

Giving a voice to medically vulnerable populations: A mixed-methods investigation of their unique perceptions and needs in emergency situations

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Abstract

Older adults in poor health represent a growing sector of the population worldwide. These medically vulnerable individuals often tend to be ill-prepared for emergencies. In times of crisis they are at higher risk of experiencing adverse health outcomes and are liable to place an additional burden on health and social care services. The aim of this study was to explore the unique perceptions and diverse needs of community-dwelling medically vulnerable individuals in Israel in order to gain insights that could be used to promote future preparedness. A mixed methods design was employed that included 16 in-depth interviews, followed by a quantitative survey of 179 participants. Data were collected between 2016 and 2017. The analysis process included thematic analysis for qualitative data. Quantitative data analysis focused on estimating associations between preparedness levels and participants' characteristics and perceptions. The results indicated low levels of preparedness—only 13.5% of participants reported having prepared a full emergency kit with supplies. Family members played a key role in almost every dimension related to emergency preparedness; alongside certain authorities perceived by the participants as responsible for initiating the preparedness process. Additional issues that emerged were related to information and communication and to the logistics of medication handling and special nutrition. The findings suggest that it is vital to adopt a proactive approach to the problem of preparedness in this population. This conclusion should be of value to health and social care practitioners in the community as well as to family members and caregivers. Practical and simple recommendations for enhancing preparedness based on these findings are provided. Viewing preparedness as a process that is the joint responsibility of the individual, the family, caregivers, and community health and social welfare services could contribute to maintaining continuity of care among vulnerable populations and mitigate adverse health outcomes in future events.

KEYWORDS

emergency preparedness, health & social care in the community, medically vulnerable populations, mixed methods

1 | INTRODUCTION

Ageing of the population is a global demographic trend that has broad implications for public health and healthcare provision (Beard & Bloom, 2015), mainly due to increasing rate of age-related chronic health conditions and disabilities in the elder population. This trend has led to higher demand for healthcare and medical services required to stabilise these conditions (Barnett et al., 2012; Lehnert et al., 2011).

In the field of disaster and emergency research, older adults with poor health (i.e. physical or sensory disabilities and chronic health conditions) are usually referred to as medically vulnerable populations (MVP). MVPs constitute a major share of what is widely known as at-risk populations (along with young children, women and socioeconomically disadvantaged persons; Balbus & Malina, 2009; Bethel, Foreman, & Burke, 2011; Fernandez, Byard, Lin, Benson, & Barbera, 2002; Noji, 2005). Extensive evidence suggests that these individuals are disproportionately affected by large-scale emergencies (e.g. natural disasters or security-related threats such as armed conflicts): the casualty rates among them exceed their proportion in the general population (Bourque, Siegel, Kano, & Wood, 2007; Ngo, 2001; Shapira, Aharonson-Daniel, Shohet, Peek-Asa, & Bar-Dayyan, 2015), and they are also likely to experience greater difficulties during response and recovery phases (Cutter, Mitchell, & Scott, 2000; Xu & He, 2012). The possible disruption to continuity of routine health and social care (e.g. provision of prescription drugs, medical treatments, nursing care, special nutrition) due to unavailability of providers and damage to structures and infrastructures (e.g. medical facilities, pharmacies, and roads leading to them; Qureshi et al., 2005) can increase the risk of secondary morbidity and mortality among MVPs and exacerbate existing health conditions. This phenomenon has been observed in various emergency scenarios and across different geographical regions (Aldrich & Benson, 2008; Banks, 2013; Bar-Dayyan et al., 2000; Bloem & Miller, 2013; Miller & Arquilla, 2008; Yamanda et al., 2013).

Community-dwelling MVPs have difficulty engaging in emergency preparedness actions (Bethel et al., 2011; Kohn et al., 2012; Levac, Toal-Sullivan, & O'Sullivan, 2012). Many studies have shown people with disabilities or chronic illnesses to be poorly prepared for emergencies compared with their healthier counterparts, as reflected in the absence of an evacuation plan or of an emergency kit with supplies such as food, water, and a functioning flashlight, radio and batteries (Bethel et al., 2011; Kohn et al., 2012). Large-scale emergencies usually generate chaos, often hampering the ability of states and communities to respond immediately (Col, 2007); the affected population is thus left alone to cope with the consequences—at least in the first few days—and must rely on personal resources (The Reut Institute & Israel Trauma Coalition for Response and Preparedness, 2009). Low levels of preparedness combined with reduced physical resilience and overwhelmed community systems may create a ripple effect that compounds MVPs' risk of experiencing adverse consequences (Aldrich & Benson, 2008; Fernandez et al., 2002). Strengthening

What is known about this topic

- Medically vulnerable persons such as older adults with poor health are highly vulnerable during emergencies and are often ill-prepared for them. Thus, they are prone to experience adverse health outcomes
- Not enough is known about their unique perceptions and diverse needs in crisis situations. Such information can assist in enhancing preparedness

What this paper adds

- Preparedness was perceived as the responsibility of others—mainly family members and relevant authorities
- Additional barriers to preparedness were related to logistical aspects of medication management and nutritional needs, as well as to risk communication
- A proactive approach towards preparedness is vital for mitigating outcomes in future events; healthcare and social welfare services have a central role in accomplishing this goal

MVPs' emergency preparedness is thus crucial in ensuring their health and well-being.

In Israel, approximately 11% of the population (roughly one million residents) are adults aged 65 and older, of whom over 50% suffer from at least one chronic health condition and over 20% from some form of disability (Israel Center for Disease Control, 2017; Myres-JDC-Brookdale Institute, 2017). Many of those are community-dwelling individuals. The 1994 National Health Insurance Law defines healthcare and social welfare in Israel as public services. Primary healthcare and hospital services are provided mostly by four not-for-profit health funds (offering their members egalitarian services on the basis of monthly payments). Medications and other technologies are also provided, based on an annually updated health basket (Clarfield et al., 2017); welfare services are provided mainly by government ministries and local municipalities (Katan & Lowenstein, 2009). Despite Israel's vast experience in emergency situations and the fact that national preparedness plans targeting MVPs were developed long ago (Ben-David Rokni, 2004), health and social care provided for MVPs during recent emergencies was far from optimal and many of their needs were not met (The State Comptroller & Ombudsman of Israel, 2014). To remedy this situation, preparedness plans need to be revised to reflect the perspectives of the MVP population (Hutton, 2009; Vaughan & Tinker, 2009). To date, however, only a small number of studies have explored the views of these individuals and their needs in emergency situations.

The aim of this study was to achieve a thorough understanding of the unique perceptions and diverse needs of community-dwelling adult MVPs in emergency situations with a view to promoting emergency preparedness.

2 | MATERIALS AND METHODS

A mixed methods design was used in order to obtain an in-depth understanding of the investigated issue. Collecting qualitative data was performed through face-to-face semi-structured interviews, while quantitative data was obtained using a survey.

2.1 | Setting

The study was conducted in the city of Beer-Sheva, the largest urban centre in the southern region of Israel (~200,000 residents). Approximately 15% of the city's population are persons aged 65 and older, and a similar proportion (~13%) suffer from sensory, mental and/or physical disabilities (Israel Central Bureau of Statistics, 2008). The city has one hospital (level one trauma centre) that serves the city's residents as well as the entire population of the southern region of Israel (~1 million) in both routine and emergency situations.

2.2 | Qualitative study

2.2.1 | Semi-structured interviews

The semi-structured interview guide was developed based on findings from a literature review conducted as part of a previous study (Aharonson-Daniel, Feder-Bubis, Clarfield, & Shapira, 2017), as well as the researchers' expertise in emergency management research. The interview guide was designed to explore the participants' experiences in previous emergency situations (stemming from security threats related to Israel's hostile relations with bordering states), and their personal views and practices in the face of new and plausible large-scale events, such as a major earthquake (Levi, Bausch, Katz, Rozelle, & Salamon, 2015). Alternative wording and probe questions were included (Ritchie, Lewis, McNaughton Nicholls, & Ormston, 2014). The interview guide evolved in the process of data collection, with input from participants facilitating refinement of certain items or addition of emerging themes.

2.2.2 | Participants

The study used maximum variation purposeful sampling to recruit relevant study participants. The leading inclusion criteria were: (a) residential status as community-dwelling adults; (b) self-reporting as having at least one chronic health condition; (c) regular use of medications and/or other medical technologies, devices or aids. Criteria for ensuring variation of the sampling included: number of chronic conditions per person (single vs. multiple conditions); employment status (unemployed or retired vs. employed); and household composition (living alone vs. living with a family member, a companion, or a professional caregiver). Exclusion criteria

were cognitive impairment (mild or severe), such as Alzheimer's disease or dementia.

2.2.3 | Recruitment and data collection

Recruitment was facilitated by the municipal social welfare department and elderly daycare centres in Beer-Sheva.

Data were collected from September 2016 to March 2017, when theoretical saturation was reached. Most interviews were conducted one-on-one either at the participant's home or in a private room in elderly daycare centres. Only one interview was held at the workplace of the participant, at his request. All participants were provided an oral description of the study and were requested to sign an informed consent form. Two exceptions were participants who were visually impaired and therefore recorded oral consent. All interviews were audio-recorded with permission from the participants. Field notes were taken by the interviewer following each session. The study protocol was approved by the review board of the Faculty of Health Sciences at Ben-Gurion University of the Negev.

2.2.4 | Data analysis

The audio-recordings were transcribed verbatim. A thematic analysis was undertaken and began during the data collection stage (Braun & Clarke, 2006). To ensure trustworthiness, the transcripts were reviewed independently by two members of the research team who noted the emergent key categories. Following independent coding, the two researchers held peer-debriefing sessions to discuss findings, map out categories that emerged from the transcripts, and resolve discrepancies when necessary. A consolidated categories scheme was produced and verified by the two researchers. After all transcripts had been coded using this scheme, the researchers aggregated and organised the codes into higher-level descriptive themes.

2.3 | Quantitative study

2.3.1 | Survey instrument

A structured, anonymous, self-administered survey was designed to assess: (a) sociodemographic characteristics; (b) household emergency preparedness; (c) health status and needs; (d) risk perception; (e) preparedness-related perceptions (trust and fatalism); (f) exposure to emergency-related information. The questionnaire was a modified version of a validated tool used to measure preparedness components in an urban population (Shapira, Aharonson-Daniel, & Bar-Dayana, 2018). The knowledge gained from the qualitative interviews was incorporated into the questionnaire as part of its adaptation process for MVPs.

Household preparedness was assessed using a self-reported checklist documenting the possession of five elements comprising an emergency kit: food and water for emergency use; flashlight and batteries; radio and batteries; 3-day supply of prescription medications; and copies of prescriptions (IDF Home Front Command, n.d.). The total score in this section ranged from 0 to 5 (where a higher score indicated higher level of preparedness). Health status and needs were assessed using two items: (a) "self-reported health", rated on a 4-point Likert scale (Aberbuch, Keidar, & Horev, 2010; Israel Central Bureau of Statistics, 2011); (b) a checklist comprising 14 common chronic health conditions derived from the Centers for Disease Control and Prevention' Health-related quality of life questionnaire (Centers for Disease Control & Prevention, n.d.). In addition, participants indicated whether they were being treated (using medications, technologies, or other medical aids) for their conditions. Two measures were calculated based on this section: the first was a chronic disease index that included the first eleven conditions (score ranged over 0–11); the second was a physical disability measure and included the last three conditions (score ranged from 0 to 3). Risk perception ($\alpha = .87$; Shapira et al., 2018), preparedness-related perceptions ($\alpha = .81$; Kano, Wood, Kelley, & Bourque, 2009; McClure, Allen, & Walkey, 2001), and exposure to information ($\alpha = .68$) were assessed on a 5-point Likert scale. A total score was calculated separately for each section as the mean of all items comprising that section.

The initial draft of the questionnaire was evaluated by an expert panel from the field of emergency management and revised according to their insights and comments. The final draft was piloted with a convenience sample of 18 MVPs residing in Beer-Sheva. Based on the participants' recommendations, minor modifications were made to produce the final version.

2.3.2 | Study design and data collection

The survey was conducted from June 2017 through August 2017 in the city of Beer-Sheva. The study population consisted of community-dwelling adults over the age of 65 self-reporting as having at least one chronic health condition.

A priori power analysis using a power of 0.80 and $\alpha = .05$ yielded a minimum sample size of $n = 139$. Assuming a 50% response rate, this would require posting surveys among 278 potential participants. In order to ensure sufficient data, it was decided to increase the sample size to 300 potential participants. A trained field surveyor distributed the questionnaires to elderly daycare centres in Beer-Sheva. The surveyor was instructed to approach all persons present at the daycare centre, provide a short explanation about the study, and request them to fill out the questionnaire. The participants were informed that participation was voluntary and that they were allowed to quit at any time. If a specific individual experienced a technical difficulty in completing the survey (e.g. due to vision impairment), the surveyor provided the necessary assistance (e.g. reading text aloud). Questionnaires were completed and collected in place.

2.3.3 | Statistical analysis

Data analysis included a univariate analysis (descriptive statistics), following bivariate analysis using Spearman and Pearson correlations, Mann-Whitney *U*-test, and Kruskal-Wallis one-way analysis of variance to estimate the associations between the dependent variable, namely the household preparedness measure, and other survey variables. Data were analysed using Statistical Package for the Social Sciences (SPSS) version 24.0.

2.4 | Integration of data sets

Knowledge and insights gained from the qualitative component were used to adapt the quantitative survey for MVPs which was administered subsequently. Following completion of the quantitative component, the research team performed triangulation (a strategy to validate data interpretation through the convergence of information from different data sources) by reviewing findings from both datasets and reconsidering themes that emerged in the qualitative analysis. The discussion section addressed the research findings as a combination of both qualitative and quantitative results, namely quotes or themes and quantitative statistical findings relating to them.

3 | RESULTS

3.1 | Qualitative findings

Sixteen interviews were held (with nine females and seven males). The participants' ages ranged from 59 to 86 years. All the participants reported to have at least one chronic illness; four also reported suffering some kind of sensory impairment (hearing or seeing), and three had a physical impairment leading to difficulty in walking. The list of codes, categories, and themes relating to the diverse needs of the MVPs are organised and summarised in Table 1; they are also briefly described below.

3.1.1 | A relational approach towards emergency situations

The dominant theme in the interviews was the relational approach of the participants towards both past and future emergency situations.

One of the most striking issues raised by some participants was their strong *sense of helplessness* in the absence of another person to rely on during an emergency; often these experiences had an impact on their future behaviour:

..."I went for a walk [by himself] in the street with my cane [visual aid] when the siren went on [refers to a rocket alert during a past security crisis] ...everybody ran, or

TABLE 1 Qualitative data analysis - emerging themes, categories and codes

Themes	Categories	Codes
A relational approach towards emergencies	Sense of helplessness in the absence of others	Fear of not receiving required assistance from others during an emergency Feeling incapable of taking care of oneself in a crisis Feeling unable to protect those under one's care (e.g. young grandchildren, spouse)
	Reliance and dependence on others	Family members are seen as responsible for emergency management: preparing emergency supplies, providing relevant information, assisting when evacuation is needed Childless individuals are perceived as highly vulnerable Individuals with sensory impairments tend to focus on the physical presence of others
	Caring for others	Primary concern is for the safety and well-being of family members rather than oneself Occupying oneself with other persons experiencing hardships during emergencies (young children, childless persons, IDF soldiers) Older age as an expression of a fully lived life and as a reason to focus on others and not on the self
Preparedness-related perceptions	Responsibility for initiating preparedness activities	Need of an announcement from authorities to initiate preparedness process Absence of a specific warning indicates a certainty that taking preparedness measures is not required
	Fatalism	Helplessness in the face of the forces of nature Helplessness in the face of an almighty God Belief that no one or no measure can alter the consequences of a given emergency (especially a natural disaster)
	Barriers for preparedness	Living on an upper floor of an apartment building Mobility impairment that limits personal ability to perform self-protective activities The use of walking aids as impeding ability to perform self-protective activities
Communication	Family as a source of information	Family members are perceived as primary source of information Information gained through family members is perceived as more reliable than that gained from authorities
	Traditional media	Radio and television were the preferred means for gaining information during emergencies Traditional means such as telephone were used for communicating with family members as well as healthcare professionals
	New media	Lack of knowledge about how to operate smartphones or the internet Acknowledgment of advantages of new media and a desire to learn how to use them Turning to younger family members familiar with the new media in order to obtain information or to communicate with others
Logistics	Nutrition management	Need of assistance from others to adhere to diet during routine times and emergencies Difficulty in obtaining special or fresh food products during emergencies
	Stockpiling and prioritising regular medications	Concerns regarding the ability of health funds to dispense adequate amounts of regular medications at times of emergency Concerns regarding their ability to provide less commonly used medications during emergency Difficulty in stockpiling due to health funds' policy to dispense medications for only one month ahead (in routine times)
	Expiry dates of emergency medications stock	Difficulty in constantly monitoring expiry dates of medications in the emergency stock Waste of expired drugs that were not used

hid... I was left alone. Everyone takes care of themselves in these moments... After it happened to me, I refrained from walking the streets alone".

Reliance and dependence on others during emergencies was another prominent category. The vast majority of participants pointed to family

members (mostly children) as the ones responsible for caring for them during emergencies. Mention of family members occurred very frequently in relation to almost every aspect of emergency management (e.g. preparing supplies, gathering information, possible evacuation etc.). Participants with sensory impairments tended to focus on the physical presence of others who could assist them during an emergency:

"If I'm inside the house and the siren sounds...that requires assistance ... to run to the secured space in the apartment ...I depend on the help of others!"

Focusing on and caring for others was prevalent among participants. Family members (mainly children) were their main object of concern. Others mentioned a general concern for individuals experiencing hardships, such as young children or childless individuals. Older age, as an expression of a fully lived life, was cited as a possible reason for focusing on others rather than on oneself:

"I didn't panic [when the emergency situation occurred]...I had no reason to. If something happens...so what? I am not young any more. So be it... I am not afraid for myself—only for others".

3.1.2 | Preparedness-related perceptions

Several issues were identified as having a potential impact on the decision to engage in preparedness actions. The role of the *authorities as elements responsible for initiating a preparedness process* was discussed. The conflict between the need for an early warning or announcement from the authorities (e.g. Homefront Command) regarding uncommon scenarios such as an earthquake and the nature of these events was mentioned by several participants. Despite explicitly acknowledging that the onset of some events may be sudden and unpredictable, the participants attributed their lack of preparedness to the absence of a clear message or guidance from the authorities:

"Once the Homefront Command speaks about it [earthquake] in the media—that you have to start preparing—of course we will do everything required...although I know it can happen without notice... If there isn't proper notice—no one will do anything..."

Some participants also revealed *fatalism* in the face of emergency scenarios, especially those inflicted by natural causes. This was expressed as a sense of total helplessness face to face with the forces of nature, and sometimes as helplessness before the Almighty. When this attitude was expressed, it was usually in the context of refuting the necessity of preparedness measures:

"If there is an earthquake, I don't think anyone can help. It's nature. It's an act of God and no one can help us. Not the mayor nor anyone. Even we can't help ourselves, because it's from God".

Most of the *impediments to emergency response* that were mentioned referred to the built environment, such as living in an apartment on an upper floor:

"How can I prepare myself here? My neighbours from the first floor—they can jump outside [in case of an earthquake]. Here, I am simply anxious, what will be with us who live on the 8th floor?"

Objective impediments impacting mobility limitations were also mentioned:

"In our daycare centre there are a lot of elderly persons [referring to persons using wheelchairs or other mobility aids], we have a secured space, but until they take us all inside, everything will be over..."

3.1.3 | Communication

The problem of obtaining information about emergencies was extensively discussed. Participants expressed heavy *reliance on family members*—both as information providers and as a source that was more trustworthy than the authorities or other official entities:

"Thank God, I learn everything from my daughter...I don't trust strangers. Sometimes strangers won't tell you the truth."

Almost all participants mentioned the use of *traditional media* (i.e. radio, television, newspapers and landline telephones) as primary sources of information during emergencies. Radio was the means most often mentioned by the older participants and those with visual impairments:

"My husband used to get us information [during a past security threat] ... from the newspapers, and we kept the radio turned on all the time".

Although the vast majority of participants indicated that they did not know how to use *new media technologies* (i.e. internet, smartphones), they explicitly expressed a desire to *learn to use them* and recognised the advantages that were inherent in their use.

"It's a shame I don't know how to operate a smartphone... people trust them more often these days...to seek information instead of calling everyone with my regular phone".

3.1.4 | Logistics

One of the salient problems associated with having a chronic health condition is the need to adhere to a regular medication regimen, and at times to special dietary recommendations as well. Diverse aspects of this issue were discussed by the participants in relation to the logistics involved.

Nutrition management was mentioned by participants who were diagnosed with diabetes mellitus:

"...sometimes I didn't have anything to eat [refers to food included in his diet] so I ate whatever was available. Usually what you can find in this kind of situation [his place of work during the same period of security crisis] is pastries."

The participants expressed concerns related to the health funds' ability to dispense adequate quantities of their regular medications in times of crisis, when *stockpiling for emergency use* may be difficult.

"The pharmacies are unable to supply; I mean—they do supply, but to a limited extent, or they lack some of the needed amount [of a specific medication]."

The same participant also referred to prioritisation of various medications. For example, in the case of medications that are not commonly used, availability in emergencies might be a particular concern:

"I take one drug that I have to import from abroad...it costs thousands! Will someone be responsible for importing it for me? [during or following an emergency]. Will they bring it to me?" [Laughs].

Other participants expressed concerns regarding *expiry dates of medications* and the constant need to discard the expired stock and replace it.

"A friend told me—look, if you keep your medications for emergency times, in a year from now if nothing happens they will have expired, and its gone!".

3.2 | Quantitative findings

A total of 179 individuals completed the questionnaire (60% response rate). The demographic characteristics of the study population are summarised in Table 2. The majority of participants were female (60%) and resided with a spouse (43.5%) or alone (33%). The mean age was 72 years ($SD \pm 8.5$), and 82.5% had children or other family members residing in Beer-Sheva. Eighty three percent of participants were not born in Israel, and the average time lived in Israel (since immigrating) was 54.5 years ($SD = 15.6$); 15% had an academic education, and 69% defined themselves as traditional or religious (Jews). The vast majority owned their home (73%), and most resided in apartment buildings.

3.2.1 | Emergency preparedness

Emergency preparedness was assessed using a 5-item checklist: 41% of participants kept food and water for use during emergencies; and

TABLE 2 Demographic and socioeconomic characteristics of participants ($n = 179$)^a

	Demographics		N (Total)	
			%	n
1	Gender	Female	62	111
		Male	38	67
2	Age (years; Mean + SD)		72 ± 8.5	(n = 179)
3	Household composition	Lives alone	33	59
		With a spouse	43.5	77
		With other family member	16	28
		With spouse and other family member	3	5
		Other	4.5	8
4	Family members in Beer-Sheva	No	17	29
		Yes, my children	56.5	97
		Yes, other family members	22.5	39
		Children & other family members	3.5	6
		Not relevant	0.5	1
5	Country of origin	Israel	17	30
		Other	83	147
6	Years in Israel-for those born abroad (Mean + SD)		54.5 ± 15.6	(n = 126)
7	Education	Elementary	30.5	53
		Secondary (High school)	27.5	48
		Tertiary	14.5	25
		Academic	15.5	27
		Other	12.1	21
8	Building type	Apartment building	57	99
		Private house	43	75
9	Religiousness	Secular	27.5	48
		Traditional	39	67
		Religious	30	52
		Ultra-orthodox	3	5
		Other	0.5	1
10	Homeownership	Own	73	129
		Rent	13	23
		Family ownership	8.5	15
		Public housing	5.5	10

^aWithout missing values; the rate of missing values ranged from 1% to 5% for the different variables.

a similar rate kept a flashlight and batteries (39%) and a radio and batteries (42%). Fifty-seven percent of participants kept a 3-day supply of prescription drugs, but only 23% kept copies of their prescriptions.

When position of "5-item family emergency kit" was analysed it was found that those who did not have even one item formed the single largest group (29%); and only 13.5% had all five items (meaning a full family emergency kit). The mean score of the preparedness measure (family emergency kit) was 2.5 ($SD \pm 1.9$).

3.2.2 | Health status and needs

A similar proportion of participants estimated their health status as "very good" or "good" (51%) and "not so good" or "not good at all" (49%). Table 3 depicts the distribution of chronic health conditions among the study participants and indicates whether they were receiving treatment or using aids. The chronic disease index (calculated based on the first 11 items) indicated that 57% of the participants suffered from at least one chronic health condition. The disability index (calculated based on the last 3 items) indicated that 36% of participants had some kind of physical impairment (i.e. gait, hearing, or visual impairment).

TABLE 3 Distribution of chronic health conditions among the study participants, $n = 179$ (according to self-report)

Condition	N (%)	Receiving drug treatment or using aid N (%)
<i>Chronic health conditions</i>		
1 Arthritis	13 (7%)	3 (2%)
2 Back or neck problem	35 (20%)	2 (1%)
3 Fractures, bone/joint injury	27 (15%)	—
4 Diabetes	44 (25%)	10 (6%)
5 Lung/breathing problem	5 (3%)	—
6 Hypertension/high blood pressure	50 (28%)	12 (7%)
7 Heart problem	38 (21%)	14 (8%)
8 Kidney problem	9 (4.5%)	Dialysis 1 (0.5%)
9 Depression/anxiety/emotional problem	3 (2%)	0
10 Stroke-related problem	7 (4%)	0
11 Cancer	6 (3.5%)	1 (0.5%)
<i>Disabilities</i>		
12 Walking problem	34 (19%)	Walking aid = 17 (9.5%)
13 Eye/vision problem	30 (17%)	Glasses = 21 (12%)
14 Hearing problem	22 (12%)	Hearing aid = 10 (6%)

Items 1–11 composed the chronic disease index; items 12–14 composed the disability index.

3.2.3 | Risk perception

Risk perception was assessed using a three-item measure which examined: participants' evaluations of the likelihood of a large-scale emergency occurring in the near future (the example of an earthquake was mentioned in the survey); its perceived effect on the participant and his/her household members; and perceived general concern about future large-scale emergencies. Most participants reported medium-low levels of belief that a large-scale event would happen in the near future (75%); similar results were obtained for perceived effect and general concern (73% reported medium-low levels for both items). The average risk perception score was 2.5 (out of 5; $SD \pm 1.1$).

3.2.4 | Preparedness-related perceptions

This section included items related to: (a) trust (six-item measure) and included indicators such as: interpersonal trust, trust attitudes, trust in institutions (i.e. local municipality, healthcare services, and Homefront Command), and trust in the family to care for the respondent during and following emergencies; (b) fatalism (two items) in relation to future emergencies and their consequences. One item dealt directly with an earthquake scenario. The participants reported that they trusted their families and Homefront Command the most (76%), followed by the healthcare services (59%) and the local municipality (49%). Thirty-two percent of participants believed that it is impossible to prepare for rapid-onset events, and 52% perceived the adverse consequences of a destructive earthquake as inevitable.

3.2.5 | Exposure to information

Exposure to information during emergencies may occur in various ways: talking with family and friends, radio, television, newspapers, surfing websites (using a computer), and using smartphones. Television and radio were the most popular of the media (84% and 78.5% of participants, respectively, reported using these media extensively to very extensively); they were followed in popularity by talking with family and friends (61%), smartphones (39%), newspapers (38%), and surfing websites (34%).

3.2.6 | Relation between preparedness measure and study variables

The preparedness measure associations with nominal variables (gender, country of origin, type of residential structure, home ownership status, household composition, family support) were assessed by conducting a Mann-Whitney *U*-test and Kruskal-Wallis one-way analysis of variance. Gender and household composition were significantly associated with having higher levels of emergency preparedness, as represented by median score (MD) and interquartile

range (IQR). Females showed significantly higher levels of preparedness compared with male participants: MD = 2 (IQR = 1–4) versus MD = 1 (IQR = 0–3); $p < .05$, respectively. Participants who resided with family members or a caregiver had significantly higher levels of preparedness than persons living alone: MD = 2 (IQR = 0.75–4) versus MD = 1 (IQR = 0–2); $p < .05$, respectively. Other variables did not reach statistical significance ($p > .05$).

Table 4 presents the inter-correlation matrix between emergency preparedness level and other ordinal and continuous study variables. A significant association to levels of preparedness was found between risk perception and level of physical disability (disability index), but the latter was significant only in one (of two) correlation tests.

4 | DISCUSSION

The aim of this study was to gain a thorough understanding of the unique perceptions and diverse needs of adult MVPs in emergency situations. The findings are discussed below in relation to various aspects of emergency management as well as to health and social care in the community.

Relatively low levels of personal emergency preparedness were found among community-dwelling MVPs, as reflected in the low rate of survey participants keeping a full emergency kit in their homes. Previous findings regarding MVP personal preparedness are inconclusive. While a U.S. study reported levels of preparedness similar to our results (Bethel et al., 2011), a Hong Kong study found high preparedness among elderly participants, many of them chronically ill (Loke, Lai, & Fung, 2012). This difference may originate in socio-cultural and environmental differences and highlights the importance of assessing MVP preparedness in specific contexts. The qualitative interviews pointed to possible explanations (later supported by the survey results) for the varying levels of MVP preparedness: First and foremost, preparedness was perceived as the responsibility of others—family members (mainly grown children), and relevant authorities (e.g. Israel Defense Forces' Homefront Command, healthcare services, local municipality). The survey results indicated family and Homefront Command were seen as the factors chiefly responsible for taking care of the individual in an emergency; and indeed, survey participants living alone reported lower preparedness levels than those living with family or caregivers. Family solidarity in Israel is considered relatively high, and family members play a central role in caring for older adults (Daatland & Herlofson, 2003; Katz, 2009). The propensity to rely on others, along with the fact that Israel is a welfare state in which public institutions are often charged with providing services related to the wellbeing of individuals, including during emergencies (The Reut Institute, 2009), is one possible explanation for the low preparedness of the MVPs. Other factors that were mentioned in the qualitative study as potential barriers to preparedness were either objective, such as mobility limitations (physical disability), or perceptual, such as a sense of fatalism;

TABLE 4 Means and correlation matrix between study variables

Variables	M (SD)	Emerg. prep.	Age	Resident in Israel (time)	Educ.	Relig.	Health status	CD index	Dis. index	Risk percept.	Trust	Fatal.
Emergency preparedness (Emerg. prep.)	2.01 (1.78)	—	0.016	0.006	-0.009	-0.009	-0.139	0.041	0.119	0.266**	0.128	-0.004
Age	72 (8.56)	0.015	—	0.202*	0.206	0.046	0.257**	0.125	0.148	-0.009	-0.125	0.040
Israel residence (time)	54.44 (15.66)	-0.018	—	—	-0.339**	0.064	-0.017	-0.142	-0.143	0.105	-0.016	0.069
Education (Educ.)	N/A	-0.005	-0.025	-0.313**	—	-0.049	-0.109	-0.067	-0.047	-0.075	-0.100	0.098
Religiousness (Relig.)	N/A	0.010	0.067	-0.022	-0.118	—	0.115	0.242**	0.080	-0.043	0.121	-0.160*
Health status	N/A	-0.120	0.280**	0.057	-0.127	0.099	—	0.361**	0.156	-0.067	-0.180*	0.111
Chronic Disease index (CD index)	0.97 (1.08)	0.046	0.202**	-0.079	-0.137	0.201**	385**	—	0.350**	-0.077	-0.067	0.023
Disability index (Dis. index)	0.48 (0.72)	0.189*	0.185*	-0.070	-0.065	0.051	0.149	0.292**	—	0.061	-0.159*	-0.097
Risk perception (Risk percept.)	2.57 (1.19)	0.283**	-0.048	0.118	-0.072	-0.043	-0.069	-0.062	0.141	—	0.010	0.201*
Trust	3.5 (0.93)	0.083	-0.161*	-0.017	-0.081	0.145	-0.180*	-0.063	-0.200**	0.013	—	-0.033
Fatalism (Fatal.)	3.19 (0.94)	-0.020	0.029	0.062	0.099	-0.125	0.089	0.010	-0.030	0.172*	0.042	—

* $p < .05$; ** $p < .001$.

however, none of the latter findings were supported by the quantitative study results. Risk perception was revealed as a factor associated with preparedness in the quantitative survey; in the literature, however, the nature and direction of this association has not been consistent, and it is often modified by other factors such as trust and emotions (Miceli, Sotgiu, & Settanni, 2008; Terpstra, 2011; Wachinger, Renn, Begg, & Kuhlicke, 2013). Further inquiry is needed to better understand the meaning of this association among MVPs, especially as preparedness appears to be framed as a familial concern rather than a self-concern.

Two other themes that emerged in the qualitative study were communication, on one hand, and logistics regarding nutritional needs and medication supply and storage, on the other. These issues have also been mentioned as barriers to preparedness in an earlier U.S. study; however, in that study the subjects were young, healthy homeowners, and therefore the perspectives discussed were somewhat different from those detailed in the current study (Diekman, Kearney, O'Neil, & Mack, 2007). Our results stress another major role of families in emergency management—that of serving as a primary source of information, the other preferred sources being radio and television; this was reflected in both the qualitative and the quantitative results. These findings have important implications for risk communication among MVPs: the widespread use of social media in the new emergency arena (Simon, Goldberg, & Adini, 2015) is inapplicable when it comes to MVPs, since the majority of those concerned are unable to use smartphones and computers. Traditional media are the preferred (and widely used) venues for disseminating information to MVPs during emergencies. However, the new media can still be of value through family or caregivers: designated mobile apps could be developed for MVP family members or caregivers that would allow them to share location and special needs with the relevant authorities during emergencies.

Logistics issues reported by the MVPs centred on prescription drugs and nutritional needs. Stockpiling of drugs was hampered either by the health funds' drug distribution policy or by the participants' reluctance or inability to maintain an up-to-date stock of medications. Furthermore, the percentage of participants who kept copies of prescriptions was small. This could pose a double challenge to healthcare services: in an emergency many MVPs are likely to run out of regular medications, and if medical records are inaccessible it would be difficult to identify the drugs required. Just such a scenario played out in previous events, leading to severe disruption to continuity of care, exacerbation of existing morbidity, and imposition of a considerable burden on healthcare services in affected areas (Bloem & Miller, 2013; Greenough et al., 2008; Kishimoto & Noda, 2012; Ochi, Hodgson, Landeg, Mayner, & Murray, 2014).

In light of the current findings, it is clear that a more proactive approach to assuring the emergency preparedness of community-dwelling MVPs is vital. Community healthcare workers responsible for their routine care (both clinical and non-clinical) could become preparedness agents by taking some simple steps, such as

printing an "emergency card" detailing current diagnosis and regular medications once a year during routine clinic visits and ensuring that this card is stored in the person's wallet. If this is done methodically and consistently, emergency teams will be able to locate and consult the card to provide better care during a crisis when medical records are inaccessible. Healthcare institutions should also stockpile drugs for common conditions to avoid exacerbation of morbidity. The present survey details the conditions prevailing in a specific Israeli community, and it is recommended that other communities or states conduct a similar preliminary investigation. Social welfare workers can motivate MVPs by discussing preparedness through a relational approach: for example, they might explain that adequate preparedness on their part would contribute not only at a personal level but also to the community or even at the state level by reducing the burden on family members and emergency teams.

The present study was conducted in a specific regional community in Israel which may well have unique attributes differing from those of MVPs elsewhere. Added to the fact that the quantitative survey encompassed a relatively small sample, the regional character of the study may limit its generalisability and should be taken into consideration when interpreting the results. Still, the adoption of a mixed methods approach strengthened some of the findings and facilitated an accurate interpretation of others. It is expected that adopting such an approach will assist practitioners and policy makers in translating the research findings into practice (Bayliss et al., 2014; Creswell, Klassen, Plano, & Smith, 2011; Glasgow & Emmons, 2007).

5 | CONCLUSIONS

Improving the emergency preparedness of MVP is crucial regardless of region or scenario. This study revealed the need for a more proactive approach towards MVP preparedness and for enhancing the contribution of healthcare and social welfare services to accomplishing this goal. Simple and practical recommendations to promote preparedness are provided. Adopting such an approach, which frames preparedness as the joint responsibility of the individual, his family, and community institutions, may assist in maintaining continuity of care among vulnerable populations and mitigate adverse health outcomes in future events.

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