies in attempts to understand men's health and for an approach that instead takes into account the economic, political, and social spheres in which problems arise in order to explain recurrent problems and work at creating environments conducive to better health. Macdonald states further that analyses should acknowledge 'spotlight cases' of men who faced life challenges positively, employing their personal strengths and qualities to overcome adversity. Within the scope of the present study, salutogenesis constitutes a conceptual framework centred on men's optimal well-being [60].

4. Methodology

The present study was mixed, exploratory in nature, and involved a small number of participants. Moreover, the dearth of data on the health of men exposed to earthquake events in rural communities did not allow for comparative analysis in light of previous results.

4.1 Participant recruitment methods

The sample was constituted using a non-probabilistic procedure. The initial participants ($n = 15$) were recruited through a local community health centre in Lo Figueroa, a rural community located within the municipality of Pencahue, in central Chile. Every participant received all information necessary to fully understand the objectives and implications of the study. They were also informed of the means by which their anonymity would be protected. Additional participants were recruited using the snowball method [61, 62], that is, the initial participants referred additional respondents. Individual interview locations and schedules were established with each participant. Data collection took place in the period December 2016–February 2017.

The primary researcher collected the study data in the course of semi-directed, face-to-face interviews recorded on audio media. The interviews addressed a range of themes in order to draw a comprehensive portrait of participants' views of the consequences of the disaster on their physical and mental health. For the purposes of the study, an interview guide originally developed in French was adapted into Spanish using a double back-translation method, which maximized the validity of questions presented to participants [63]. The sociodemographic characteristics of respondents were collected through a brief questionnaire containing exclusively closed questions. A second instrument served to identify the presence or absence of post-traumatic stress manifestations using the Impact of Event Scale-Revised (IES-R) [64]. The IES-R includes 22 items assessing PTS intrusion and avoidance experiences in the week preceding the application of the questionnaire.

4.2 Data analysis

The collected qualitative data were processed using a thematic analysis procedure. The information collected using the IES-R self-administered questionnaire [64] were analyzed in terms of proportion as a relative frequency and subjected to binary classification, by age group, into men aged 54 and younger and men aged 55 and older. Based in Canada, the researchers established this grouping on the basis of the Canadian government's statistical classification of individuals aged 55 and older as senior citizens [65]. All study participants were citizens and residents of Chile.

4.3 Ethical considerations

The present study was validated by the UQAT research ethics committee (CER-UQAT) and posed no risks to the physical or psychological health of participants. No ethical certificate: 2016-0. All participants were presented with a consent form informing them of the implications of their choice to participate in the study. Participation was entirely voluntary and all participants were informed that they could withdraw from the study at any moment without justifying their decision and without negative consequences. Data collected during interviews were kept, unaltered, in a locked file cabinet accessible by only one designated member of the research team. Pseudonyms were attributed to each participant in order to safeguard their confidentiality. All collected data will be destroyed 5 years after study completion.

4.4 Sociodemographic characteristics of respondents

The sample ($n = 45$) was composed of men aged 54 and younger (55.6%) and 55 and older (44.4%). A non-negligible proportion of participants were single (40%), while others were either married (28.9%), had common-law spouses (11%), were divorced or separated (13%), or were widowed (6.7%). Education levels among the sample were relatively low: only eight participants had completed a secondary education. A significant majority (75.6%) reported monthly incomes below minimum wage levels, equivalent to US\$464. In terms of occupation, 40% of participants were retired, 33% were self-employed in agricultural activities, 22% were employed, and 2% were students.

5. Results

The present section presents health data collected from male respondents residing in rural communities in the Penco municipality, in Chile's Central Valley, who had experienced exposure to a major earthquake event in 2010. The event occurred in the night of 27 February, at 3:45 AM local time, off the coast of the Maule region. The tremors persisted for 3 minutes and attained a magnitude of 8.8 Mw (moment magnitude scale). It was one of the strongest earthquakes ever recorded and caused severe damages across the coastal region. The first part will address participants' physical health prior and subsequent to the event. The second part will address the consequences of the event on respondents' mental health.

5.1 Physical health before and after the event

The physical health problems described in the present section were self-declared by participants. The data collected during participant interviews show that the male respondents suffered from a variety of illnesses prior to the earthquake event of 27 February 2010. Twelve (26.6%) men (average age: 67.3) reported having experienced health problems prior to the event, the majority of which were linked to hypertension and diabetes. These health problems had a negative impact on the professional life of some respondents, as expressed in the following testimony:

I've had this thing [diabetes] since some time. Before, I was someone who could work without any difficulty, but since I got sick things changed a lot; I have to watch what I can and can't eat. This has also had an impact on my work. You know, farming work is difficult and the days are long! (Manuel).

In addition, 10 men who declared other illnesses, in addition to hypertension and diabetes, reported feeling misunderstood at work, which translated into feelings of uselessness:

For me, the fact of having an irregular heartbeat limits me a lot and cuts my hands off, as the saying goes, for working in what I like best: agriculture. Because I have a series of limitations and things that mean that I can't be available for all kinds of work. But, you see, I can do things, but people don't understand that. Even at home my wife is always saying do this, don't do that, be careful! In the end you become a burden for others. I'm 68 and I still feel capable of working (Victor).

Others were troubled by feelings of defeat, since their health condition had forced them to terminate their professional activities and find employment outside their community.

Since I got sick I only pick up odd jobs [pololos]. Before I had a permanent job, but I don't have that now. It's difficult for us when these things happen! I try to get by doing occasional work in construction here, because now you don't find people who know much about maintenance on a house and I take care of that. It's little things, like for example, putting stucco on a wall, redoing a floor, etc., little things I can do at my own rhythm (Andrés).

Although these 12 men were experiencing health problems at the time of data collection, the majority ($n = 7$) occupied salaried positions, while the remainder were self-employed ($n = 5$).

For the sample overall in the post-disaster period, **Table 1** shows that the incidence of health complications rose considerably for respondents during the 7 years following the disaster. Indeed, the majority of respondents ($n = 25$) stated that their health had deteriorated significantly since the event.

Close to half ($n = 21$) of participants reported having developed new health problems after the event. Their testimonies reflect a negative perception of the effects of the disaster on their health:

After the earthquake, everything changed for me, in the sense that I feel more vulnerable than before. I get sick often, but before I never had anything. For example, last year I spent a month in hospital with fever and headaches. I'm sick more than before and I don't know why (Efraín).

I always considered myself as someone who didn't know hospitals or health centres or places like that. But everything changed from 1 day to the next after I had a heart attack. It happened 2 years ago and I haven't been the same since. Here we say that when one bad thing happens, all bad things happen! I say that because after the earthquake a lot of people became sick. My wife, for example, spent her days crying because she was afraid that another one [earthquake] would come (Ernesto).

It is important to note, however, that although many respondents reported that their health had deteriorated significantly in the 7 years following the disaster, there is no direct evidence for a causal link between increasing health problems and exposure to the event, since new health problems reported by participants may be associated with ageing or external factors other than the event.

Physical health problems	Before	After
	<ul style="list-style-type: none">• Cardiac arrhythmia• Diabetes• Lumbar disc disease• Bone pain• Epilepsy• Gout• Vision impairments• Blood pressure problems• Psoriasis	<ul style="list-style-type: none">• Vascular accidents• Osteoarthritis• Hip pain• Muscle and bone pain• Physical fatigue• Hemorrhoids• Heart attacks• Back pain• Joint pain• Kidney diseases• Varicose leg ulcers

Table 1.
Principal physical health problems reported by respondents as present before and after the earthquake.

5.2 Mental health before and after the event

During the interviews, respondents were asked to describe their mental health before and after the event. None of the participants reported suffering from psychological health problems before the event. A majority ($n = 35$), however, stated that they experienced mental health problems afterwards. The problems most commonly cited by respondents were stress problems ($n = 15$), manifestations of emotional pain ($n = 7$), a permanent fear that an earthquake would re-occur ($n = 5$), depressive and anxious manifestations ($n = 5$), and sleep disorders ($n = 3$).

Among those experiencing emotional pain, those who stated that the manifestations occur without apparent immediate cause associated the occurrences with their advancing age.

For example, when I get up in the morning, I feel something squeezing in my heart. It's as if I wanted to cry. I don't know why I feel like this. I don't say anything to my viejita [wife] but it's a feeling that just comes sometimes; maybe it's because I'm old, I don't know! [80 years of age at time of interview] (Alberto).

Others associated their emotional pain with the fact of having irrecoverably lost all their material and immaterial goods during the earthquake. These respondents reported feelings of defeat.

When I think about what I lost [his house], it hurts. It hurts to lose everything and to be powerless to do anything about it. It hurts to lose your house and all your things, and that your house is in a bad state now! (Diego).

Participants also spoke of a feeling of fear that presented itself following the earthquake; this feeling was still present for a third of respondents at the time of data collection. Manifestations of fear were most clearly associated with the possible recurrence of an earthquake of similar intensity (8.8 Mw):

Sometimes I go to bed thinking that another earthquake might happen, just as strong as the one in 2010. This scares me a lot and I think about what might happen, being sick like me, with all the difficulty I have moving around! (Lamberto).

In terms of stress disorders, as well as depressive and anxious manifestations, participants reported pervasive feelings of sadness, which impact their ability to function, and persistent thoughts about the finality of life. As one respondent put it: 'I do not have much. Why keep on living? I keep feeling more and more sick. I've been feeling like that for a while. I feel alone!' (Orlando). Although mentioned only by a few ($n = 3$) respondents, sleep disorders were also present within the range of mental health complications declared during the interviews and seemed closely related to the fear of another severe earthquake:

I have trouble getting to sleep because I think about what will happen if we have another earthquake in the middle of the night! Thoughts about this, they just come on by themselves; it keeps me from sleeping. You sleep by fits and starts, as they say! I wake up at the smallest noises (Demiro).

5.3 Post-traumatic stress manifestations and concomitant physical and mental health problems

Table 2 illustrates IES-R results for the two age groups in the sample. As the results show, all respondents aged 55 or more ($n = 20$) suffered from PTSD (score

Average age	IES-R	Age		
		Total (<i>n</i> = 45)	54 and younger (<i>n</i> = 25)	55 and older (<i>n</i> = 20)
25.7	1–11 (<i>n</i> = 3)	7%	12%	0%
21.3	12–32 (<i>n</i> = 7)	16%	28%	0%
62.5	33 or over (<i>n</i> = 35)	78%	60%	100%
Total		100%	100%	100%
IES-R average		52.3	42.2	65.0

Table 2.
Impact of event scale-revised (IES-R).

of 3 and higher) 7 years after the disaster event. For participants aged 54 or less, the PTSD rate was 60%, while another 28% of participants in this age group obtained scores ranging between 12 and 32, indicating that they presented a number of PTS symptoms, but did not suffer from the disorder.

As **Table 3** demonstrates, participants who obtained IES-R scores of 33 or higher declared greater numbers of physical and mental health problems than did participants who scored lower on the scale. Respondents aged 70 and older presenting PTS manifestations were the group reporting the greatest number of physical health problems, specifically: visual impairments, diabetes, osteoarthritis, bone pain, heart problems and hypertension.

Presence of PTS manifestations (<i>n</i> = 35)	Absence or low occurrence of PTS manifestations (<i>n</i> = 10)
Physical health problems self-declared during data collection: <ul style="list-style-type: none">• Vascular accidents• Cardiac arrhythmia• Osteoarthritis• Diabetes• Hip pain• Lumbar disc disease• Muscle and bone pain• Epilepsy• Gout• Hemorrhoids• Hypertension• Heart attacks• Back pain• Joint pain• Psoriasis• Visual impairments• Blood pressure problems• Physical fatigue• Kidney problems• Varicose leg ulcers	Physical health problems self-declared during data collection: <ul style="list-style-type: none">• Diabetes

Presence of PTS manifestations (n = 35)	Absence or low occurrence of PTS manifestations (n = 10)
Mental health problems self-declared during data collection: <ul style="list-style-type: none">• Anguish• Depression• Persistent nervousness• Persistent emotional pain• Loss of motivation• Permanent fear• Extreme preoccupation• Feelings of loneliness• Stress• Sleep disorders	Mental health problems self-declared during data collection: <ul style="list-style-type: none">• Emotional pain• Fear, anguish• Fatigue

Table 3.
Self-declared post-disaster health problems as a function of post-traumatic stress manifestations.

In summary, following exposure to the disaster event, the majority (35/45) of men participating in the study reported a progressive deterioration of both their mental and physical health. However, given that 7 years had elapsed between the disaster event and the data collection period, the results must be interpreted with caution. It is not possible to determine with any degree of certainty whether the health problems self-reported by respondents were linked directly with exposure to the earthquake or whether they were more closely linked with other factors, such as natural ageing or negative experiences since the earthquake. Nevertheless, the results suggest that the physical and mental health of men aged 55 or older who have been exposed to earthquake events are particularly at risk.

6. Discussion

The results of the study suggest that a majority of men living in rural communities in central Chile declared that their health had deteriorated significantly since their exposure to the earthquake of 27 February 2010. Nearly half of participants declared suffering from physical and mental health problems that had not been diagnosed prior to the disaster. It is worth noting, as well, that, overall, men living in rural communities are more likely to suffer from certain health problems, such as diabetes and coronary diseases [37, 40]. Moreover, the sample presented the additional health risk factor of poverty: 75.6% of men participating in the study reported monthly incomes below Chilean minimum wage levels. Some authors point out, poverty remains one of the most common health risk factors among men living in rural communities [37]. Thus, age, economic status, and post-disaster trauma may all account for participants’ declining health and feelings of increased vulnerability. It is important to note, as well, that, although respondents’ physical and mental health had deteriorated in the 7 years following the event, it is not possible to establish a direct link between the reported health problems and exposure to the disaster, since they may be more closely associated with natural ageing processes or other, external factors. Further research will be necessary to pinpoint more definitively the causes of health problems reported by rural men in post-disaster contexts, especially since they are more vulnerable than women in the same communities and more vulnerable than both men and women in urban communities [30, 31].

Participant testimonies show that their mental health had also deteriorated following exposure to the disaster. These results parallel those of other studies, which show that exposure to natural disasters can have significant consequences for the health of survivors [66, 67]. Within the scope of the present study, the majority of participants cited mental health problems, such as anguish, depression, emotional pain, constant fear, and stress disorders, as factors that had contributed to the deterioration of their quality of life since the event (**Table 3**). Emotional pain, depression, anguish, and stress were the mental health problems most commonly reported as having emerged in the 7 years following the disaster. As a previous study has shown, the deleterious consequences of natural disasters on the lives of survivors can persist as long as 50 years following the event [9]. A longitudinal study comparing the health of survivors with the health of individuals not exposed to the event would allow for a more thorough verification of this hypothesis. Previous studies have reported similar results in terms of the presence of depressive and somatic symptoms, as well as emotional distress, among natural disaster survivors [2, 4, 68]. Elsewhere, it has been noted that the deterioration of the natural environment seems linked to depression in adults living in rural communities [8].

IES-R results (**Table 3**) show that respondents aged 55 or more (20 of 45, average age 62.5 years) presented elevated levels of post-traumatic stress when compared with the rest of the sample, providing evidence of a deterioration of their mental health. This group, moreover, reported numerous physical health problems (e.g., vascular accidents, cardiac arrhythmia, osteoarthritis, visual impairments). The results, which parallel those of Labra et al. [68], point to two conclusions: (1) that the deleterious consequences of natural disasters on the physical and mental health of male survivors intensify with age; and (2) that, within the framework of the salutogenic model [57–59], the men in the sample have since the disaster lived in environments that are not conducive to good health; that is, they do not have access to an offer of services likely to motivate psychosocial consultation or to medium- or long-term psychosocial post-disaster intervention programmes. These factors may account for the negative overall results obtained through the IES-R.

Thus, advanced age appears to be a factor affecting the vulnerability of men in natural disaster contexts, particularly in connection with health problems and the loss of physical and cognitive autonomy [1]. It appears, as well, that men aged 54 and younger fare better with the consequences of a disaster event, since 60% suffered from PTSD, while 28% obtained scores ranging between 12 and 32, that is, presenting certain PTS symptoms without developing PTSD. This observation leads to the following question: what are the factors that account for the ability of younger men to better avoid the deleterious health effects of a disaster event? Within the perspective of the salutogenic model [55–60], answers to this question could help to identify the positive forces and elements of the environment that benefit younger men in order to extrapolate them in working towards creating healthier environments for older individuals.

6.1 Implications for psychosocial intervention

The consequences of natural disasters on men's physical and mental health vary depending on the level of exposure, the losses suffered, the survivors' age, as well as their physical, psychological, social and financial capacities to effectively face the various stress factors that follow a disaster event [69]. Older men are frequently more vulnerable than are other groups in these situations [68]. In addition, men as a group are frequently reluctant to seek help, whether from their family and social circles or from professionals in the public and community health networks [66]. This reluctance is frequently motivated by norms and beliefs rooted in traditional notions of masculinity that cause men to underestimate their health needs and there is evidence to suggest that these trends are stronger in rural communities [70].

The social work approaches used in disaster-context interventions must vary in relation to different clienteles and different stages of intervention, including prevention, preparation and recovery [71]. In practice, psychosocial intervention with disaster survivors is generally focused on immediate needs (e.g., access to basic resources and shelter) and only rarely takes into account holistic perspectives that acknowledge individuals and their social environment [12]. Consequently, disaster interventions fail to address the long-term consequences of disaster events for survivors' health, including various effects on their personal, conjugal, family and professional lives. In developing interventions, helping professionals can benefit from approaches such as ecosystemic [72] or salutogenic models [55], to name just two of the available options that may be applicable, depending on the specific needs and conditions of men experiencing physical or mental health problems and social interaction difficulties following exposure to a disaster event. As pointed out by [73], however, interventions tailored to the needs of men should also take into account their specific strengths and abilities.

Given the nature of the problems identified among participants in the present study, group interventions may also offer an effective approach. In group interventions, helping professionals must remember that their clientele, in this case men, are 'the experts of their own lives' [73], but in need of guidance towards effective mutual self-help.

The nature and intensity of exposure to a given disaster event are determining factors in the extent of consequences for survivors and must enter into consideration in the deployment of psychosocial intervention measures to minimize the deleterious effects on men's health. Helping professionals must devote particular attention to the psychosocial support necessary to overcome various difficulties specific to given groups, particularly, in the light of the results presented above, those specific to older men; intervention objectives, by the same token, must be formulated clearly in relation to specific clienteles and tailored to the pre-disaster, emergency assistance, and recovery phases of intervention. The testimonies of male survivors indicate that they continue to suffer from post-traumatic stress 7 years after exposure to a disaster event. In order to contribute to the reduction of consequences such as depressive manifestations and other mental health problems, intervention programmes should foresee the need and integrate the availability of psychosocial support services for the long term. Helping professionals involved in post-disaster interventions with men can also contribute to reduce disparities between available services and real needs, which are inadequately understood and inefficiently coded within health and social services networks.

7. Conclusion

The present article addressed the long-term post-earthquake health of men in a rural community and its implications for helping professionals' interventions. The study found that, among the sample, 7 years after a major earthquake, men 55 and older remained the group most adversely affected by the event. It is important to note that a factor contributing to the reluctance of men to seek help and thus potentially to reduce these impacts, particularly in rural areas, is a predominant notion of masculinity, typified by the image of strong and self-sufficient man, informed by conservative values in which gender roles are binary and fixed. This presents particular challenges for helping professionals who seek to reduce the existing gap between available service offers and men's real needs, which remain insufficiently understood and imprecisely coded.

The standards of traditional masculinity prompt men to conceal their private lives, seek to maintain control, and project strength [73], as well as deny suffering or pain and attempt to maintain independence, as ascertained above. Based on the findings of the present study, psychosocial intervention targeted towards men should:

1. Work on strengths rather than weaknesses [55] by focusing on the positive attributes of the environment that are conducive to health, rather than on negative elements conducive to disease.
2. Acknowledge men's needs and communicate to men that health professionals are willing to listen and elaborate interventions and treatments based on men's needs.
3. Work incrementally on specific elements so that men can understand their progress throughout the intervention process.
4. Include men's spouses and partners as facilitators in the intervention process, since women often play decisive, positive roles in men's help-seeking.

Lastly, the consequences of the natural disaster described above on the physical and psychological health of participants were not uniform, varying according to factors specific to individuals. It is thus important that intervention programs be designed to include flexibility and adaptability to individual needs.

The authors consider that further developing the following research avenues may contribute to facilitate men's help-seeking following disaster events: (1) to identify factors facilitating older men's use of health services and (2) to examine sociosanitary services and programs, in particular their adaptation to specific clienteles, in particular as defined by age and gender.

Conflict of interest

The authors declare that they have no conflicts of interest.

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Author details

Oscar Labra^{1*}, Robin Wright², Danielle Maltais³, Gilles Tremblay⁴, Ray Bustinza⁵ and Gabriel Gingras-Lacroix⁶

1 Department of Human and Social Development, Université du Québec en Abitibi-Témiscamingue, Rouyn-Noranda, Quebec, Canada

2 School of Social Work at Windsor University, Windsor, Ontario, Canada

3 Department of Human and Social Sciences, Université du Québec à Chicoutimi, Chicoutimi, Quebec, Canada


4 School of Social Work, Laval University, Quebec City, Quebec, Canada

5 National Institute of Public Health of Quebec, Quebec City, Quebec, Canada

6 Department of Human and Social Development, Université du Québec en Abitibi-Témiscamingue, Rouyn-Noranda, Quebec, Canada

*Address all correspondence to: oscar.labra@uqat.ca

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