

September 23, 2020

Authors' response to editor's and referees' comments

Enclosed, please find a revised version of our manuscript, "Earthquake preparedness among religious minority groups: The case of the Jewish ultra-Orthodox society in Israel." We would like to take this opportunity to thank the Handling Editor and the referees for the exceptionally constructive feedback. We found the comments and suggestions that they offered very helpful and we appreciate the opportunity to revise key aspects of the article. We have made all of the changes suggested by the Handling Editor and referees, and we believe that the revisions create a stronger and clearer paper. We highlighted the main changes to the manuscript within the document by using colored (blue) text. To facilitate review of the revised manuscript, we outline the main changes that were made:

Authors' response to the Handling Editor

Editor comment: Figure 1b

Figure 1b (the revised version) shows the 1927 Dead Sea EQ (?) which is not postdating 1984 as indicated in the caption. In addition, what is the population-threshold/criteria for a settlement to be presented in the figure as 'with UO residence'? Please state clearly.

Authors' response:

We fixed the caption to indicate that earthquakes are presented from 1900.

The criterion for a settlement to be presented in the figure is a settlement with over a thousand ultra-Orthodox residents, according to Shahak, 2017. We clarified this criterion in the figure's caption.

Editor comment: Figure 2

Figure 2 (the revised version). Similar to the above, what is the population-threshold/criteria for a neighborhood to be presented in the figure as 'with UO residence'? Please state clearly. E.g. Kiryat Yovel/Arnona are different from Har Nof. The figure caption as a whole is not clear, please revise.

Why showing the instrumental <2 Md earthquakes? They are irrelevant to the seismic risk, are not the one presented in Fig. 1a and are not defining seismic zones. Consider omitting them. I am not sure the map in the background is the one to present. It shows local geological conditions of ground amplification.

Authors' response:

We revised the figure to include only ultra-Orthodox neighborhoods in Jerusalem. An ultra-Orthodox neighborhood is defined as a neighborhood where over 50% of the

Jewish population aged 15 or older are ultra-Orthodox (Korach and Choshen, 2020, p. 25). This criterion is now included in the figure's caption.

The figures' captions were edited.

Following the suggestion, the $M < 2$ earthquakes were removed and only a single $M > 3$ earthquake is presented. This earthquake is sufficiently large to be felt.

The aim of showing a ground amplification map is to emphasize that in some ultra-Orthodox neighborhoods there may be excessive shaking that could risk the residents.

Authors' response to Referee 1

Referee comment: Abstract

The abstract outlines the findings of the survey and interviews, but the last sentence does not outline any new idea.

Authors' response:

We concluded the abstract by stating the uniqueness of this research: it studies a religious group that is also a cultural minority and therefore requires special adaptations. This research offers a perspective on the complex reality of hazard preparedness in a religiously diverse country and its conclusions are applicable to other countries and natural hazards. We also listed some of the key adaptations suggested.

Referee comment: Introduction

Please rewrite with more specific and more precise data and observations.

Authors' response:

We rewrote the introduction using the following structure: information on earthquake destruction; the significance of the research topic and the research gap; the goal of our research; the research questions; summary of the main argument. We believe that this new structure reflects more precisely the main issues that are discussed in the article.

Referee comment: Earthquake preparedness among marginalized minority groups and religious communities

Due to the title of the paper, this part should be rewritten to focus only on religious communities of the world or of the region, and not on 'marginalized minority groups'.

Authors' response:

We rewrote this section (2.1) focusing on disaster preparedness in religious communities, as described in past literature. We discussed the impact of religion on the three phases of an earthquake: the preparation, emergency, and restoration phases. We included suggestions from past literature on how to improve the response of

religious communities during these stages. We used additional sources such as Ngin et al., 2020; Waitzberg et al., 2020; Wilkin et. al, 2019, among others.

Since the social group that we study is also a minority in its country, we briefly listed several characteristics of minorities that intersect with religion and religiosity and have a great impact on disaster preparedness.

Referee comment: The Jewish Ultra-Orthodox Sector

Does the word "sector" mean that the JUO community live in a specific area? As it is not well known in Europe for instance, please also precise if the JUO have a specific language, etc.

Authors' response:

Most ultra-Orthodox people live either in towns of their own or in closed community neighborhoods within diverse cities.

Most of the ultra-Orthodox people are Hebrew speakers, although some of the communities still speak Yiddish as their first language.

We added this information in section 2.2.

Referee comment: Earthquake Hazard in Jerusalem

Please add a figure showing Israel, Jerusalem, and fault lines with dots or stars illustrating historic and instrumental earthquakes with intensities or magnitudes. Make a zoom on the eventual JUO sector of Jerusalem and eventual seismic zoning (if it does exist) and eventual shaking maps (if they do exist): the aim of this demand is to illustrate the specific vulnerability of the people and buildings

Referee comment: Figure 1

in an inset, show map of Israel + Jerusalem location + any specific JUO sector Table 1: precise 'epicentral' or 'maximal' or 'downtown' or 'whatever' intensity

Authors' response:

We added two figures that demonstrate the specific vulnerability of the people and buildings of the ultra-Orthodox society:

Figure 1 - instrumental earthquakes ($M > 3$) were added (Figure 1b); historical earthquakes are shown in Figure 1a. In Figure 1b the dominant faults are marked, as well as settlements with significant ultra-Orthodox population.

Figure 2 - a map of Jerusalem with ultra-Orthodox neighborhoods, calculated seismic intensities (Avni, 1999), zones of predicted ground amplification (Salamon et al., 2010), and instrumental earthquakes $M > 3$ in Jerusalem.

Referee comment: Survey

How many questionnaires were sent OR give a percentage of responses (can help distinguishing persons interested in preparedness who could later be used as vectors of information), see line 337

Authors' response:

The response rate was around 90% for the in-person interviews. The response rate for the online questionnaire is undefined since it was distributed via a free link. We added this information in section 3.1.

Referee comment: Results

Please simplify and re-order the answers.

Authors' response:

We revised the results section – including quantitative and qualitative results – to make this section clearer. We simplified and re-ordered answers and elaborated on the demographics of the respondents. We added data regarding the community's level of preparedness, the negative and positive effects of religion on preparedness, and ways to improve preparedness. Furthermore, we added the translated quantitative questionnaire (Appendix A), qualitative interview guide (Appendix B), and tables with quantitative findings (Appendix C). Consequently, we believe that it is now much easier to follow the results.

Referee comment: Quantitative findings

Help the reader with graphs, pie charts etc.

Authors' response:

We included diagrams to illustrate the main findings (Charts 1-3). For instance, we added a diagram to summarize the respondents' level of belief regarding the occurrence of a disastrous earthquake in the near future (Chart 1).

Referee comment: Qualitative findings

- Outline the answers of the religious leaders and key figures of the JUO community, for they could become vectors of preparedness information.
- Family names of safety officers are cited, is it common and accepted by the so-called persons, and is it allowed by the NHESS journal?

Authors' response:

- In the findings section, we added more empirical data based on the answers of religious leaders, rabbis, and educators, particularly in the context of how they could become vectors of preparedness information (sections 4.2.1, 4.2.2, 4.2.3). Further, the answers of the respondents are summarized in a revised SWOT analysis (Table 3) and in clearer and revised points in the conclusion section. Our recommendations are also deducted from the answers of the religious leaders and key figures that we interviewed.
- All the research participants' names in the manuscript are pseudonyms. We clarified this in section 3.2.

Referee comment: Discussion and Conclusions

The discussion needs to be reworked, also focusing on religious minorities. The SWOT analyze is a very good idea that could be more developed to offer preparedness perspectives based on the strong social capital of the JUO. A good perspective would be to submit preparedness ideas to interviewed religious leaders: then emphasis could be put on advices in hardware stores, simple and cheap home security (furniture organization and securing, basic rescue kits for the family), practical skills based on the specific neighborhood solidarity in the JUO, the organization of participatory experiences by the religious authorities for instance.

Authors' response:

We revised the discussion focusing on religious minorities as suggested. We reviewed the level of awareness and preparedness of the ultra-Orthodox society and compared the findings to the literature on other religious groups. We discussed the community's unique characteristics and explained how they may increase preparedness or hamper it. We also compared the ultra-Orthodox population's level of knowledge and readiness to prepare for an earthquake to that of the general Israeli public (Ya'ar et al., 2015) (Chart 3).

We developed the SWOT analysis in accordance with the referee's recommendation, emphasizing the potential contribution of the ultra-Orthodox society's strong social capital. We elaborated on this potential contribution in the findings section as well (in section 4.2.3: "Leveraging Solidarity"). We thank the reviewer for the useful ideas for upgrading preparedness that we incorporated in the manuscript.

Authors' response to Referee 2

Referee comment: Earthquake Hazard in Jerusalem

Section 2.3 does not present the state-of-the-art knowledge and understandings regarding earthquake hazards and damage in Jerusalem. For example, Avni (1999) presented detailed lists and reports of what had happened in Jerusalem during the 1927 earthquake; Salamon et al. (2010) conducted earthquake hazard evaluation for Jerusalem; Zohar et al. (2017) presented updated list of earthquakes and the damage they cause in Israel, including in Jerusalem. With this respect, Section 2.3 and Table 1 should be revised thoroughly.

Authors' response:

The detailed information of Avni, 1999 (written in Hebrew) had been translated and summarized at our initiative in Hough & Avni (2011) which we cited. Following the referees' suggestions, we use some of the detailed information from Avni (1999) together with the work of Salamon et al. (2010). The manuscript was updated using the recommended articles:

Figure 1 - instrumental earthquakes ($M > 3$) were added (Figure 1b); historical earthquakes are shown in Figure 1a. In Figure 1b the dominant faults are marked, as well as settlements with significant ultra-Orthodox population.

Figure 2 - a map of Jerusalem with ultra-Orthodox neighborhoods, calculated seismic intensities (Avni, 1999), zones of predicted ground amplification (Salamon et al., 2010), and instrumental earthquakes $M > 3$ in Jerusalem.

Referee comment: Survey

- Lines 256-7: "We then created a shortened version of the questionnaire to spread via an online form." However, in lines 371-2 it is said: "Most people do not own a television at home, and many do not have access to the internet or the radio." The reader may understand that those who replied online do not represent that group?
- Likewise, there is a need to show that the group of interviewees (228 responses) does represent the ultra-Orthodox group (one million), so that the results of this study can be generalized and represent the group.

Authors' response:

- Regarding internet access, more than half of the respondents had no smartphone or had a smartphone with limited accessibility to internet content for religious reasons (Table 2). Of those who did not own a smartphone, 69% answered the questionnaire via in-person interview. However, 31% of the non-smartphone owners answered the online form; this implies that many ultra-Orthodox people have (albeit limited) internet access. It should be noted that limited internet access was one of the considerations for choosing in-person interviews for most of the respondents. According to Cahaner and Malach (2019, p. 69), 49% of the ultra-Orthodox adults use the internet, in comparison to 89% among non-ultra-Orthodox Jews in Israel. This information was added in section 4.1.1.
- In the survey, we used non-probability sampling that may not represent the entire ultra-Orthodox population in Israel. There were only 288 respondents, and there was an over-representation of men. The average age was young, and a great majority of respondents lived in Jerusalem and its surrounding areas. However, in our opinion, our sample also has considerable advantages. First, the in-person interview survey was conducted by ultra-Orthodox or Orthodox surveyors, enabling us to reach out to ultra-Orthodox people who would probably refuse to respond to a telephone survey from an academic institution. A telephone survey, which is faster and simpler, has a lower response rate and might involve considerable bias when it comes to the ultra-Orthodox public. Second, the survey conducted in face-to-face interviews allowed a very long and detailed questionnaire to be answered. It allowed the elaboration of questions and answers, ensured that the questions and answers were understood, and avoided offhand answers. None of this happens in a telephone or internet survey. Third, focusing on particular communities, such as the ultra-Orthodox communities in Jerusalem and its surrounding areas, allows a deeper understanding of their needs and challenges and enables the possibility of working with them over time. For example, it allows efficient training in these communities, like the training led by dozens of our ultra-Orthodox students in several ultra-Orthodox communities in Jerusalem, after we trained them (as now indicated in sections 3.2 and 4.2.3: Adapting the State's Trainings). Last, the young people interviewed either had or

were about to have children. We have learned from the literature that children's education is one of the most impactful tools in disaster risk reduction. Hence, we wanted to work with these young people. This explanation now appears in the Discussion (section 5).

Referee comment: Results (general comment)

Overall, the raw data is not presented and the little that is shown does not allow the reader to follow and repeat the results and the final conclusions. The raw data should be presented in full, in tables and diagrams.

Author response:

Please see the two subsequent responses below.

Referee comment: Quantitative findings

Quantitative analysis:

1. There is a need to present the online questionnaire in full, maybe as an appendix.
2. Please present the demography of those who responded and filled the questionnaire, i.e. the information relevant to this study such as age, gender, income, education, area of living, social subgroup, etc. This of course should be kept within the confidentiality and anonymity promised to the reviewees, but still allow sufficient transparency of the database. Section 4.1.1 is not enough.
3. Please report how many forms were distributed against how many were replied and filled.
4. The findings from the questionnaires should also be presented in full as a background for the analysis of the results and the discussion.
5. It is not possible to evaluate how much the level of knowledge and awareness of the ultra-Orthodox group differs from the 'reference standard' of Israel. There is a need to present the 'common' level of knowledge in Israel, and by comparison, show the difference (sections 4.1.2, 4.1.3).

Authors' response:

We thank the referee for this helpful comment; we have added all that was recommended.

We included diagrams to illustrate the main findings (Charts 1-3). For instance, we added a diagram to summarize the respondents' level of belief regarding the occurrence of a disastrous earthquake in the near future (Chart 1).

We updated and elaborated on the demographics of the respondents (age, gender, marital status, children, economic status, education, area of living, social subgroup, and type of mobile phone they own). This information appears in section 4.1.1 and Table 2.

We added substantial quantitative and qualitative data regarding the community's level of preparedness. Moreover, following the referee's advice, we added the questionnaire in Appendix A and the quantitative findings in Appendix C.

The response rate was around 90% for the in-person interviews. The response rate for the online questionnaire is undefined since it was distributed via a free link. We added this information in section 3.1.

In the Discussion and in Chart 3, we compared the ultra-Orthodox population's level of knowledge and readiness to prepare for an earthquake to that of the general Israeli public as found by Ya'ar et al. (2015).

Referee comment: Qualitative findings

1. Even though the interviews were open, there is a need to show the main leading issues and questions, as well as the answers, at least in a schematic way. Otherwise, there is no way to infer and conclude the systematic attitude or approach of the examined population.
2. The demography of those who participated in the open interview should also be presented. Which segment of the ultra-Orthodox group do they belong to? Does this segment represent the entire ultra-Orthodox group?
3. Please note how many people were approached against how many were interviewed.

Some sections or paragraphs seem to belong to the Introduction rather than to the results, e.g. lines 382-390, 402-404. In any case, such facts or statements (e.g. lines 389– 90: ". . . most ultra-Orthodox schools still do not allow military personnel to conduct trainings") should be supported by a proper source. Sometimes it is not clear whether the given statement refers to a direct outcome of this study? For example, lines 395- 398 regarding the "Low Socioeconomic Status." Lines 442 – 444: belong to technology section in lines 481?

Authors' response:

Regarding stakeholders:

1. We enclosed the interview guide (qualitative questionnaire) as Appendix B. The answers were analyzed thematically and are now summarized in clear and straightforward subsections in section 4.2. We incorporated additional representative qualitative data (citations from interviews and focus groups) to allow an in-depth understanding of the research participants' approach. Also, their answers are concluded schematically in the revised SWOT analysis and in points in the Conclusion section.
2. The interviewees consisted of 16 relevant national-level policy and decision makers (e.g., in the Home Front Command, Ministry of Health, Ministry of Education, National Steering Committee for Earthquake Preparedness, etc.), 10 officials in rescue organizations, and five religious leaders and key figures in the ultra-Orthodox community.

Of the interviewees, 17 described themselves as ultra-Orthodox but did not specify the community they were affiliated with; the rest were secular or religious but not ultra-Orthodox.

In addition, focus groups were held with the rescue organization Magen David Adom, ultra-Orthodox educators and teachers, and an ultra-Orthodox organization for people with disabilities.

We included this information in section 3.2.

3. We approached approximately 41 stakeholders, 31 of whom agreed to be interviewed (75% response rate).

All the information that is written in section 4.2 is based on the qualitative results deducted from the interviews and focus groups with relevant stakeholders. Still, in order to clarify the results, we made the changes recommended by the referee:

- Section 4.2.1, paragraph on Insularity of Educational Institutions: We added supporting sources regarding the work of the Home Front Command in the education system. We added quotes from interviewees affiliated with the Home Front Command and the Ministry of Education supporting our statements.
- Lines 402-404 (in the previous version): The interviewees talked about characteristics of the ultra-Orthodox community that may create a positive effect on the preparation and emergency phases of an earthquake. Lines 402-404 introduce this section.
- Lines 395-398 (in the previous version): This paragraph reflects the assertion of the interviewees describing why the low socioeconomic status that characterizes the ultra-Orthodox society may hamper earthquake preparedness. We edited this paragraph to clarify this point.
- In the subsection "Adapting Technologies" we recommended that state authorities change technologies to be religiously appropriate. In the subsection "Soliciting Support" we recommended approaching community leaders and receiving their support in all areas of disaster management, including developing various technologies. The example of sending text messages to call-only phones is not a religiously appropriate technology and therefore requires the support of community leaders. We feel like the right place for this example is in the subsection "Soliciting Support."

Referee comment: Discussion and Conclusions

Section 5 is hard to follow. There are issues that belong to the introduction, discussion, conclusions and recommendations, and I got confused which is what. For example, the content in lines 491-495 sounds reasonable, but is it a result of this work or just ideas taken from the given references. Sometimes the phrasing seems to 'hide' the finding of this study, for example, lines 489-491: "Past research has much to say regarding how emergency preparedness among marginalized communities can be improved, including both conduct during emergencies as well as recovery efforts

following disasters. Many of our findings support this literature." I think that this should be rephrased the other way around: first state in your own words what you have found and then discuss whether it supports (or not. . .) past research and give the appropriate reference. The main understandings, outcomes and suggestions are scattered along the text and thus I would recommend splitting Section 5 into three: Discussion, Conclusions and Recommendations.

Conclusions

I recommend summarizing the actual findings of this work as independent statements, rather than mentioning that: "Many of our findings support this literature. . .".

Recommendations

Although the recommendations (e.g. lines 549-55) are part of the conclusions, I suggest listing it also in bullets or in a table, so as the authorities, who would (or should) be interested to implement the outcomes of this work, get to the point simply and easily

Authors' response:

We thank the referee for this helpful recommendation. As suggested, we split the section "Discussion and Conclusion" into three sections: "Discussion," "Conclusion," and "Recommendations." We thoroughly revised the discussion, stating our findings and then discussing whether they support past research. We reviewed the level of awareness and preparedness of the ultra-Orthodox society and compared the findings to the literature, including to a previous study regarding the general Israeli population. We discussed the community's unique characteristics and stated how they may increase preparedness or hamper it.

The research findings are concluded in the "Conclusion" section. Our research questions included three main themes: the actual state of earthquake preparedness in the ultra-Orthodox society, characteristics that may hinder or promote preparedness, and ways of improving preparedness. The findings from the first two questions are summarized in a revised SWOT analysis that we further developed (Table 3). The findings from the third question are summarized in bullets in the "Conclusion" section.

As suggested, we listed our recommendations in a separate section (7) using a clear bullet format.

Referee comment: Discussion and Conclusions

Oversimplification of the situation? Lines 514-15 state that "Given that the ultra-Orthodox constitute a religious minority in Israel, the state authorities' representation of these communities is minimal." The status of the ultra-Orthodox minority in Israel is unique. On one hand, they are a significant part of the government, sometimes even the balancing power, and are able to achieve much influence, beyond their relative share in the population. On the other hand, they refrain from accepting the Israeli authorities as is, and adhere to their own community leaders. They seem to prefer to isolate themselves and maintain their own way of life. In that sense, once you conclude and recommend that (line 554-5): "In addition, community leaders should be asked to give their support before approaching the community they lead," it means (in

the subtext) that the community leaders may share the responsibility for the "... low level of hazard knowledge and a high level of disbelief that a devastating earthquake would occur in their area in the near future." (lines 39-40). As a result, a possible recommendation could be that instead of authorizing "... local non-governmental organizations official responsibilities in the area of earthquake. . ." (line 553), the local community leaders should authorize the formal Israeli authorities the responsibilities in the area of earthquake. This is a very complex situation and it means that improving the level of knowledge and awareness in this minority group is not just a simple list of 'to do.'

Authors' response:

We appreciate the referee's criticism regarding the oversimplification of the situation. We deleted the cited sentence in lines 514-515 (in the previous version) regarding the minimal representation of the ultra-Orthodox communities in state authorities. In the revised manuscript, the presentation of the complex relationship between the state and the ultra-Orthodox society is more subtle and nuanced. Indeed, as the referee points out, this relationship often includes a high level of suspicion by ultra-Orthodox communities towards state institutions and authorities, as well as these communities' preference to adhere to their own community leaders. Moreover, we agree with the referee that the local community leaders share the responsibility for the current low level of hazard knowledge, and this is now incorporated in the Discussion.

In the revised manuscript we emphasize the urgent need to establish a reciprocal and continuing dialogue and collaboration between the relevant state institutions and ultra-Orthodox community leaders. For this purpose, both parties should acknowledge the necessity to build trust and joint work networks to improve the level of preparedness. The lack of trust and collaboration have had severe ramifications during the COVID-19 pandemic. Furthermore, we now quote our research participants' opinion regarding the impact that a joint statement of rabbis and experts on earthquakes may have on the preparedness of the ultra-Orthodox society. Based on the qualitative results, we propose that a delicate balance seems to be needed between the ultra-Orthodox community autonomy, on the one hand, and supervision and a strict professional standard defined by state authorities, on the other hand.

We hope that we now better reflect the complexity and entanglement of the situation in the sections Results, Discussion, Conclusion, and Recommendations.

Referee comment: Referencing

Many statements sounds reasonable, however, they need to be supported by a reference or source of data, e.g. line 90; lines 209-210: "With regard to earthquake preparedness, most members of the Jewish ultra-Orthodox society in Israel live in . . . buildings that do not meet the standards for earthquakes."

Authors' response:

We added supporting references to various statements and deleted some other statements. For example, for the statement in lines 209-210 (in the previous version), we now provide the Central Bureau of Statistics' data (2019) regarding the density of the Jewish ultra-Orthodox population (1.35 persons per room) in comparison to the density of the Jewish secular population (0.71 persons per room).

Line 90 (in the previous version), "marginalized social and cultural groups are more vulnerable to natural disasters than majority groups," has been removed from the revised literature review which now focuses more on religion and less on marginalization, following Referee 1's suggestion.

Referee comment: References not mentioned

Avni, R., 1999. The 1927 Jericho Earthquake, Comprehensive Macroseismic Analysis Based on Contemporary Sources. (PhD.). Ben Gurion University, Beer-Sheva.
Salamon, A., Katz, O. and Crouvi, O. (2010). Zones of required investigation for earthquake-related hazards in Jerusalem. *Natural Hazards*, 53: 375-406. Zohar, M., Salamon, A. and Rubin, R., (2017). Earthquake damage history in Israel and its close surrounding - evaluation of spatial and temporal patterns. *Tectonophysics*, 696: 1-13.

Authors' response:

We thank the referee for suggesting these references. The detailed information of Avni, 1999 (written in Hebrew) had been translated and summarized at our initiative in Hough & Avni (2011) which we cited. Following the referees' suggestions, we use some of the detailed information from Avni (1999) together with the work of Salamon et al. (2010) and cite both in the references to the text and Figure 2.

Conclusion

To conclude, we addressed all the issues raised by the Handling Editor and the two referees. We would like to thank them again for the work they invested in reviewing our manuscript. We truly believe that the review process substantially contributed to the article and we hope that the current version will be accepted to *Natural Hazards and Earth System Sciences*.

Sincerely,

The authors

Earthquake preparedness among religious minority groups: The case of the Jewish ultra-Orthodox society in Israel

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Abstract. To work effectively, emergency management systems that deal with earthquake threats must consider the needs of religious minority groups. Studies regarding earthquake preparedness among marginalized social-cultural groups can highlight ways to improve it. Recently, some research has focused on the effect of religion on earthquake preparedness. However, very few studies have connected the two and examined earthquake preparedness among religious groups that are also a social-cultural minority in relation to the authorities. This study examines the effects of religious beliefs and customs on earthquake preparedness among the Jewish ultra-Orthodox community in Israel, a significant religious minority with unique social, cultural, and economic characteristics. Data were obtained using mixed methods including a survey, in-depth interviews, and focus groups. Results demonstrated that the majority of the community had a low level of hazard knowledge and a high level of disbelief that a devastating earthquake would occur in their area in the near future. This is despite a long-documented history of earthquakes that devastated the Levant and, in particular, dwelling locations for this community. Low exposure to media, insularity of educational institutions, and suspicious attitudes toward state authorities were shown to hinder preparedness, while strong social capital improved it. This research is unique for it studies a religious group that is also a cultural minority, which, therefore, requires special adaptations. Some of the recommended adaptations include receiving support from religious leaders, publishing preparation guidelines in proper settings, working with civilian organizations that are seen as legitimate by the religious communities, and adapting technologies and information to be religiously appropriate. To conclude, this research offers a perspective on the complex reality of hazard preparedness in a religiously diverse country. The conclusions are applicable to other countries and natural hazards.

1 Introduction

Earthquakes often occur with little to no warning and have the potential to cause enormous amounts of destruction and death. The damage is mainly due to the collapse of man-made structures, such as buildings. Therefore, the disaster is not only the result of the severity of the earthquake ground motion (for example, magnitude, depth, and distance), but also of the distribution and size of the population and the degree of earthquake preparedness (Bertero and Bozorgnia, 2004; Mesgar and Jalilvand, 2016; Takagi and Wada, 2018).

Many countries have developed emergency management systems to address this threat. These systems must consider the needs of minority groups to work effectively for the society as a whole. Some research regarding response to disasters among marginalized social-cultural groups has been offering ways to improve preparedness (e.g., Maldonado et al., 2016; Shapira et al., 2018; Uekusa, 2019; Zhang, 2020). However, only few studies have focused on religious minority groups (e.g., Gianisa and Le De, 2018; Ngin et al., 2020), despite the fact that religious characteristics, in some cases, clearly have an impact on emergency preparedness.

The goal of our research is to examine the effect of religious beliefs and minority status on earthquake preparedness and recommend ways for improving risk mitigation in religious minority communities. To achieve this goal, we studied the Jewish ultra-Orthodox community in Israel, a significant religious minority in Israeli society that stands out with unique social, cultural, and economic characteristics. The research questions include the following: What is the level of preparedness in the Jewish ultra-Orthodox community? Which characteristics have a positive effect on preparedness and which have a negative effect? How can the level of preparedness and conduct during an emergency be improved?

The findings establish that religious minority groups have many characteristics and worldviews that significantly influence all stages of disaster response. Policymakers must take these features into consideration when attempting to upgrade the preparedness of religious groups in their country. This case study adds a unique perspective to the study of earthquake preparedness, which can help upgrade preparedness in other societies worldwide.

2 Literature Review

2.1 Disaster Preparedness in Religious Communities and Minority Groups

In recent years, studies have examined the influence of religion on disaster preparedness and response (e.g., Baytiyeh and Naja, 2014; Gianisa and Le De, 2018; Sun et al., 2018, 2019). These studies have shown that religion plays a crucial role in all stages of a disaster, affecting different aspects positively and negatively. Hence, scholars emphasize the importance of considering religious factors and beliefs when attempting to improve disaster management. These factors include the religious community's shared values, traditions, worldviews, goals, strengths, and vulnerabilities (Appleby-Arnold et al., 2018). Religion can impact a disaster from the preparation phase through the emergency phase and extend through the restoration phase.

Regarding the preparation phase, fatalistic beliefs, which are common in many religious societies, may lead to a passive attitude regarding the need for disaster preparedness (Baytiyeh and Naja, 2014; Sun et al., 2018,

2019). Plapp and Werner (2006) demonstrated that in some religious traditions, natural disasters are seen as a divine punishment that cannot be prevented; consequently, none of the preparations called for by the civil authorities are necessary (cf. Sun et al., 2019). A study on disaster preparedness in Martinique found that though an earthquake awareness campaign succeeded, there was still a gap between the increased awareness and actual level of preparedness. This gap can be explained at least in part by religious factors, such as the dominant fatalism embedded in religious and magical beliefs (Audru et al., 2013; cf. Azim and Islam, 2016 in the context of Saudi Arabia). Moreover, some religious communities have minimal exposure to media, which can increase their vulnerability (Ya'ar et al., 2015). However, Gianisa and Le De (2018) showed how religious beliefs can improve disaster preparedness. Muslims, among other denominations, believe that human destiny can be changed by doing good deeds in this life, even though their fate has been predetermined before they were born. This belief encourages people to prepare for a disaster and refrain from being fatalistic.

While attempting to improve disaster preparedness, it is crucial to contemplate religious factors and beliefs. For example, in cultures where fatalistic and submissive attitudes prevail, critical thinking should be emphasized in the educational frameworks (Baytiyeh and Naja, 2014; Yari et al., 2019). In the context of Muslim societies, Azim and Islam (2016) proposed to include certain interpretations of the Quranic sources to support risk mitigation strategies. With regard to the preparation guidelines, it is pertinent to choose proper agents to deliver the information and adjust the content and transformation methods (Mileti et al., 2006). Some suggest collaborating with the religiously affiliated community organizations, which often have a strong impact on all areas of life in a religious society (Baytiyeh, 2017; Gianisa and Le De, 2018), and partnering with trusted community leaders (Gil-Rivas and Kilmer, 2016). Similarly, Audru et al. (2013) illuminated the need to anchor campaign efforts in local culture and religion, using the local language and knowledge, and by developing educational techniques tailored to the needs of specific groups. Preventative training activities and information campaigns in the education system are some of the most common and effective strategies in disaster risk mitigation (Lucini, 2014; Smawfield, 2013). Last, decentralizing disaster risk reduction policies and measures, thereby increasing the role of local government in decision-making, is also effective in improving preparedness (Grady et al., 2016).

A growing body of evidence has established that appropriate behavior during **the emergency phase** can save many lives and reduce property damage. In the Italian context, Lucini (2014) showed how cultural approaches of diverse social groups can affect their behavior. Studies have shown that religion can have a major impact on the emergency phase. For example, religious fatalistic beliefs may lead to passivity during the emergency (Baytiyeh and Naja, 2014; Sun et al., 2018). On the positive side, religious beliefs and practices may serve as a vital source of spiritual support in crucial times by bonding people together and helping them cope with the disaster successfully (Gianisa and Le De, 2018; Sun et al., 2018). Gianisa and Le De (2018) described that following the 7.6-magnitude earthquake that hit Padang city in Indonesia in 2009, prayer positively improved people's coping abilities by giving them the reassurance that every event is caused by God, a belief that provided them with the strength to face the event. Moreover, a cohesive religious community often has a strong social network and social capital, which can optimize emergency management. Following an earthquake, for example, community members will take action even before the emergency forces arrive (Aldrich, 2011; Gianisa and Le

De, 2018). During the emergency phase, it is vital for the state to support and coordinate emergency response at the local level, since local response is crucial at this stage of a disaster (Alexander, 2010).

The **restoration phase** refers to resilience, which is the ability of communities and individuals to cope relatively well during and after a crisis. Resilience includes the ability to rebuild, recover, and secure livelihoods, and return quickly to normalcy. Aldrich (2011, 2012) maintained that the resilience of a community primarily depends on its social capital or, in other words, the resources embedded in its social networks. He showed that social capital acts as the strongest predictor of population recovery after a catastrophe, for example, by providing informal insurance and housing (see also Wilkin et al., 2019). This factor is particularly significant in many religious communities that have very strong social networks, such as the Jewish ultra-Orthodox community in Israel (Caplan, 2007; Caplan and Stadler, 2012). As Sun et al. (2018) have explained, a shared belief system can generate social capital and network-linked advantages, which can become a vital source of support. This strength ought to be leveraged in the restoration, reconstruction, and rehabilitation phase.

Ngin et al. (2020) found that Cambodian and Thai Buddhist temples in Auckland, New Zealand have a pivotal role in assisting their members to recover from natural hazard events. These researchers contended that faith, culture, and social bonding are the main factors that allow the temples to perform their role. These findings support the assertion that religious institutions' social capital plays a decisive role in urban resilience. Likewise, in the context of Tibetan Buddhism, Sun et al. (2019) found that temples and the Buddhist clergy significantly helped Tibetans cope with an earthquake disaster. These researchers showed that belief in Tibetan Buddhism had a detrimental and constructive effect on the Tibetans' behavior. In the context of the 2005 earthquake in Pakistan, Cheema et al. (2014) found that mosques have been entry points to access communities during response and relief. One mosque even facilitated public and private sector activities during the recovery and restoration phase. Mosques had a similar role in the aftermath of the 2004 Indian Ocean Earthquake and Tsunami in Aceh, Indonesia (McGregor, 2010). These findings underscore the need to engage community-based religious institutions and their leaders in the recovery phase and create partnerships between them and the international organizations to win the local communities' trust and use local knowledge and resources (Cheema et al., 2014). Scholars have also highlighted several factors that impede the potential contributions of community-based religious institutions, such as gender inequality and political controversies (Cheema et al., 2014), language barriers, generational divides, and internal divisions (Ngin et al., 2020). Furthermore, religious beliefs can be an obstacle in relocating people, building back differently, or making other changes to livelihoods to reduce exposure to future hazards (Schipper et al., 2014).

Religious groups may also be minorities in their countries, and religion and religiosity often intersect with socioeconomic status, as clearly demonstrated by the case examined in this study. Therefore, it is pertinent to examine the marginalization of certain religious groups, which can greatly impact earthquake preparedness and raise vulnerability. Maldonado et al. (2016) found that minority groups, such as Hispanic immigrants in the United States, show a low level of self-protection and preparedness, low level of hazard knowledge, and high level of risk perception, all of which reflect a high degree of vulnerability. It is generally accepted that racial and ethnic minorities and the poor are hit harder during crises and disasters are disproportionately debilitating for disadvantaged social groups, which, therefore, need better preparedness (Lucini, 2014; Maldonado et al., 2016;

Shapira et al., 2018; Spence et al., 2007). Marginalized groups have a harder time accessing information and, consequently, are at greater risk before and after a disaster (Kellman, 2011). Moreover, the guidelines transferred by the mass media may ignore the needs of minority groups, which can lower the level of compliance, such as in the case of COVID-19 in Israel (Kalagy et al., 2020; Waitzberg et al., 2020). In addition, owing to their distrust in the government, minority groups are less likely to take the risk warning messages seriously without confirming them first, especially if these messages were sent out directly by the government (Spence et al., 2007). To conclude, religious groups are often vulnerable due to intersecting factors such as poverty and minority status, like the Jewish ultra-Orthodox society in Israel.

2.2 The Jewish Ultra-Orthodox Society

In 2019, Israel's ultra-Orthodox population reached 1,125,000 million people, comprising 12.5% of the country's total population (Cahaner and Malach, 2019). Ultra-Orthodox Jews adhere to a strict interpretation of Jewish religious law. Religious precepts regulate all aspects of their daily life. Their life values, educational frameworks, and culture distinguish them from all the other groups in Israeli society. The ultra-Orthodox Jews strive to create a "scholarly society" where men are totally immersed in studying Jewish religious law. Some other values and norms of the Jewish ultra-Orthodox society include a family-centered lifestyle, insular communal life, conservatism, extensive social control of members' behavior, special dietary laws, gender segregation, strict dress codes, and respect for the leadership of prominent rabbis in all areas of life. The Jewish ultra-Orthodox society is characterized by high population growth, poverty, very limited participation in the army draft, and a separate education system that focuses on religion, with a minimal presence of secular subjects. Though many tend to view the ultra-Orthodox population as homogeneous, it is in fact composed of several different communities belonging to different factions that diverge in their worldview, lifestyle, custom, religious leadership, and economic and political institutions (Cahaner and Malach, 2019; Caplan, 2007; Caplan and Stadler, 2012; Gal, 2015; Vardi et al., 2019). Most of the ultra-Orthodox people are Hebrew speakers, although some of the communities still speak Yiddish as their first language (Assouline, 2017). Most ultra-Orthodox people live either in towns of their own or in closed community neighborhoods within diverse cities (Regev and Gordon, 2019; Shahak, 2017) (Figure 1). Recently, there has been a rise in ultra-Orthodox participation in the general Israeli economy, society, and civic affairs. This change indicates that a large number of ultra-Orthodox individuals believe that the society should move away from being a "scholarly society" where men are discouraged from joining the workforce. However, this is not the view of the entire ultra-Orthodox population (Caplan and Stadler, 2012; Vardi et al., 2019).

Regarding earthquake preparedness, many Jewish ultra-Orthodox people in Israel live in high-density neighborhoods and buildings that do not meet the standards for earthquakes. According to the Central Bureau of Statistics (2019), the density of the Jewish ultra-Orthodox population is 1.35 persons per room and that of the Jewish secular population is 0.71 persons per room. In Jerusalem, where most of our interviews were conducted, many of the neighborhoods with a majority of ultra-Orthodox residents (Figure 2) do not have earthquake-resistant buildings since they were built before 1980 (Municipality of Jerusalem, 2020), the year in which a seismic building code was introduced in Israel. As most earthquake fatalities result from building collapses (e.g., Coburn et al., 1992), the ultra-Orthodox population is subject to a considerable earthquake hazard.

As indicated above, besides having unique religious features, the Jewish ultra-Orthodox society is also a minority group in their country. As the above literature review indicates, the responses of religious communities and minority groups to natural disasters have been studied to some extent. Yet, to date, very few studies have researched disaster preparedness among religious groups that also constitute a marginalized minority. It seems that this intersection of religion and minority status may create distinct needs in terms of disaster risk reduction — needs that thus far have not been sufficiently addressed. As a religious minority, the Jewish ultra-Orthodox population is more vulnerable to disasters and demands specific adjustments in terms of disaster management. Our research proposes to improve this population's preparedness and resilience by examining the community's characteristics relevant to these matters. We believe that this case study can also be relevant to other religious societies.

2.3 Earthquake Hazard in Jerusalem

Some of the ultra-Orthodox communities in Israel have lived in the vicinity of seismogenic faults for centuries, and suffered severe damage and loss of life. Such is the case for Zefat (Figure 1) that was devastated in the 1759 and 1837 earthquakes (Katz and Crouvi, 2007). We focus our attention on Jerusalem where most of our interviews were conducted. Throughout Israel, the active Dead Sea fault system (DSFS), which separates the Arabian plate from the Sinai-Levant Block (Figure 1) (e.g., Quennell, 1958; Freund et al., 1968; Garfunkel, 1981), exposes the nearby settlements to earthquakes. Since 1900, a number of medium-to-strong earthquakes have caused numerous casualties and extensive structural damage along the DSFS. On February 11, 2004, a small, 5.1-magnitude earthquake occurred on the DSFS northeast of the Dead Sea (Figure 1). It caused minor damage and panic in Jerusalem, 32 km to the west (Hofstetter et al., 2008). The 6.2-magnitude earthquake of 1927 centered north of the Dead Sea (e.g., Avni, 1999; Hough and Avni, 2011; Shapira et al., 1993), killed several hundred people, injured a thousand or more, and destroyed numerous buildings (Figure 1). Since 1927, the population has grown significantly, and so has the number of buildings. Clearly, such an earthquake would lead to far greater damage today. In 1995, a strong 7.2-magnitude earthquake occurred on the DSFS, much farther south in the Gulf of Aqaba (Figure 1). This earthquake was accompanied by more than 10 reportedly felt aftershocks, causing damages to buildings in the towns of Aqaba (Al-Tarazi, 2000) and Eilat (Baer et al., 2008; Shamir et al., 2003). This latest strong earthquake on the same DSFS is a potent reminder that a nearby earthquake would have devastating effects. The population of Jerusalem and its buildings repeatedly have suffered from such earthquakes on the DSFS (Ambraseys, 2009; Guidoboni & Comastri, 2005) (Figures 1, 2). The ever-growing ultra-Orthodox neighborhoods are prone to increased ground shaking during earthquakes (Figure 2).

Table 1 lists historic earthquakes that damaged Jerusalem since Roman times. The locations and intensities of earlier catastrophes, depicted in the Bible or by Josephus Flavius are less certain (Ambraseys, 2009; Guidoboni & Comastri, 2005). The sources of most of these events were likely in the Jordan Valley-Dead Sea sector of the fault system (Figure 1) (Agnon, 2014; Lefevre et al., 2018).

3 Methods

In this research, we used a mixed methods approach that combines quantitative and qualitative methods. This approach allowed us to consider different aspects of the research field from multiple perspectives (Creswell and Plano Clark, 2011). Specifically, this study used convergent parallel mixed methods (Creswell, 2014). The quantitative aspect of the study included closed-ended questions in a survey, and the data were analyzed using statistical tools. The qualitative aspect included a few open-ended questions in a survey, in-depth interviews with key stakeholders, and focus groups with several organizations. Findings from the qualitative data were analyzed using qualitative content analysis and grounded theory, including an iterative search for repeating concepts and ideas (Corbin and Strauss, 2014).

3.1 Survey

We conducted a special-purpose social survey comprising both open-ended and closed-ended questions, which was distributed throughout the general Jewish ultra-Orthodox public. The questionnaire was based on a reliable and validated questionnaire created by Ya'ar et al. (2015), who studied the Israeli public's attitudes toward earthquake preparedness by asking the respondents to indicate the perceived level of earthquake risk and their self-assessed level of preparedness. We edited, processed, and adapted the questionnaire to the ultra-Orthodox society and distributed it to people through in-person interviews. Most of the interviews took place in Jerusalem and its neighboring towns, allowing us a deeper understanding of the residents' needs and challenges and enabling the possibility of working with them over time to upgrade preparedness. Subsequently, we created a shortened version of the questionnaire that was administered via an online form. The questionnaires received 228 responses: 140 through in-person interviews and 88 via the online form. The response rate was around 90% for the in-person interviews. The response rate for the online questionnaire is undefined since it was distributed via a free link (Appendix A).

The answers to the closed-ended questions were analyzed using statistical methods with SPSS (Statistical Package for the Social Sciences). The data collected using the open-ended questions was thematically analyzed both deductively and inductively according to key categories and themes.

The research questionnaire included the following topics: Sociodemographic features (age, civil status, area of living, socioeconomic status, community affiliation); involvement in earthquake preparedness activities; religion and preparedness; preparation in the respondent's home for an earthquake; subjective views on earthquake preparedness; coping capacities; and exposure to information regarding earthquake preparedness.

3.2 In-Depth Interviews and Focus Groups

The research team conducted 31 in-depth, semi-structured interviews based on an interview guide (qualitative questionnaire), without strictly adhering to it (Appendix B). The semi-structured interviews allowed us the flexibility and interactivity of qualitative research, while simultaneously facilitating a greater degree of standardization than more open "field" interviews (Kelly, 2010). The interviewees consisted of 16 relevant national-level policy and decision makers (e.g., from the Home Front Command, Ministry of Health, Ministry of Education, National Steering Committee for Earthquake Preparedness, etc.), 10 officials in rescue organizations, and five religious leaders and key figures in the ultra-Orthodox community. Of the interviewees, 17 described

themselves as ultra-Orthodox but did not specify the community they were affiliated with; the rest were secular or religious but not ultra-Orthodox. For example, from the Home Front Command, three out of the four people interviewed identified themselves as ultra-Orthodox and one as secular. From the United Hatzalah Emergency Service, four out of the six people interviewed identified themselves as ultra-Orthodox. The response rate to the interviews was 75%. The interviews allowed us not only to gain new insights and obtain data from additional perspectives, but also to openly discuss the existing and proposed policy mechanisms and recommendations with key actors in a dialogic and interactive process.

In addition, focus groups were held with the rescue organization Magen David Adom, ultra-Orthodox educators and teachers, and an ultra-Orthodox organization for people with disabilities. Focus group is a moderated group discussion that allowed us to be attentive to the group interaction and the discursive dynamic between the participants (Barbour, 2010).

The interviews and focus groups were recorded, transcribed verbatim, and thematically analyzed both deductively and inductively according to key categories and themes. Pseudonyms are used for participants' names to maintain anonymity.

Finally, this socially engaged research (Golan et al., 2017; Orr, 2016-17) also aimed to promote practical positive change in the level of earthquake preparedness of the ultra-Orthodox community in Jerusalem. Based on an implementation of the research findings, we trained a class of ultra-Orthodox fourth year nursing students at the Jerusalem College of Technology in earthquake preparedness. These students trained numerous ultra-Orthodox families in Jerusalem using a culturally-adapted curriculum. Many of these family members agreed to become "ambassadors" in their community and train other community members using the localized curriculum. The people trained by the students filled out a short feedback questionnaire that allowed us to improve the training.

4 Results

4.1 Findings from the Survey

4.1.1 Demographic Features

The mean age of the respondents was 28, with an over-representation (63%) of men. Segmentation was carried out for each gender separately because of the different educational trajectories for men and women in the ultra-Orthodox education system. Most men graduated Yeshiva (an Orthodox Jewish seminary that focuses on the study of traditional religious texts), while most of the women had academic or nonacademic higher education. The majority (82%) lived in Jerusalem and its surrounding towns. The others lived in other ultra-Orthodox cities (Modi'in Illit, Bnei Brak, Elad) and in mixed cities. The sample represents the major ultra-Orthodox subgroups, including Hasidim, Lita'im, and Sephardim; and other subgroups such as "Olim" (first- or second-generation immigration) and "Baalei teshuva" (secular Jews who returned to practice Judaism). More than half had no smartphone or had a smartphone with limited accessibility to internet content for religious reasons (Table 2). Of those who did not own a smartphone, 69% answered the questionnaire via in-person interview. However, 31%

of the non-smartphone owners answered the online form; this implies that many ultra-Orthodox people have (albeit limited) internet access. It should be noted that limited internet access was one of the considerations for choosing in-person interviews for most of the respondents.¹

4.1.2 Earthquake Preparedness

When asked about the likelihood of a disastrous earthquake occurring in Israel in the next five years, 55% believed that the chances are nonexistent or low. The percentage of disbelief rose to 64% when respondents were asked about the likelihood of an earthquake occurring in close proximity to their living area (Chart 1). To the statement "I do what it takes to prepare for the possibility of an earthquake even if it costs money and requires time," the majority (75%) responded negatively or said that they prepare minimally. Similarly, 81% responded negatively to the statement "I actively look for information regarding earthquake preparedness." Likewise, 77% of the respondents indicated that they did not take any preparedness actions such as stabilizing bookshelves and keeping heavy objects close to the floor, and 52% said that they do not have the equipment available for emergencies. The quantitative findings are presented in Appendix C.

One of the open-ended questions asked the respondents what they would do if an earthquake occurred. Many of the respondents (40%), including those who replied that they did not know the rules of conduct, knew the basic guideline of exiting to an open area. In response to another question, however, most of the respondents (68%) said that they were not aware of the guideline of disconnecting electric and gas switches following an earthquake. Fifty-nine percent of the respondents believed that they did not have the knowledge and aptitude necessary to deal with an earthquake. Around half of the respondents believed that their home did not meet the requirements of the law passed in Israel in 1995 setting a new standard regarding earthquake safety. Only 15% of the respondents who are parents to small children discussed the rules of earthquake emergency with their children. Three percent of these parents practiced the rules with their children. To the question, "Overall, have you prepared for an upcoming earthquake in Israel?" only 6% answered that they have prepared or that they have very much prepared. Men prepared more than women (p value = 0.013, $\chi^2=10.639$). Education, marital status, community affiliation, and hometown did not influence preparation.

4.1.3 Effect of Religion on Preparedness

Regarding the religious views on earthquake preparedness, the respondents were asked in an open-ended question if they believe that there is a Jewish religious obligation to prepare for disasters like earthquakes. Approximately two-thirds (68%) answered positively, with some quoting specific commandments to prove their point — for example, "but you shall greatly beware for your souls" (Deuteronomy 4:15), 7% stated that a leading rabbi must rule on this matter, and 12% answered that they believe that there is no such obligation. When asked more specifically if earthquake preparedness is a religious obligation enforced by the directive that one must guard one's own life (hishtadlus), 46% strongly agreed (Chart 2).

¹According to Cahaner and Malach (2019, p. 69), 49% of the ultra-Orthodox adults use the internet, in comparison to 89% among non-ultra-Orthodox Jews in Israel.

The respondents were asked whether they think that the fact that emergency preparedness guidelines are issued by the national (largely secular) authorities has a negative effect on their community's preparedness level. Twenty percent answered positively, saying that the source of the instructions has a negative effect. Another 20% believed that the source of the instructions has a positive effect on preparedness since it makes people take the guidelines more seriously. Others believe that there is no existing connection between the source of the instructions and preparedness level.

4.1.4 Exposure to Earthquake Preparedness Publications

About half (46%) of the study participants answered that they have been exposed to publications regarding earthquake safety measures through various media such as newspapers, websites, radio, and direct mail. Additional sources of exposure include hospitals, government offices, and schools. [There was a significant positive correlation between exposure to advertisements and preparing for the possibility of an earthquake in Israel \(p value = 0.002\).](#)

4.1.5 Ways to Upgrade Preparedness

We asked the respondents about what could convince or help the ultra-Orthodox public to prepare for an earthquake. Twenty-five percent of the respondents answered that learning of the high probability of an earthquake occurring in their area would convince them to prepare. Other factors they mentioned include having a higher level of awareness, training, advertisements on the subject, the authority of a religious leader and other state authorities, and educating the youth. When asked specifically if an instruction from a religious leader or a ruling according to Jewish law would convince them to prepare for earthquakes, 68% of the respondents said "yes." Thus, the four main ways that respondents identified as effective in raising awareness in the ultra-Orthodox society are as follows: instruction from a religious leader, disseminating information in ways that are adapted to the ultra-Orthodox society, community preparedness efforts, and youth education.

4.2 Qualitative Findings

[A key issue discussed in the in-depth interviews and focus groups was how the religious faith and culture of ultra-Orthodox Jews affect their preparedness.](#) The findings can be divided into three main themes: the characteristics of the ultra-Orthodox society that may have a negative effect during the preparation and emergency phases; the characteristics of the ultra-Orthodox society that may have a positive effect during the preparation and emergency phases; and strategies for improving the preparation and emergency phases. [All the information in this section is based on the qualitative results deducted from the interviews and focus groups with relevant stakeholders.](#)

4.2.1 Characteristics That May Have a Negative Effect

The Jewish ultra-Orthodox society has several characteristics that may have an adverse effect on its level of preparedness for an earthquake and make functioning during emergencies difficult. The characteristics we will discuss in this section include the following: certain aspects of the ultra-Orthodox worldview and guiding

354 philosophy, technological disparities, the insularity of educational institutions, attitudes toward state authorities,
355 and low socioeconomic status.

356 **Worldview and Guiding Philosophy.** In the Jewish ultra-Orthodox society, various religious laws and
357 viewpoints influence emergency preparedness. We identified two basic, ostensibly contradictory perspectives
358 rooted in the Jewish tradition that lead to divergent approaches to emergency preparedness. One perspective can
359 contribute to a religious preference not to prepare for earthquakes, while the other can lead to appropriate
360 preparations. It is the deeply-held belief that everything that happens is God's will and preparation for a disaster
361 cannot change God's decree that leads many ultra-Orthodox individuals to refrain from preparing for disasters.
362 Likewise, some believe that the best way to prepare is through prayer, repentance, and studying sacred texts.
363 Last, some consider preparedness efforts to be implying a lack of trust in God and, therefore, refrain from such
364 activities. Some of these philosophies may make it difficult for the people to efficiently prepare for earthquakes.
365 This point was brought out through the words of Shmuel, one of the leaders of an ultra-Orthodox emergency
366 rescue organization: "During an emergency, we approached members of one ultra-Orthodox community asking
367 for help. They immediately offered to pray, when in fact we were looking for help in rescue operations and
368 evacuating the injured. There is totally a risk factor here that needs to be emphasized ... Part of the ultra-
369 Orthodox community believes that ultra-Orthodox faith and prayer would do more to protect than anything
370 else."

371 *Having said that, some of our interlocutors presented a more complex and nuanced perspective according to*
372 *which their strong belief that everything that happens is God's will does not contradict the need to prepare for an*
373 *earthquake. For example, Bilha, an ultra-Orthodox educator, explained: "We told the students that an earthquake*
374 *is something that God does, and no one can do such a thing but God. If he does it, there is a reason why he does*
375 *it." However, her take was that "It does not contradict the fact that we should learn to be careful and how to*
376 *protect ourselves, and that the authorities should do their job."*

377 **Technological Disparities.** Most interviewees spoke of a prevailing lack of awareness regarding earthquake
378 risk and proper preparation. This may adversely affect functioning during emergencies and make it difficult for
379 the rescue forces to operate. One main cause for this low awareness is the fact that the ultra-Orthodox public is
380 less exposed to technology for religious reasons. Most people do not own a television at home, and many do not
381 have access to the internet or radio. This impedes the preparation and emergency phases of disaster
382 preparedness, since many ultra-Orthodox people are not exposed to information disseminated online. This
383 challenge is outlined by Gershon, an officer at the Israel Defense Force's Home Front Command, which
384 coordinates the government's response in emergency situations, especially regarding the protection of civilians:
385 "Today, despite having the most advanced technology, it is not accessible to most of the ultra-Orthodox sector
386 ... Such communication with the ultra-Orthodox sector is limited. Some of them still use old forms of media
387 such as street posters and leaflets."

388 **Insularity of Educational Institutions.** *In Israel, the military-affiliated Home Front Command invests*
389 *heavily in providing emergency training to children and youth through schools and other educational*
390 *institutions (Home Front Command, 2020). We learned from our interviews with role holders from the*
391 *Home Front Command and Ministry of Education that many ultra-Orthodox institutions do not allow*

the government or military to enter educational institutions to deliver training even on crucial issues such as emergency preparedness. This is a decisive factor that leaves the ultra-Orthodox population less prepared for earthquakes. Gershon from the Home Front Command elaborated on this subject: "Everything related to the Israeli army, especially in our times, hold a lot of tension. It is complex. Very few institutions cooperate with us. The ultra-Orthodox education system usually does not allow military elements to enter." Though the Home Front Command has adapted its curriculum to the norms of the ultra-Orthodox society, most ultra-Orthodox schools still do not allow military personnel to conduct training. Therefore, the majority of the students do not receive any such instruction. Moreover, the Home Front Command has prepared booklets with safety information for students, adapted according to the ultra-Orthodox norms. However, according to Ya'ir, a safety officer at the Ministry of Education, many schools would not use these booklets because they are published by the Home Front Command.

Attitude Toward State Authorities. Opinions among the interviewees differed on the fact that earthquake preparedness guidelines come from the state and military authorities. Some of them insisted that members of the ultra-Orthodox population would not accept directives that come from the army or state institutions, while others believed that the ultra-Orthodox society would respectfully accept these instructions.

Low Socioeconomic Status. A few interviewees stated that the low socioeconomic status that characterizes the ultra-Orthodox society is another factor that may hamper earthquake preparedness. The interviewees reasoned that people immersed in daily survival spend less time thinking about preparing for future emergencies. Furthermore, people with limited means will find it difficult to buy and maintain essential emergency equipment.

4.2.2 Characteristics That May Have a Positive Effect

The Jewish ultra-Orthodox society features characteristics that may improve its level of preparedness and help its functioning in times of emergency. The interviewees talked about certain characteristics of the ultra-Orthodox community that may create a positive effect on the preparation and emergency phases of an earthquake. These characteristics include certain aspects of the ultra-Orthodox worldview and strong social capital.

Worldview and Guiding Philosophy. As mentioned earlier, there are two Jewish perspectives that result in opposing approaches to emergency preparedness. In the previous section, we explained a prominent view that has a negative effect on preparedness. Another set of Jewish laws, however, may actually have a positive effect. A large number of interviewees said that the ultra-Orthodox society is very strict about the religious precept to keep away from danger and threats. They pointed out that in Judaism, one may not rely on miracles to stay safe. Many of our interlocutors argued that the subject of preparedness would be acceptable if it were presented in such terms. Many research participants referred to specific Torah sources in their explanation of the duty to prepare for an earthquake. Akiva, an ultra-Orthodox educator, explained: "The Torah says: 'Be wholehearted

with the Lord, your God,² ... a person should be concerned about the present and not be paranoid. However, 'You shall greatly beware for your souls.'³ It requires us not to underestimate anything that can harm us, no matter how close or far away it is. One should not panic; one should not be haunted by this thing. But, to prepare for it ... is part of the Halakhic requirement" (The Halakha is the collective body of Jewish religious laws). Rabi Levy, a prominent rabbi that we interviewed, said that learning about earthquake preparedness can be considered as Torah study (Jewish religious study) and, therefore, can be viewed as legitimate: "Caution is in itself a learning that I would consider to be Torah study." The research participants proposed to emphasize and leverage this religious point of view.

Strong Social Capital. The ultra-Orthodox community has a high level of social solidarity and sustains many community organizations that provide medical and financial aid. The qualitative data reflect a general agreement that one of the strengths of the ultra-Orthodox society from a disaster risk reduction point of view is its high level of social involvement. A number of respondents noted that in the first few days after a potential earthquake, they expect most of the aid to come from within the community and not from the authorities. For this reason, a cohesive and engaged community, such as the ultra-Orthodox community, has a higher chance of reducing harm in the emergency phase and thriving in the recovery phase. David, a senior official in an NGO specializing in rescue and recovery, described how a large, connected ultra-Orthodox community can improvise and manage during a disaster: "From the perspective of manpower, we have more organized and dynamic manpower than any other place. There are between 70,000 and 130,000 Yeshiva students and young men. There is a clear hierarchy. They can mobilize recruitment, know how to organize huge events, and know how to translate that to improvisation and emergency assistance."

4.2.3 Strategies to Improve the Preparation and Emergency Phases

In this section, we will focus on those methods discussed by the participants that can help improve the ultra-Orthodox population's earthquake preparedness and functioning during the emergency. The main ways to improve these stages include the following: providing information, [demands from state authorities](#), soliciting support from religious leaders or community figures, school training, family activities, advertising, adapting the state's training to the ultra-Orthodox public, empowering the ultra-Orthodox organizations in leading preparedness efforts, [leveraging solidarity](#), and adapting technologies.

Providing Information. Many interviewees agreed that it is essential to invest in explaining to the public "what an earthquake is." Various ways were suggested to publicize the information, including children books, community leaders, workshops for parents, conferences, and existing community-based organizations. Several respondents said that this process should emphasize the importance of moving to an open area during an earthquake.

Most of our interlocutors were knowledgeable about the earthquake risk because of their professional role. However, those who did not think that the risk is real demonstrated the need for providing and disseminating

²Deuteronomy 18:13

³Deuteronomy 4:15

information. Thus, when we asked the ultra-Orthodox teachers whether a ruling from rabbis would help improve preparedness, they said that it would help, but is unnecessary because Halakhic rulings deal with more important issues: "It is not one of the matters of utmost importance that currently preoccupies the ultra-Orthodox public ... If there is a ruling, then it will probably have a greater impact; but, our rulings focus on more relevant issues now." Another teacher supported her: "Come on, in the Land of Israel, we hardly suffer from earthquakes. So, there is nothing much to worry; we are not like Japan." The precondition for applying effective methods like rabbis' ruling is increasing the public understanding of the risk.

Moreover, rabbis and community leaders felt that they themselves do not know enough about the subject and were willing to learn more to be able to take action. Rabbi Cohen told us, "I know very little. I know about earthquakes and about the fear. But, I do not know of any practical thing that I can advise people to do. Just talking to them will only create panic. I have nothing to do; I cannot do anything." Rabbi Levy said: "The last time there was an earthquake, I remember, people did not escape from the buildings. There was an earthquake. People felt it. I thought that some construction work was happening in the synagogue where I studied. It was interrupting my studies. But, I did not think of an earthquake. People are not aware of the possibility of a disaster." These and other rabbis and community leaders were open to learn about the practicalities of earthquake preparedness as the first step in their engagement in promoting the religious community's preparedness.

Demands from State Authorities. Participants in the focus groups with educators in the ultra-Orthodox institutions described a bad and worrying situation in terms of knowledge, preparedness, and drill in the ultra-Orthodox education system. They attributed this problematic situation to the very few binding requirements on the part of the government and municipality. Rivka said: "I think that if there was a demand [from the authorities], we would fulfill it. It does not seem something out of this world. But, we do not conduct drills as the authorities do not require it. We are incredibly busy and we have plenty of other things to do. No one demands, no one comes to see, no one asks." In response, Akiva added that if there is no formal requirement to prepare a lesson on this subject, he will not spend time working on it. He also contended that the state should provide appropriate pedagogical materials to the ultra-Orthodox institutions. These research participants believed that a formal, binding, measurable, and unequivocal requirement from state authorities would be helpful in placing this issue high in their institutional agenda.

Soliciting Support. The ultra-Orthodox society places great value on obeying religious authorities. Interviewees often believed that efforts to disseminate earthquake preparedness guidelines to the public must be supported by the ultra-Orthodox religious authorities. Apart from receiving their support on earthquake preparedness training, interviewees identified other critical matters where they can help. For example, Gershon from the Home Front Command said that there is an existing technology that can send a text message to "call only" phones (audio devices without texting options) and issue alerts about an earthquake in progress. Many ultra-Orthodox Jews do not allow the use of text messaging for religious reasons, and use "call only" phones. Therefore, implementing this technology would require the support of religious leaders.

There were differences of opinion among the interviewees regarding which religious authority figures should be approached. Some said that support must come from the accepted and esteemed rabbis, while others believed

that it is enough to receive support from the community leaders, directors of major educational institutions, or public activists. However, the rabbis and community leaders agreed that in order to be effective, the message should come from both the rabbis and experts in the earthquake field by working closely together. Rabbi Cohen explained: "If an expert would come and talk, I do not know how many people would come to hear him ... I think that a combination of an expert and a rabbi, who will say 'listen, I saw the data, I am telling you that we must prepare,' will work in religious communities."

School Trainings. Respondents frequently said that an effective way to improve the preparedness of the ultra-Orthodox population is through lectures, activities, and seminars in educational institutions. They surmised that children and adolescents who undergo these sessions could raise the awareness of their entire family. Mendy, a safety officer in an ultra-Orthodox city, explained the importance of school training: "We invest a lot in instruction and preparation ahead of time. We do it through the schools because it is very difficult for us to gather the population, sit them down, and give lectures and sermons. We think that the ones we trained twenty years ago are already parents today ... We invest in lectures, study days, instructions, and all that we can to give them the information."

Family Activities. The ultra-Orthodox society is very family-centered. Therefore, family ties can be a means of raising awareness regarding earthquake preparedness. It is reasonable to assume that parents who undergo training will pass on the information to their children. Shmuel, one of the leaders of an ultra-Orthodox emergency rescue organization, recommended conducting large events for ultra-Orthodox parents and children that will include activities such as earthquake training, demonstration of rescue techniques, emergency kits, publishing vital emergency preparedness documents, and holding lectures for parents and ultra-Orthodox public figures. Research participants emphasized the impact of interactive, participatory, and experiential activities that are more enjoyable, memorable, and effective.

Advertising. Another effective way to raise awareness is to publicize the issue among the ultra-Orthodox population using appropriate media. These include publishing the guidelines in ultra-Orthodox newspapers, and distributing street ads and neighborhood leaflets for free to every household. Further, the guidelines should also be published in ultra-Orthodox news websites and radio channels.

Adapting the State's Trainings. A considerable part of the ultra-Orthodox population is reluctant to accept directives issued by the state and military authorities. For this reason, the interviewees recommend removing all national government symbols from the earthquake preparedness literature. Moreover, respondents repeatedly recommended that the soldiers who deliver earthquake preparedness trainings in schools should not wear uniforms. Ya'ir, a safety officer at the ultra-Orthodox education system, explained the significance of the way the instructors introduce themselves: "The way he introduces himself to the ultra-Orthodox education system is crucial. He should introduce himself as a representative who has come to help and not as a representative of the Home Front Command ... He must say that it is a religious obligation to prepare."

Using religiously and culturally adapted and appropriate language and concepts in trainings is crucial. For instance, when we had trained the ultra-Orthodox students who later trained other ultra-Orthodox community members, one of our slides that discussed the DSFS included the words "in the past 10–20 million years." The

students asked us to modify these words because the ultra-Orthodox people strictly believe that the world was created by God only 5,780 years ago, as written in the Torah. According to the students, the original slide would immediately alienate the ultra-Orthodox audience who would simply stop listening as the training contradicts their religious beliefs. This ostensibly minor detail, which can easily be fixed by using a broader term like "for many years," demonstrates the need to carefully adapt and localize the trainings in close collaboration with the ultra-Orthodox actors. The ultra-Orthodox students, who are familiar with both the ultra-Orthodox worldview and academic discourse, can serve as intermediaries and translators between these worlds.

Empowering Organizations in Leading Efforts. Several respondents noted that one of the ways to improve the population's preparedness for an earthquake is by transferring the entire issue from the Home Front Command to a civilian body that is considered legitimate by the ultra-Orthodox society. For instance, the government can conduct community-based trainings in ultra-Orthodox schools with ultra-Orthodox educators rather than soldiers as trainers.

Leveraging Solidarity. Research participants suggested practical ways to leverage the high level of social solidarity, mutual support, and strong social networks in the ultra-Orthodox communities. For instance, Yosef worked for an ultra-Orthodox rescue and recovery organization and volunteered at a community residential home for people with difficult physical disabilities in an ultra-Orthodox neighborhood in Jerusalem. He suggested training people in this neighborhood so that they can come and help the residential staff when an earthquake occurs, especially in evacuating residents with disabilities from the upper floors when the elevator does not function. This is essential due to the small number of staff members (especially at night) and because the evacuation of these residents is very complex. According to Yosef, these neighbors will be able to provide emergency assistance long before the professional rescuers arrive and can, thus, save lives. This project requires strong community engagement, commitment, and dedication that indeed exist in the ultra-Orthodox neighborhoods.

The strong solidarity in the ultra-Orthodox society is also reflected in an extensive and well-organized donation system (food donations, for instance). Some research participants proposed to include the necessary emergency equipment, such as canned food and flashlights, in this donation system. This will help to cope with the difficulties that derive from the high rate of poverty in the ultra-Orthodox society and also make earthquake preparedness part of the day-to-day discourse, thus raising awareness on this issue.

Adapting Technologies. Many respondents believed that preparedness for the emergency stage can be improved using various technologies adapted to the ultra-Orthodox population's culture. One idea is the distribution of single-channel radios that would only be used during emergencies to receive guidance from the authorities. Although many leading ultra-Orthodox rabbis do not allow the use of radio, there is hope that this idea would get acceptance as the device has access to only one emergency channel.

5 Discussion

It is worthwhile to compare the level of preparedness of the Jewish ultra-Orthodox population in Israel to that of the general Israeli public. Ya'ar et al. (2015) explored the Israeli population's perception of the occurrence of a

strong earthquake in their country, and found that 33% of the Israelis do not believe that a devastating earthquake will occur in Israel in the near future. The level of disbelief rose to 45% when asked about the occurrence of a devastating earthquake in their close proximity in the near future. In comparison, our ultra-Orthodox respondents showed a higher level of disbelief regarding the occurrence of a devastating earthquake in Israel in the near future (55%) and in their close proximity in the near future (64%). These differences are also reflected in percentages of the people who agree with statements regarding knowledge and readiness to prepare for an earthquake (Chart 3).

We found that religious beliefs and worldviews can have both a positive and negative impact on disaster preparedness. Most of the respondents (75%) said that they have not prepared much for such a disaster. This finding aligns with previous studies on minority groups' low level of self-protection, preparedness, and hazard knowledge in comparison to the majority group (e.g., Lucini, 2014; Maldonado et al., 2016). Specifically, half of our survey respondents indicated that the buildings they live in do not meet the legal safety standards despite the fact that some of their neighborhoods are in areas with increased ground shaking hazard during an earthquake (Salamon et al., 2010) (Figure 2). Alarming, none of our respondents recommended retrofitting, a crucial strategy for minimizing the harm caused by earthquakes (Bertero and Bozorgnia, 2004). Our interviews with relevant stakeholders further confirmed that very few ultra-Orthodox people are interested in retrofitting. They explained that this is because of a lack of awareness regarding three factors: the potential impact of earthquakes, significance of building conditions in reducing damage and casualties, and government's willingness to support retrofitting. Other reasons include the intangibility of the danger and low economic status of the ultra-Orthodox society.

On the positive side, most respondents believed that there is a religious obligation to prepare for a disaster, stating that the Jewish religion forbids one to rely on miracles and one must do all they possibly can to stay safe. This finding stands in opposition to many studies that have found that religion often creates a fatalistic attitude that hinders disaster preparedness (Baytiyeh and Naja, 2014; Plapp and Werner, 2006; Sun et al., 2018; Yari et al., 2019). Uniquely, Gianisa and Le De (2018) support our finding; they described how religious beliefs urge preparation among Muslims. In our qualitative research, however, many interviewees said that fatalistic attitudes are common in the ultra-Orthodox society, negatively affecting their state of preparedness, as described by other scholars regarding different religious groups. These interviewees said, for example, that some ultra-Orthodox people believe that one should pray to avoid a disaster instead of actively preparing for it. The more complex and subtle approach reflected in the aforementioned words of Bilha maintains that the strong belief that everything that happens is God's will does not contradict the need to prepare for an earthquake. Disaster risk reduction efforts can include illumination and reinforcement of this complex position, for example, in schools, like Bilha does. This strategy is in keeping with Azim and Islam's (2016) proposal to incorporate certain interpretations of religious sources to improve preparedness (cf. Baytiyeh and Naja's, 2014).

We found that lack of exposure to the mainstream media lowers the ultra-Orthodox society's preparedness level. This finding is in line with previous studies (Kellman, 2011; Ya'ar et al., 2015). We also found that in some communities within the ultra-Orthodox society, any guidelines that come from national authorities are viewed with suspicion. This attribute can be troubling when adherence to these messages is a matter of health and safety

(Spence et al., 2007). Many interviewees described that the ultra-Orthodox education system is characterized by insularity, forbidding entry to military personnel to deliver emergency training and sometimes disallowing the distribution of information pamphlets written by state officials. This finding is bothering considering the key role of education in improving preparedness in many other countries (Baytiyeh, 2017; Lucini, 2014; Smawfield, 2013; Yari et al., 2019). However, some participants insisted that the state authorities should define clear and binding requirements for the ultra-Orthodox educational institutions and provide them with appropriate pedagogical materials. Hence, a delicate balance seems to be needed between the ultra-Orthodox community autonomy, on the one hand, and supervision and a strict professional standard defined by state authorities, on the other hand. For example, the state can define a clear standard of preparedness, but allow community-based organizations the flexibility and freedom to choose how to reach the shared goals with the support of state funds and resources. The state will monitor and examine the local organizations' achievements in fulfilling these goals.

It is essential to build trust and improve the mutual communication channels and cooperation between the relevant state institutions, and ultra-Orthodox rabbis and community leaders. The lack of such trust and communication has had extremely negative ramifications during the COVID-19 pandemic that hit the ultra-Orthodox community much harder than the other communities in Israel (Waitzberg et al., 2020). Both sides must engage in a respectful dialogue, acknowledging the knowledge, expertise, capabilities, beliefs, needs, and difficulties of the other side. They should recognize that they both share the responsibility for the current low level of hazard knowledge. They must also share the responsibility to fundamentally change this bothersome situation.

Many of our interviewees predicted a relatively successful recovery in the ultra-Orthodox society following an earthquake. This is due to the strong social capital and resilience, which distinguish the ultra-Orthodox community. The effective community-based ultra-Orthodox religious institutions can play a pivotal role in the reconstruction and rehabilitation phase. Our research results support the finding of previous studies that established social networks are a strong predictor of population recovery after an earthquake (Aldrich, 2011; Gianisa and Le De, 2018). Community support, social bonding, and shared beliefs are especially helpful for religious minorities following a disaster (Ngin et al., 2020). However, scholars have demonstrated that political controversies and various social-cultural divides may constitute an obstacle to recovery (Cheema et al., 2014; Ngin et al., 2020). Therefore, building trust, ongoing dialogical communication, and long-term collaboration between the ultra-Orthodox community and state authorities are crucial in the recovery, preparation, and emergency phases. Furthermore, the prevailing poverty in the ultra-Orthodox society is another considerable obstacle to recovery and preparation (cf. Shapira et al., 2018).

We asked the research participants' opinion on how to effectively improve preparedness in the Jewish ultra-Orthodox society. Most respondents answered that the key to improving disaster management in the ultra-Orthodox community is to raise earthquake hazard awareness. In line with Appleby-Arnold et al. (2018), the respondents thought that national-level policymakers must consider all the characteristics of the ultra-Orthodox society that we discussed, before planning disaster management strategies. All tactics should be adjusted and adapted according to the ultra-Orthodox norms. The participants believed that guidelines on earthquake explained and approved collaboratively by both the rabbis and experts will be very effective. This finding is

supported by recent data during the COVID-19 pandemic that shows that the ultra-Orthodox people tend to comply with prominent ultra-Orthodox rabbis as well as expert physicians (Kalagy et al., 2020).

Finally, we would like to discuss the limitations of the research methods used. In the survey, we used non-probability sampling that may not represent the entire ultra-Orthodox population in Israel. There were only 288 respondents, and there was an over-representation of men. The average age was young, and a great majority of respondents lived in Jerusalem and its surrounding areas. However, in our opinion, our sample also has considerable advantages. First, the in-person interview survey was conducted by ultra-Orthodox or Orthodox surveyors, enabling us to reach out to ultra-Orthodox people who would probably refuse to respond to a telephone survey from an academic institution. A telephone survey, which is faster and simpler, has a lower response rate and might involve considerable bias when it comes to the ultra-Orthodox public.⁴ Second, the survey conducted in face-to-face interviews allowed a very long and detailed questionnaire to be answered. It allowed the elaboration of questions and answers, ensured that the questions and answers were understood, and avoided offhand answers. None of this happens in a telephone or internet survey. Third, focusing on particular communities, such as the ultra-Orthodox communities in Jerusalem and its surrounding areas, allows a deeper understanding of their needs and challenges and enables the possibility of working with them over time. For example, it allows efficient training in these communities, like the training led by dozens of our ultra-Orthodox students in several ultra-Orthodox communities in Jerusalem, after we trained them. Last, the young people interviewed either had or were about to have children. We have learned from the literature that children's education is one of the most impactful tools in disaster risk reduction. Hence, we wanted to work with these young people.

6 Conclusion

Our research questions included three main themes: the actual state of earthquake preparedness in the ultra-Orthodox society, characteristics that may hinder or promote preparedness, and ways of improving preparedness. The findings from the first two questions are summarized in a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis that identifies the areas where the community is prepared and where it lacks preparedness. Furthermore, it identifies the community characteristics that hinder and increase preparedness (Table 3). To answer the third research question, we asked the research participants to share their opinions on venues for increasing preparedness. These venues include the following:

- Providing information and raising awareness of the ultra-Orthodox community and its religious leaders.
- The state should set clear, binding, and measurable preparedness standards and goals but allow the local communities the autonomy and flexibility to decide how to reach these goals with state funds and monitoring.

⁴Before the current study, surveyors refrained from using in-person interviews in this subject. This resulted in a lack of sufficient knowledge about the ultra-Orthodox society's preparedness. A member of the National Steering Committee for Earthquake Preparedness shared in an interview: "From our experience, the ultra-Orthodox society is less open to cooperate in surveys ... We do not know their level of preparedness."

- Collaborating with civil organizations that are perceived as legitimate by the ultra-Orthodox society that can lead and coordinate the preparation initiatives in this society.
- Receiving the support of ultra-Orthodox religious authorities for any project or campaign.
- Close collaboration between rabbis and experts on earthquakes in reaching out to the ultra-Orthodox public.
- Lectures, activities, drills, and seminars in ultra-Orthodox educational institutions and during family activities.
- Publishing the guidelines in ultra-Orthodox newspapers, street ads, neighborhood leaflets, news websites, and radio channels.
- Removing any national and government symbols from earthquake preparedness publications for ultra-Orthodox communities. Preferably, trainers should be ultra-Orthodox community members; if soldiers deliver earthquake preparedness trainings in schools, they should not wear uniforms.
- Leveraging the ultra-Orthodox community's strong social capital during preparedness and emergency phases.
- Adapting emergency technologies to make them acceptable for the community.

The findings establish that religion is a significant factor that influences all stages of disaster response. Therefore, it must be taken into consideration when attempting to improve earthquake preparedness. This research highlights some of the features of a religious minority group that may affect its preparedness, whether positively or negatively, and suggests avenues for improving its level of preparedness. While previous studies have examined the impact of religion on the level of preparedness in general, our findings add significant knowledge to the existing literature on the influence of religion on preparing for a natural disaster among minority groups, especially when most state officials and policymakers are part of the secular majority. The findings of this study can be generalized and used by policymakers worldwide when attempting to improve disaster management of any religious group.

7 Recommendations

We would like to conclude with several recommendations based on this study that can possibly improve disaster management among religious, sociocultural, and other minority groups worldwide:

- In-depth study of every social-cultural and religious group, and the required adaptations that will upgrade their earthquake preparedness, building on their local knowledge.
- Before approaching a particular group, it is helpful to receive support from its leaders.
- Establishment of a formal mechanism for reciprocal and continuing dialogue and collaboration between the relevant state institutions, and community leaders and representatives. For this purpose,

- 711 both parties should acknowledge the necessity to build trust and joint work networks to improve the
712 level of preparedness.
- 713 • Emergency preparedness representatives must be acceptable for the community; their dress code and
714 language must be appropriate; and their instructions must be adapted to the community's needs and
715 social, cultural, and religious characteristics.
- 716 • The preparation guidelines should be spread on tracks to which the group is exposed. In sectors
717 unexposed to media for cultural or religious reasons, guidelines should be published in alternative
718 ways.
- 719 • Another venue for publicizing earthquake preparation guidelines is in hardware stores where cheap
720 rescue kits for the family and home security items can be sold.
- 721 • Bolstering existing local resources and community organizations by giving them official
722 responsibilities in the area of earthquake preparedness, since these organizations are acceptable for the
723 community.
- 724 • Government offices should proactively raise awareness regarding the importance of retrofitting. The
725 information about the financial support available to citizens who want to retrofit their houses should be
726 more accessible.
- 727 • The government should suggest practical emergency skills considering the population density and form
728 of construction that characterize the specific social group.

729 **Data availability**

730 The data is unavailable for review as we promised complete confidentiality and anonymity to the research
731 participants adhering to the ethical principles of social science research.

732 **Team list**

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738 **Author contribution**

739 ZO and AA designed and led the study, developed the methodology, and contributed to data interpretation. TE
740 conducted interviews and analyzed the qualitative data. SG created the questionnaire and performed the
741 statistical analysis. OB contributed to the questionnaire and data collection. MW initiated the study and
742 conducted interviews. All authors contributed to the article preparation.

743 **Competing interests**

744 The authors declare that they have no conflict of interest.

745 **Financial support**

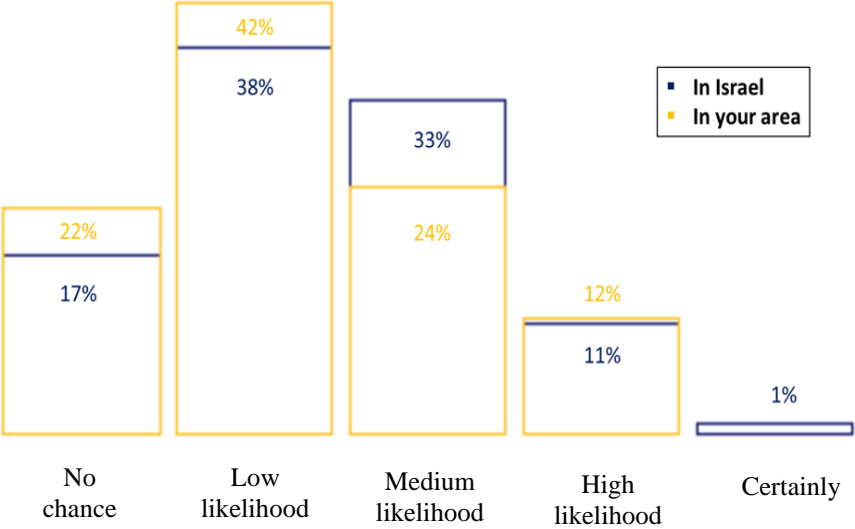
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Chart 1 – Level of belief that a disastrous earthquake will occur in Israel/in your area in the next five years

Level of belief that a disastrous earthquake will occur in Israel/in your area in the next five years



757 **Chart 2 – Agreement with the statement that earthquake preparedness is a religious obligation enforced**
758 **by the directive that one must guard one's own life (hishtadlus)**
759

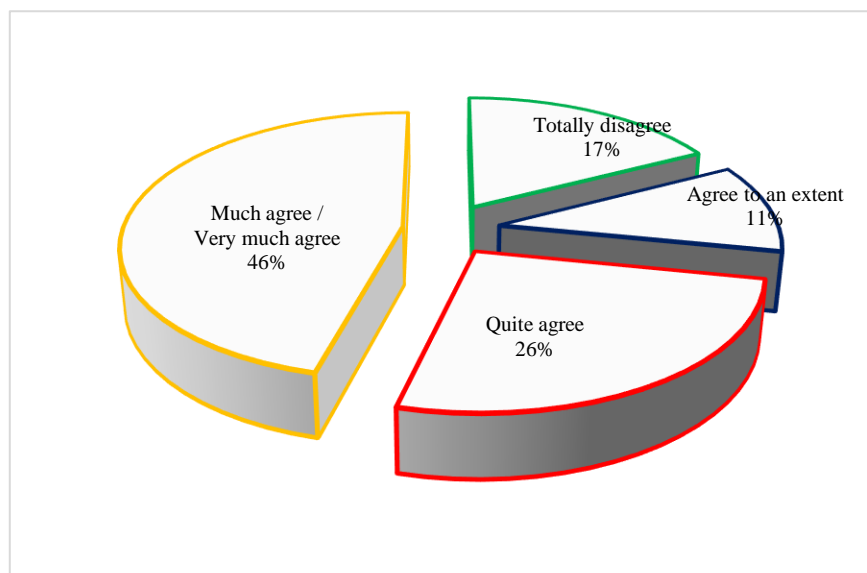


Chart 3 – Level of knowledge and readiness to prepare for an earthquake in Israel

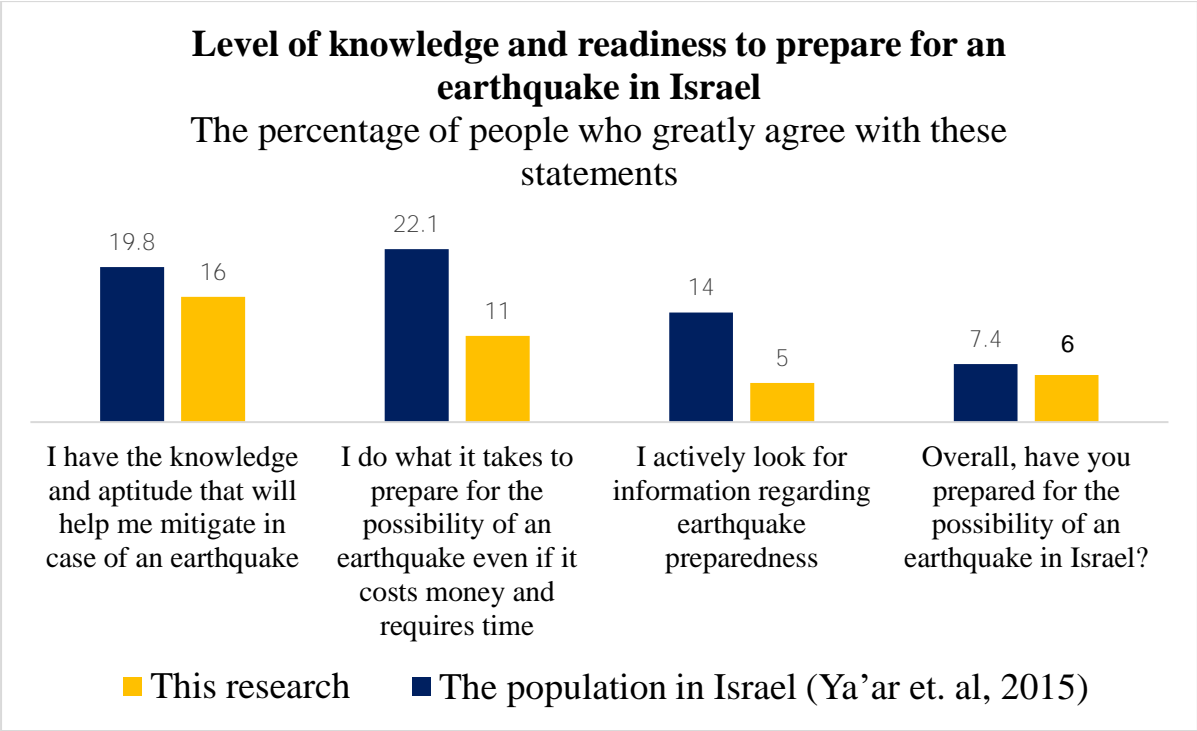


Table 1 – Listing of historic (pre-instrumental) earthquakes that damaged Jerusalem since Roman times

Year CE	Estimated magnitude	Jerusalem intensity ^a	Comments
363	6-6.5	VIII	Likely source: the Carmel branch
418/419	6-6.5	≥VI	Likely source: Jordan Valley
634/635	~6	~VII	Northern Wadi Araba
659/660	~6	VI-VII ^b	Jordan Valley
746 to 757	6.5-7.5	VIII-IX	Multiple rupture along rift
(1016)	?	VII	Local event, dubious
1033	6.0	VIII-IX	Holy sites damaged ^c
1068	6.0	VII	Dome of the Rock (or the rock) said to crack ^c
1105	n/a	V	Panic, no damage
1113	n/a	V	Panic, no damage
1117	n/a	conflicting accounts	Located to the Lebanese coast ^c or Jerusalem ^d
1293	6.5-7	No reports	Likely between VIII (Ramla) and IX (Karak)
1458	6.5-7	~VII	Holy Sepulchre destroyed; a minaret collapsed
1504	n/a	V	Three shocks, no damage
1546	6-6.5	VIII	"Damage to all tall houses"; "fell... Al Aqsa" ^e
1557	n/a	VII	Several buildings collapsed ^f
1643	n/a	III-IV	Reported panic ^f
1753	n/a	III-VI	Felt in Jerusalem ^f
1817	n/a	VI-VII	Two churches seriously damaged ^f
1834	6-6.5	VI-VII	Several churches damaged, few collapsed ^f
1843-1857	n/a	IV-V	Several shocks felt ^f
1859	n/a	IV-VI	A strong earthquake felt ^f
1863-1873	n/a	III-V	Four to five shocks felt ^f
1874	n/a	IV-VI	A strong earthquake felt ^f
1877	n/a	III-V	Two earthquakes felt (15 February; 14 March) ^f

1879	n/a	III-V	A shock felt ^f
1885-1889	n/a	III-IV	Two slight shocks felt ^f
1893	n/a	III-V	An earthquake felt ^f

^a Intensity: local level of damage; The table below lists a key for reading the numerals. ^b Calculated by Langgut et al. (2016).

^c Guidoboni & Comastri, 2005. ^d Ambraseys (2009, p. 291), from "Historia Hierosolymitana of about 1122."

^e Ambraseys (2009), p. 445. ^f From catalogues of Amiran et al. (1994) and/or Ambraseys (2009).

<i>Intensity</i>	III	IV	V	VI	VII	VIII	IX
<i>Level</i>	light	moderate	relatively strong	strong	very strong	destructive	ruinous
<i>Effects</i>	short shock, a few may realize that the earth quakes	furniture tremble, felt by a few outdoors, indoors feels like ship over a rough sea	freely hung objects swing, thin branches sway, liquids spill, waking of the sleeping, occasional panic	panic, liquids shake, small damage to solid houses, widespread panic, cracks in plaster	moderate damage to numerous solidly built buildings, like small fissures in walls	heavy destructions to about one fourth of the houses; some collapse	about half of the stone houses heavily destroyed, moat become uninhabitable

MCS - Mercalli-Cancani-Sieberg intensity scale (only seven out of twelve levels shown). Abstracted and rephrased from Ferrari & Guidoboni, 2000.

Table 2 – Demographic features of the sample

		% , unless otherwise stated
Age	mean	28 years
	standard deviation	10.22 years
	range	18–67 years
Gender	men	63
	women	37
Marital status	married	59
	single	39
	divorced / widower	2
Children	have children	50
	mean number of children	3.7 children
	range	1-12 children
Economic status	below average	23
	average	53
	above average	16
	refused to comment	8
Education - men	non ultra-Orthodox high school education	7
	nonacademic higher education	5
	academic education	20
	Yeshiva	68
Education - women	primary education	5
	high school education	9
	nonacademic higher education	27
	academic education	59
Living area	Jerusalem and surroundings	82
Ultra-Orthodox subgroup	Hasidim	18
	Lita'im (Lithuanian Jews)	28
	Sephardim	25
	Other (e.g., Olim, Baalei teshuva)	29
Mobile phone type	kosher phone (no SMS, no internet)	29
	basic phone / protected smartphone (SMS, limited internet)	24
	unprotected smartphone (internet)	47

Table 3 – SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis summarizing the state of earthquake preparedness in the ultra-Orthodox society and characteristics that may hinder or promote it

	Strengths	Weaknesses
Actual State of Preparedness	<p>Many (40%) know the basic earthquake emergency guideline of exiting to an open area.</p> <p>Almost half of the respondents were exposed to advertisements on the subject.</p>	<p>The majority do not believe that a devastating earthquake will occur in their area in the near future.</p> <p>The majority have not made the necessary preparations.</p> <p>Many are unfamiliar with the emergency response guidelines.</p> <p>Over half of the respondents have not stocked on equipment and supplies necessary for emergencies.</p> <p>Half of the homes are not built according to the legal standard.</p> <p>Very few discussed the subject with their children or practiced the rules with them.</p>

	Opportunities	Threats
Opportunities and Threats for Improving Preparedness	<p>The majority believe that there is a religious obligation to prepare for a potential disaster.</p> <p>The community has a strong social capital, which can be an advantage in the preparation, emergency, and restoration phases.</p> <p>Preparedness perspectives based on strong social capital can be expressed in several areas:</p> <ul style="list-style-type: none"> • Obedience to religious leaders – by issuing a directive for preparation. • NGOs – Provide simple and inexpensive home security measures; issue detailed instructions for preparation in appropriate language, content, and distribution; organization of trainings in coordination with the authorities and experts. • Concern for each other and solidarity – Sharing tips for strengthening structures and preparation of emergency supplies; assistance in buying equipment. • Train neighbors to come and help vulnerable people in their area when an earthquake occurs. • Entrepreneurship – Initiatives to strengthen buildings, consulting services on the subject, hardware stores where basic home security items can be sold. 	<p>Religious belief that disasters are God's will.</p> <p>Belief that the appropriate means of preparation is through prayer and not through action.</p> <p>Low exposure to information and the media.</p> <p>Difficulty in using educational institutions as a tool.</p> <p>Suspicion towards instructions brought by state authorities.</p> <p>Low socioeconomic status.</p> <p>Minimal demands from state authorities to educational institutions.</p>

Figure 1 – (a) Estimated spatial extent of ruptures from historic periods along the DSFS. (b) The DSFS main branches

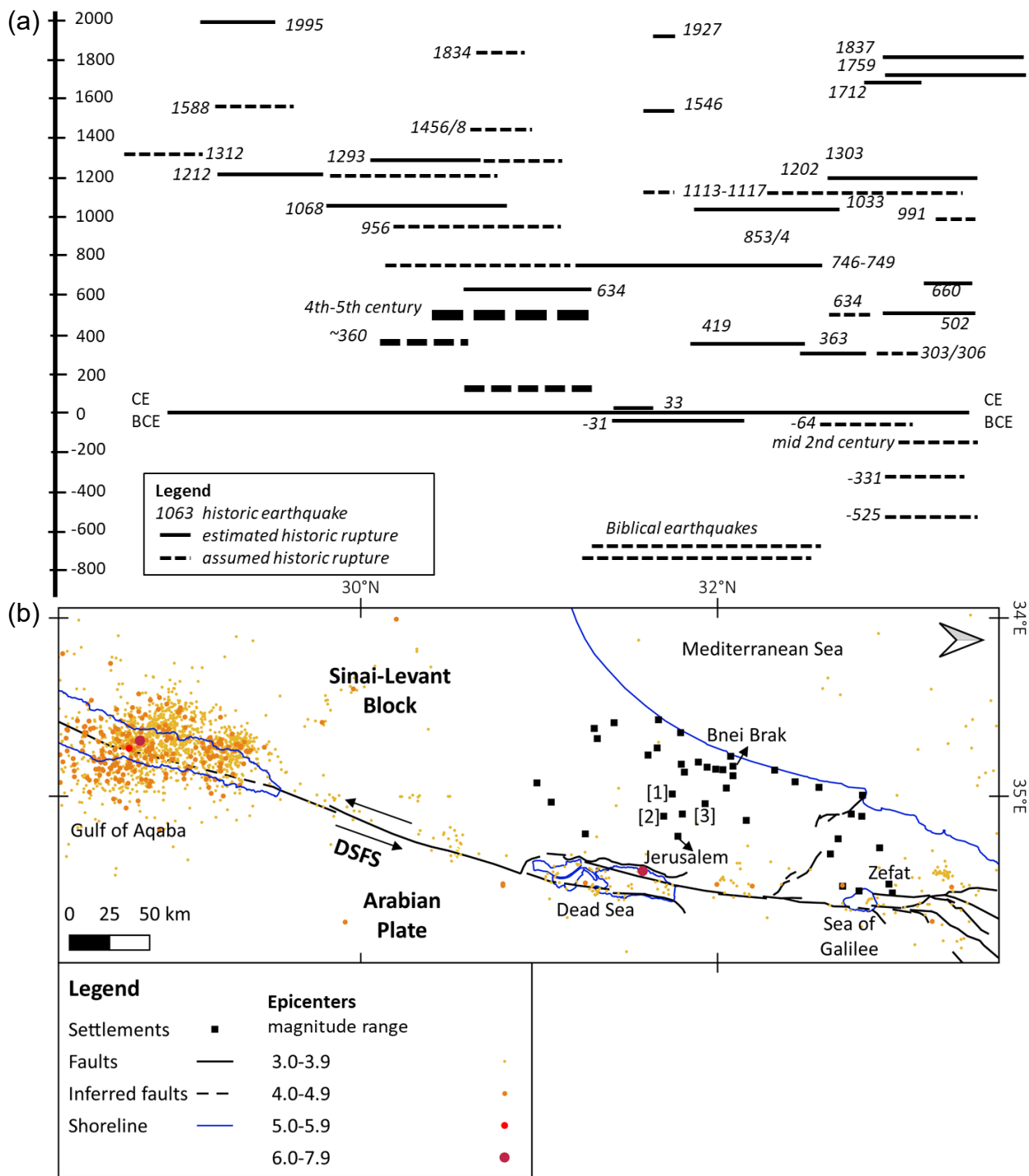


Figure 1: (a) - Estimated spatial extent of ruptures from historic periods along the DSFS (after Agnon, 2014). The position of the events in the figure is projected from the map of the DSFS below in (b). (b) - The DSFS main branches (modified after Hamiel et al., 2018; Hofstetter et al., 1996; Kagan et al., 2011; Politi, 2011; Sharon et al., 2020) over epicenters recorded (since 1900) with $M_d > 3$ (www.gii.co.il). Black solid squares mark settlements with prominent ultra-Orthodox populations (over a thousand ultra-Orthodox residents according to Shahak, 2017); the largest population is in Jerusalem and Bnei Brak. Secondary yet prominent are Beit Shemesh [1], Beitar Illit [2], and Modi'in Illit [3].

Figure 2 – Map of ultra-Orthodox neighborhoods in Jerusalem

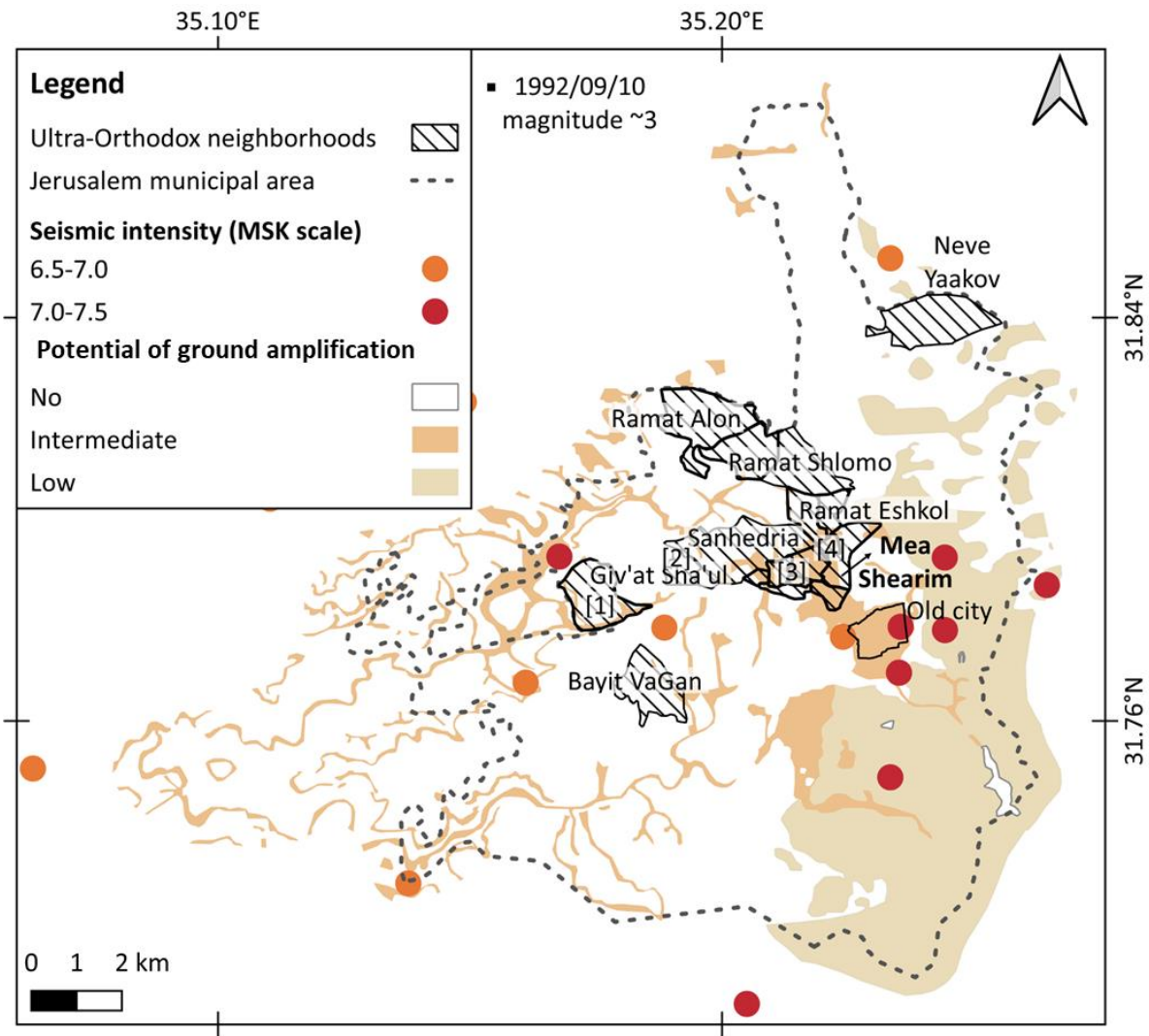


Figure 2: Map of ultra-Orthodox neighborhoods in Jerusalem (modified after Korach and Choshen, 2020; Golan-Agnon, 2020).

An ultra-Orthodox neighborhood is defined as a neighborhood where over 50% of the Jewish population aged 15 or older are ultra-Orthodox (Korach and Choshen, 2020, p. 25).

The background map outlines soil with a tendency to amplify shaking (Salamon et al., 2010). This is based on soil and rock classification and needs verification.

[1] – Har Nof, [2] – Romema, [3] – Ge'ula, [4] – Shmuel HaNavi.

The neighborhood Mea Shearim, associated with the ultra-Orthodox society, and the adjacent neighborhoods to the north and west, are expected to suffer increased ground shaking.

An instrumentally located epicenter (1992, $M > 3$) is marked by a solid black square (www.gii.co.il).

The Medvedev–Sponheuer–Karnik (MSK) intensity scale evaluates the severity of ground shaking for a given location; the mean seismic intensity in Jerusalem during the 1927 6.2 M Jericho earthquake ranged 6.5-7.5 in MSK scale (Avni, 1999; Shapira et al., 1993; Hough and Avni, 2011).

This scale corresponds roughly to the MMS given at the bottom of Table 1.

Appendix A – Quantitative Questionnaire

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1. Gender (male/female)
2. Age _____
3. City/town of residence _____
4. Neighborhood of residence _____
5. Marital status
 1. Single
 2. Married
 3. Divorced
 4. Widowed
6. Do you have children? Yes/No
If Yes, number of children _____ at ages _____
7. What, in your opinion, is the likelihood that a disastrous earthquake will occur in Israel within the next five years?
 1. No chance
 2. Low likelihood
 3. Medium likelihood
 4. High likelihood
 5. Certainly
8. What, in your opinion, is the likelihood that a disastrous earthquake will occur in your area within the next five years?
 1. No chance
 2. Low likelihood
 3. Medium likelihood
 4. High likelihood
 5. Certainly
9. To what extent do you agree with the following statements?

		Totally disagree	Agree to an extent	Quite agree	Much agree	Very much agree	Do not know	Irrelevant
1	I do not believe that an earthquake will occur in my area and therefore do not need to prepare							

2	Regarding an earthquake, I think "what will be will be," hence I do not prepare							
3	I think that we need to do everything possible in order to prepare for an earthquake							
4	The forecasted scenarios following an earthquake are exaggerated, therefore it is unnecessary to prepare							
5	I think that, even if there will be an earthquake in my place, improvisations may solve the situation							
6	Even if an earthquake occurs, I will know what to do - we have been adequately exposed to emergencies in this country							
7	The idea of an earthquake is so frightening - I							

	avoid thinking of it							
8	The chance to survive an earthquake is so slight, that preparing is not worthwhile							
9	I feel that I will be able to deal with an earthquake situation							
10	Earthquake damages are avoidable with "proper" preparation							
11	I have the knowledge and aptitude that will help me mitigate in case of an earthquake							
12	I do what it takes to prepare for the possibility of an earthquake even if it costs money and requires time							
13	I actively look for information regarding earthquake preparedness							

14	Earthquake preparedness is a religious obligation enforced by the directive that one must guard one's own life (hishtadlus)							
15	Earthquake preparedness suits people with deficient beliefs							
16	Should there be organized instruction in the community, I would like to learn how to prepare for an earthquake							

817

818 10. Does your apartment provide a sheltered space?

819 6. Yes

820 7. No

821 8. Irrelevant

822 11. Houses erected in Israel before 1995 were not constructed according to the contemporary Earthquake Code.

823 Does your home pass that Earthquake Code?

824 9. Yes

825 10. Probably yes

826 11. Probably not

827 12. No

828 13. Do not know

829 12. Does your home pass the Earthquake Code of 1980?

830 14. Yes

831 15. Probably yes

832 16. Probably not

833 17. No

834 18. Do not know

835 13. Were the foundations of your home retrofitted, e.g. under State Master Plan 38?

- 836 19. Yes
- 837 20. No
- 838 21. Do not know
- 839 22. Irrelevant
- 840 14. Have you or others insured your home against earthquake hazard?
- 841 23. Yes
- 842 24. No
- 843 25. Do not know
- 844 26. Irrelevant - I do not own a home
- 845 15. To the best of your knowledge, what measures can a family take to prepare for an earthquake?
- 846 _____
- 847 16. In preparation for an earthquake one is required to stabilize bookshelves and fasten them to walls; support
- 848 water tanks, gas tanks and air-conditioners; store toxics and inflammables away from heat sources; keep heavy
- 849 objects close to the floor. Have you prepared according to all, or some, of the above precautions?
- 850 27. Yes
- 851 28. No
- 852 29. Partially. Please detail: _____
- 853 17. Do you have emergency equipment available in your home, such as a first aid kit, water and canned food,
- 854 medicines, battery-powered flashlight and radio, etc.?
- 855 1. Yes
- 856 2. No
- 857 3. Some of the equipment. Please specify: _____
- 858 18. What will you do in case (Heaven forbid) that you feel an earthquake?
- 859 _____
- 860 19. Do you and your family know the safety guidelines for behavior in the event of an earthquake (such as
- 861 switching off electricity and gas lines, exiting to an open area away from buildings or entering a safe room or
- 862 stairwell)?
- 863 1. Yes
- 864 2. No
- 865 3. Partially. Please specify _____
- 866 20. Are you and your household members acquainted with the safety instructions for an earthquake?
- 867 30. Yes
- 868 31. No
- 869 32. Partially. Please detail: _____
- 870 21. (for parents of minors)
- 871 Have you discussed the safety instructions for an earthquake with your children?
- 872 33. Yes
- 873 34. No
- 874 35. Partially. Please detail: _____
- 875 22. Have you practiced with your children proper behavior during an earthquake?

876 36. Yes

877 37. No

878 38. Partially. Please detail: _____

879 23. Overall, have you prepared for the possibility of an earthquake in Israel?

880 39. Not at all

881 40. To a minor extent

882 41. To a moderate extent

883 42. To a large extent

884 43. To a very large extent

885 44. Do not know

886 24. Occasionally earthquake protection instructions are published in the various media. Have you come across

887 such publications?

888 1. Yes

889 2. No

890 25. If so, where did you come across a publication on the subject?

891 1. Newspapers

892 2. Direct mail

893 3. Radio

894 4. Websites

895 5. Other _____

896 26. What do you remember from the publication you saw or heard? _____

897 27. In your view, is the fact that instructions arrive from the military authorities significant for the ultra-

898 Orthodox public? _____

899 28. To the best of your knowledge, is there a religious duty to prepare for an earthquake?

900 _____

901 29. In your opinion, how can awareness for earthquake preparedness be raised in the ultra-Orthodox public?

902 _____

903 30. Will a Halakhic ruling or a rabbi instruction convince you to prepare for an earthquake?

904 _____

905 31. What are the strong aspects of your community which might assist the entire community to function under

906 an emergency? _____

907 32. The solidarity in the ultra-Orthodox society is commendable. How in your view is it possible to translate this

908 solidarity for promoting the earthquake preparedness of the ultra-Orthodox public?

909 _____

910 33. Education

911 Male: (secondary/tertiary/academic/Yeshiva)

912 Female: (primary/secondary/tertiary/academic)

913 34. Community you belong to _____

914 35. Your estimate of your economic status:

915 45. Below average

- 916 46. Average
- 917 47. Above average
- 918 48. Refuse to answer
- 919 36. What type of mobile phone do you typically possess:
- 920 49. Kosher
- 921 50. Basic with texting
- 922 51. Supports Kosher
- 923 52. Protected smartphone
- 924 53. Unprotected smartphone
- 925 54. I do not hold a cellular phone
- 926 37. Is there anything else you would like to add regarding earthquake preparedness in Israel?
- 927 _____

Appendix B – Qualitative Interview Guide

Note: This basic interview guide (qualitative questionnaire) includes issues and questions that are common to a broad range of interviewees. We adapted each interview guide according to the specific interviewee's organization, professional field, expertise, etc.

1. Can you please give some background about your organization?
2. In which activities does your organization participate regarding earthquake preparedness?
3. Does your organization promote preparedness for earthquakes in the ultra-Orthodox society as well? If so, I would appreciate hearing about such activities. What do they include?
4. Is the activity in the ultra-Orthodox society similar to the activities in other societies? Does the work with this society require adjustments?
5. Are you aware of special challenges in the work with the ultra-Orthodox public? If so, what are these challenges?
6. Are you aware of special opportunities in the work with the ultra-Orthodox public? If so, what are these opportunities?
7. What, in your opinion, can be improved or strengthened in the work of your organization with the ultra-Orthodox public?
8. How, in your opinion, can the awareness for earthquake preparedness be elevated within the ultra-Orthodox public?
9. Is it significant in the ultra-Orthodox public that the instructions on this topic arrive from the Home Front Command and the state authorities?
10. To the best of your knowledge, what is the Halakha's (the collective body of Jewish religious laws) position regarding earthquake preparedness?
11. In your experience, how does the Jewish Halakha and the faith of ultra-Orthodox Jews affect their actual preparedness?
12. In your view, which characteristics of the ultra-Orthodox society assist or impede its functioning under a state of emergency?
13. The ultra-Orthodox society is characterized by strong solidarity. Do you view it feasible to harness this solidarity to promote the preparedness of the ultra-Orthodox public for an earthquake? If so, how?
14. Is there anything you wish to add regarding the topic of this research? Anything that I did not ask about and is important for us to know?
15. Whom else would you recommend us to talk with?
16. We would like to talk with relevant key figures in the ultra-Orthodox community. Are there people in the ultra-Orthodox society whom you work with and who might assist us?

Appendix C – Quantitative Findings

Level of belief regarding the occurrence of an earthquake

	No chance (1)	Low likelihood (2)	Medium likelihood (3)	High likelihood (4)	Certainly (5)	Mean	SD
What, in your opinion, is the likelihood that a disastrous earthquake will occur <u>in Israel</u> within the next five years?	17%	38%	33%	11%	1%	2.39	0.927
What, in your opinion, is the likelihood that a disastrous earthquake will occur <u>in your area</u> within the next five years?	22%	42%	24%	12%	0%	2.24	0.928

To what extent do you agree with the following statements?

	Totally disagree	Agree to an extent	Quite agree	Much agree	Very much agree	Do not know
I do not believe that an earthquake will occur in my area and therefore do not need to prepare	59%	17%	12%	8%	3%	1%
Regarding an earthquake, I think "what will be will be," hence I do not prepare	67%	15%	9%	5%	3%	1%
The forecasted scenarios following an earthquake are exaggerated, therefore it is unnecessary to prepare	63%	16%	9%	7%	4%	1%
The chance to survive an earthquake is so slight, that preparing is not worthwhile	80%	14%	2%	1%	2%	1%
Earthquake preparedness is a religious obligation enforced by the directive that one must guard one's own life (hishtadlus)	17%	11%	26%	22%	24%	0%
I think that, even if there will be an earthquake in my place, improvisations may solve the situation	52%	20%	12%	8%	5%	3%
Even if an earthquake occurs, I will know what to do - we have been adequately exposed to emergencies in this country	48%	24%	13%	7%	4%	4%
I feel that I will be able to deal with an earthquake situation	24%	20%	23%	21%	6%	6%
I have the knowledge and aptitude that will help me mitigate in case of an earthquake	31%	28%	23%	12%	4%	2%

I do what it takes to prepare for the possibility of an earthquake even if it costs money and requires time	53%	22%	12%	7%	4%	2%
I actively look for information regarding earthquake preparedness	66%	15%	10%	4%	1%	4%

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	Yes	No
In preparation for an earthquake one is required to stabilize bookshelves and fasten them to walls; support water tanks, gas tanks and air-conditioners; store toxics and inflammables away from heat sources; keep heavy objects close to the floor. Have you prepared according to all, or some, of the above precautions?	23%	77%
Do you have emergency equipment available in your home, such as a first aid kit, water and canned food, medicines, battery-powered flashlight and radio, etc.?	48%	52%
Do you and your family know the safety guidelines for behavior in the event of an earthquake (such as a switching off electricity and gas lines, exiting to an open area away from buildings or entering a safe room or stairwell)?	51%	49%
Have you discussed the safety instructions for an earthquake with your children?	15%	85%
Have you practiced with your children proper behavior during an earthquake?	3%	97%

969

970

	Yes / Probably yes	Probably not / No	Do not know
Houses erected in Israel before 1995 were not constructed according to the contemporary Earthquake Code. Does your home pass that Earthquake Code?	39%	49%	12%
Does your home pass the Earthquake Code of 1980?	47%	36%	17%

971

972

	Not at all	To a minor extent	To a moderate extent	To a large / a very large extent
Overall, have you prepared for the possibility of an earthquake in Israel?	45%	31%	18%	6%

973

974

	Yes	No
Occasionally earthquake protection instructions are published in the various media. Have you come across such publications?	46%	54%

975

	Newspapers	Websites	Direct mail	Radio
If so, where did you come across a publication on the subject?	41%	31%	8%	20%

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