

Life, Trauma, and Growth in Adult Female Survivors of Bam Earthquake: The Phenomenology of 16-Year Post-Earthquake Lived Experience

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Research Article

Keywords: Earthquake, Phenomenology, Post-traumatic stress disorder, Post-traumatic growth, Women

Posted Date: May 20th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-514117/v1>

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Abstract

Background: Earthquake, as a natural disaster, is considered to be one of the traumatic events. Considering the concept of trauma and two consequences of the earthquake (namely stress and growth), the present study aimed to delve into the 16-year post-earthquake living experience of adult female Bam earthquake's survivors and its relationship with their current lives.

Methods: This qualitative study was carried out in 2018, in which the interpretive phenomenological analysis method was adopted, and in-depth semi-structured interviews were run. In this study, six 22-34-year-old adult female survivors in the age range of 6-18 years at the time of the Bam Earthquake (2007) were selected using the purposive sampling method. Moreover, thematic analysis was used to extract the themes.

Results: The participants' lives could be depicted using the following themes: life before the earthquake, the moment of the earthquake, the first days after the earthquake, back to life, fear, regret, and excellence after the trauma.

Conclusion: According to the findings, the pre-earthquake life and post-earthquake social support, including the same identity of the earthquake (e.g., Bam) survivors, are the significant dimensions making the tolerance of the earthquake experience possible. Moreover, the proximal experiences of fear and regret, as common orientations of traumatized individuals towards the future and the past, were also reflected in this study. Furthermore, all the participants reported Post-Traumatic Growth (PTG) experiences in their current personality, indicating the intertwined relationship between traumatic injury and trauma tolerance. This study's findings would provide researchers and practitioners with a deeper understanding of the same population's strengths and weaknesses. Policymakers are recommended to include supporting policies for earthquake survivors' resilience in their public health plans.

Introduction

About one million earthquakes with different magnitudes occur annually, at least ten of which are traumatic and cause extensive damage. It is estimated that large-magnitude earthquakes release energy as much as the most destructive nuclear weapons. The most powerful recorded earthquake is placed at 8.9-9 on the Richter magnitude scale. The 2003 Bam earthquake on January 26 was one of such earthquakes, which occurred at 5:27:29 for 12 seconds and had a magnitude of 6.3. In Bam, with a population of about 97000 persons, the earthquake claimed 35,000 lives and injured 60,000 persons. Compared to the current statistics, the morbidity and mortality rates of the Bam earthquake were much higher than many major earthquakes worldwide. Following this devastating earthquake, approximately 30,000 residential or commercial complexes were completely or partially destroyed. The same also happened to many state buildings and two hospitals in the city (Abolghasemi et al., 2006; Raissi, 2007; World Health Organization, 2003). This catastrophic tragedy has remained numerous devastating

psychological, physical, and social consequences, especially for women (Montazeri et al., 2005), even after more than a decade (Divsalar & Dehesh, 2020).

The earthquake survivors' experiences can be described in the compact concept of trauma. The term psychological 'trauma' refers to any natural and human accident leading to problems such as the loss of a loved one or favored properties, which usually disrupts individuals' adaptive power. An accident encompasses any kind of natural and unnatural disaster, including flood, earthquake, war, car accident, street or family violence, death of a loved one, and others. Disasters often cause emotional, cognitive, behavioral, and psychological complications and even some attitudinal changes in religious beliefs. According to many studies, after experiencing earthquake trauma, the rate of different psychological disorders such as posttraumatic stress disorder, depression, sleep disorders, substance abuse, and anxiety disorders increases (J.-Y. Lee, Kim, & Kim, 2020; Makwana, 2019).

In this regard, posttraumatic stress disorder (PTSD) is introduced as the most common post-earthquake mental disorder (Schwind et al., 2019; Yang et al., 2020), which has been documented to be highly prevalent among the Bam earthquake survivors (BES) (Divsalar & Dehesh, 2020). To diagnose PTSD, in addition to experiencing at least one traumatic event accompanied with powerful feelings of fear or helplessness, one must experience at least one symptom of re-experience, three symptoms of avoidance and numbness, and two symptoms of hyperarousal over a month, and such symptoms should have caused discomfort and disruption in his/her functions (Carmassi et al., 2013). The disorder can arouse problems in various dimensions, including physical functioning (Glynn et al., 2021), sexual functioning (Carmassi et al., 2020), and social functioning (Scoglio et al., 2020), and even brain functioning in terms of positive rewarding (Seidemann, Duek, Jia, Levy, & Harpaz-Rotem, 2021).

On the other hand, many studies have also dealt with Post-Traumatic Growth (PTG). In medicine, the term 'PTG' refers to bones that become highly thick and robust bones healed after a fracture. PTG refers to the experience of significant positive changes caused by the dangers arousing from extremely critical moments in life (Zoellner & Maercker, 2006). The commonality among the proposed definitions is thus the positive changes reported by individuals after trauma. PTG is theorized as the adaptive effects of trauma would be manifested as a unified sense of oneself, a greater range of identity-seeking, a desirable sense of self-satisfaction, a sense of competence, a sense of resilience when facing life challenges, a change in new possibilities for the emergence of metamorphosis in goals, a change in personal empowerment, changes in particular interpersonal relationships, closer relationships with family members or other important individuals (meaning relatives and acquaintances), conciliatory tendency, increased capability to protect oneself and prevent abusive relationships, further altruism, enhanced willingness to accept help, enhanced sensitivity to others, and further openness to new behaviors, or perception of one's existence, changed facilities, strong beliefs, seeking meaning in life, and new perceptions of life (Linley & Joseph, 2004; Tedeschi & Calhoun, 2004). It is evidenced that PTG markedly occurs in earthquake survivors (Guo, Liu, Kong, Solomon, & Fu, 2018; Jin, Xu, & Liu, 2014; Leiva-Bianchi, Mena, Ormazábal, Serrano, & Rojas, 2020), render it to be a pivotal aspect of earthquake survivorship.

Failure to deal with trauma and its consequences would change the survivors' quality of life for the coming years. Due to the lack of a systematic approach to mental health in Iran and the large extent of the Bam earthquake, many destructive psychological symptoms and effects of this accident are still observed among the survivors, and their treatment and quality of life have not been adequately explored. In this regard, the surviving female population is of greater importance. Their vulnerability and their role in disasters further highlight the need for in-depth delving into their life experiences (Enarson, Fothergill, & Peek, 2007; Enarson & Meyreles, 2004). In the same vein, the social structure of women's vulnerability was revealed to be as if they had lower life expectancy than men when tackling disasters (Neumayer & Plümper, 2007).

Accordingly, the two aspects of PTSD and PTG were considered in the present qualitative study as the basic presuppositions of two significant post-earthquake consequences. The two major post-earthquake consequences were included in this study regarding the main researcher's lived experience as both a survivor and a therapist and being explicitly represented during the female participants' lived experience. This study was not explicitly concerned with a specific meaning of gender (Enarson et al., 2007); however, it explored the lived experience of adult female BES, who experienced the Bam earthquake in their childhood (7-18 years old) and reviewed their 16-year post-earthquake experience in 2018. Note that few studies have been conducted in Iran to discover the lived experience of this population. Accordingly, an in-depth investigation of this issue is of great importance to explore different aspects of this traumatic experience phenomenologically from the perspective of the female survivors' lived experience and detect its relationship with their lives today.

Methods

The interpretive phenomenological analysis approach was adopted in this qualitative study. The approach is to discover the meaning existing in the network of individuals' detailed experiences by reflecting on the main issues in participants' lives (Smith, Flowers, & Larkin, 2009). A purposive sampling method was used to select the participants. Sampling was performed via a call on social networks for individuals from different age groups of adults aged 6-18 years during the Bam earthquake. In the present study, the number of samples was determined according to the saturation of the data obtained from the interviews. Finally, six individuals were selected to be included in this study, who were in the age range of 22-34 years and had experienced the Bam earthquake in person. Table S1 presents the participants' demographic information.

Reviewing the candidates' information and selecting them to be included in the present study lasted from April to May 2017, and the interviews were also conducted from May to June 2017. Each interview lasted 90 minutes on average. The researcher spared his efforts to provide the same interview conditions for all the interviewees. Prior to the interviews, the participants received the same explanations regarding the research objectives, procedures, information confidentiality. After obtaining informed consent, the interviews were conducted in the form of personal video calls on WhatsApp while considering confidentiality issues. All interviews were audio-recorded with the interviewees' consent. The interviews

were then transcribed verbatim by the interviewer (RJ). It should be noted that many components of the questions were raised by the participants narrating their life stories while the examiner asked no relevant questions. All methods were carried out in accordance with relevant guidelines and regulations.

Data collection

In this study, semi-structured in-depth interviews were conducted to collect information. To develop the interview questions, unstructured interviews were first conducted with two members of the community. The information extracted from these two interviews and the researcher and experts' comments and points extracted from the literature resulted in the final pool of questions. When developing the questionnaire items, the participants' lived experience with regard to their life history at different stages before and after the earthquake was of concern. According to the literature, the researcher spared efforts to consider the areas that have been commonly considered significant in most trauma recognition theories to develop the inquiries. Finally, the preliminary interview questions were confirmed by the research supervisors (RP and SS).

The first question was as follows: "Suppose that your life has a story and you are to author a story book with each turning point in your life being a book chapter. Now, would you please tell me the chapters of this book?" This question was asked to detect speech coherence, discover what is important to individuals in their history of life and earthquake, and encourage them to speak and share their own experiences. Subsequent questions were extracted from the "chapters" presented by the interviewees, which addressed the following concepts: relationships with family and friends before and after the earthquake, death, tackling with trauma and grief, living under challenging conditions after the earthquake, and metamorphosis. Each concept was dealt with the main question and some sub-questions. Table S2 summarizes the sub-questions questions, and Table S3 presents the considerations concerned by the interviewer (RJ) during the interviews.

Analysis

Smith et al. (2009) introduced six steps of analysis: 1) Reading the text several times and taking some preliminary notes; 2) Identifying emerging themes; 3) Searching to find relationships between themes; 4) Preparing a systematic table of themes; 5) Analyzing other texts; and 6) Writing a general analysis. RJ and SB collaborate in this phase, in which all the steps were repeated for each interview and then for all interviews to coherently reflect the participants' narratives. The co-authors monitored the procedure to enhance the credibility of the study by promoting the consensus between the researcher and observers. To this end, the aforementioned steps were approved and reviewed step-by-step by all authors, and after confirming and applying their comments, the subsequent stages were adopted.

Results

The study findings were classified into seven main themes and their corresponding sub-themes. Table S4 reports the themes and sub-themes, their frequency, and summarized descriptions. The themes were

mainly titled according to the interviewees' wording in describing their experience as much as possible. The participants are introduced using pseudonyms to maintain confidentiality.

Theme I: Life before the earthquake

In response to the first question, all the participants chaptered their narrative storybook by dividing life into *pre-earthquake* and *post-earthquake* phases. In this theme, they described their pre-earthquake living conditions by discussing issues such as their economic conditions, relationship and emotional connection with family members and friends and the surrounding community, and so on by night before the earthquake. They finally described the sparks of the earthquake thought arousing in their mind just the night before the earthquake. Such sparks had been emerged in their minds because of the aftershocks.

Sub-theme I.I: Economic status and financial resources

Most of the interviewees considered acceptable financial status before the earthquake as one of the factors making their conditions difficult after the earthquake. They considered it a reason for a significant contradiction between the economic conditions before and after the earthquake. For example, *Fatemeh siad* about her family's economic status before the earthquake,

"Financially, we were above average. My mom and dad were teachers and so sensitive about their children. They prepared us everything, and I had no financial problem. Everything was fine, I was the happiest girl on earth before the earthquake."

Sub-theme I.II: Relationship network

Approved relationships can play a critical role in any individual's healthy growth. The same point also came true for the participants of the present study as the participants highlighted this point in describing the network of their relationships before the earthquake. For example, *Najmeh* mentioned,

"I was living in a very happy family before the earthquake. Everything was going well, and my parents had a very good relationship with each other. I cannot remember their having any problem at all. We lived in a very healthy family, and my parents were both teachers. We were three siblings ... We had a great life, we had good family relationships, and my relationship with my family was also excellent. Everything was OK."

Sub-theme I.III: Earthquake, what we had thought about!

Given the shocks occurred three days before and the night before the earthquake, most of the interviewees had thought about the earthquake and had considered its probability before the mainshock, some of whom had even adopted the required measures to deal with this event. *Farnaz* noted,

"The night before the earthquake, it was the wedding ceremony of our neighbor's daughter. We were there by about 3:00 AM. People coming to the ceremony stated that the earthquake was likely because the

foreshocks occurred at 10:00 PM. The same night, we visited our mom's uncle in the alley; he told us "Don't worry, who has said an earthquake is supposed to happen? No earthquake is going to occur. The armies are doing military exercise tonight, so the shocks are likely because of this issue."

In addition, *Sadaf* talked about the other predictive signs of the earthquake,

"I well-remember it was a holiday. I was sleeping in my room. My three-year-old brother was very naughty ... I felt he was shaking my bed... My eyes were still closed. I yelled Mom, Ali! My mom asked what was wrong. I answered, "say a word to Ali, he is always shaking my bed. He wakes me up." She answered back that Ali was by her side and he was not in my room at all ... I told her that my bed shook and it could have been an earthquake. My mom did not accept my word and said that they were sitting and did not feel anything. I was sure it was an earthquake! However, I completely forgot that there was an earthquake and it might continue again! Well, I had no information about the earthquake at that time, I just heard something about it, but I didn't know what it was! I did not know that it completely destroys everything."

No matter whether the interviewees, either consciously or unconsciously, took the foreshake and aftershock signs seriously, the earthquake raised a catastrophic event.

Theme II: Earthquake

The main and the most heartbreaking points mentioned by the interviewees were associated with the moment when the earthquake happened. The interviewees had experienced tough experiences at the moment, from staying under the rubble to making attempts to escape and save their lives, getting injured, and so on.

Sub-theme II.1. At the time of the earthquake and escaping

Each of the participants described the time of the earthquake as one of the most breathtaking moments. *Farnaz* described the time of the earthquake as follows:

"When I opened my eyes, I felt that our house was shaking, everyone but my cousin and I, who were of the same age, had left the house. Then we both ran outside. When running away, we both were stumbling and hitting everything. Then we hit the stove, but we stood up again and went outside. When we arrived there, we saw our mothers waiting for us...."

Having enough knowledge about how to deal with an earthquake may reduce the severity of the damage; however, most of the interviewees indicated that they were confused at the time of the earthquake and were just trying to escape. *Mahin* also described the time of the earthquake as follows:

"I remember the moment when my mother threw herself on me. I clearly remember that I was a child, and my father told her, "Get away from her, she cannot breathe. When we could open the door and get out, that mainshake had just happened."

Fatemeh explained her experience of being under rubble as follows:

"When I was to stand up, I found out that I could not do so, I could not breathe. my lungs were full of dust, I could not breathe at all, I just yelled out. My brother said "Dad, here, she is here!" They pulled the dust and rubble away and then walked away. I did not understand anything until I saw my aunt standing above me. They picked me up and took me to the yard ... there was still an earthquake and I was watching the building shaking"

Elaheh also narrated her lived experience from the time of the earthquake as follows:

"Trembling sound... the windows were shaking, as if the room was turning around our heads ... I was holding my mother's hand firmly ... I was thinking about my math test tomorrow and how I was supposed to take the test. I supposed it was just happening in our house, and I really had no idea of what was going on outside. ... I was looking at the ceiling of the room ... it was falling down, ... The ceiling was not falling down on the side where we were standing. Then a beam fell down ... The earthquake lasted for 13 seconds; however, it seemed to me to be 13 years. Why wasn't it supposed to be over yet !!!"

The narrations were filled with the experiences of fear, shock, injury, and loss, arousing emotional tensions during the interview.

Sub-theme II.II: Environmental conditions

Environmental conditions were one of the sub-themes highlighted by the interviewees in this study before, during, and after the earthquake. Bam is a desert city, so it has hot summers and cold and dry winters. The Bam earthquake on December 26, 2003, happened in the winter when the cold weather killed many survivors of the earthquake. The interviewees described the cold weather as one of the most challenging environmental conditions after the earthquake.

In this regard, *Farnaz* described the first moments after rescuing herself and her family from death as follows:

"It was very cold, I remember that we were shivering, we were feeling very cold. My mother was standing there. Since we were children and could not stand the cold weather, I was standing on one of her feet, and Mohammad, my cousin, was standing on her other foot... because we did not have slippers! Because the ground was cold, and she didn't let our feet be on the ground."

In the words of five interviewees, very harsh environmental conditions were mentioned from the early days after the earthquake, the days that were experienced years after the earthquake.

Sub-theme II.III: death and injury of family members

According to all the interviewees' lived experience in this study, the worst memory of the Bam earthquake, which was not to be forgotten forever, was the death of their beloved ones. All the interviewees mentioned that their beloved ones' death was much more unbearable than the loss of their homes and belongs. They

referred to the earthquake as the looter of their lives and property. In this regard, *Farnaz*, who was feeling blue, noted,

"I saw that the house of my mother's uncle was destroyed, they were pulled out of the rubble ... They had a small child who was two years old ... Aref ... I was a child, I did not know that Aref was no longer alive, I thought he was sleeping ... I did not realize what had happened, I was telling my mom to give Aref to me, I want to hug him, ... I remember ... My mother cried more and was more impatient. She was the one who told me that Aref was no longer alive"

Fatemeh recounted the loss of her family as follows:

"My mom was under the rubble, and she had hit her head. My father had brought my mom to Kerman; however, there was no room in the hospital. They were going to send her to Tehran, and she was supposed to have a surgery. We were hopeful. I visited a holy shrine in Kerman and donated my bracelet there... But my mom never underwent a surgery. She passed away three days later ..."

Sadaf, who lost her grandfather, grandmother, and others in this event, burst into tears and said,

"When I got out of the car, I could only see my grandfather's feet in the back of the car. I just realized what had happened, I yelled and said, "Mom, tell them they are fine, tell me you are taking them to the hospital ..." She told me, "It's OK, and Go home. I will come soon." Men try not to believe it and suppose that they are fine, but it was not like that ...When Grandpa's cold and blue legs were out of the car, I was just watching him to see any movement ... I told myself that they are to move now ... But the car was going away, and my grandfather's feet did not move ... My cousin, my mom's cousins, my mom's cousins, my grandfather, and my grandmother and many of our relatives passed away in the earthquake"

All the interviewees had lost many of their friends, relatives, and family members in the Bam earthquake, and the effects of such a loss on the female survivors of this study have remained after 16 years.

Sub-theme II.IV: Physical injuries

Many individuals suffered from physical injuries in the Bam earthquake, which have sometimes been irreparable and caused serious disabilities and limitations. Two of the interviewees in this study described their physical injuries as follows:

Mahin: *"... During the first few seconds under the rubble, everything was going wrong, and we did not even notice that I had broken my head. My father had hugged me ... It was very cold, and my father was wearing a jacket. A few hours later, when he unzipped his jacket, he found his jacket bloody. We did not know what had happened. After a few hours, I felt my head was burning, and I had a headache, that is when that we found out my head had been injured ..."*

Fatemeh: *"My teeth were full of blood. My jaw was full of blood. When the rescue team arrived, I said that I was fine. I was sitting in the park, and I did not know how it happened! In the park, the woman, who was*

living next door and was a doctor, put a few stitches on my head My jaw had been broken, and eight of my teeth had also been broken ..."

These reports indicate that the experience of post-earthquake mental disturbance was so severe that it overshadowed the physical pain and injuries.

Sub-theme II.V: Getting shocked

Posttraumatic shock is one of the consequences of the unexpected events such as an earthquake. The interviewees had experienced feelings of shock in different situations, from the moment the shock made the body a stranger, as the injured did not realize the pain caused by the injury until hours after the earthquake when they witnessed the death of their beloved ones and their city under the rubble, etc. The first reaction to this shock usually was the denial of reality.

As Farnaz mentioned, "... I was shivering, I was getting shocked, I did not even speak ..."

Mahin also talked about his shock sadly,

"There was much fear, so much fear. I do not remember crying; I did not react excitedly. I was mostly shocked ... When we passed from my school, the school was completely destroyed, but its door ... All these years, I have had all the scenes, even my pre-school friends, in my mind and I can well-remember them. However, I do not remember anything about the school. I do not even remember any of my friends' names. I do not know anything about them. I think I cannot remember anything because of the earthquake shock since I remember before and after the school but not the school."

In this regard, the traumatic person seemed to have completely forgotten a part of his memories due to the shock caused by the trauma.

Theme III: First days after the earthquake

All the interviewees recalled the first days after the earthquake, when they experienced difficult emotional conditions, left with the disaster, and felt a lack of resources. This issue is addressed in this theme and its sub-themes.

Sub-theme III.I: Tough emotional conditions

The loss of intimate friends, relatives, and family members, the psychological damage to oneself and one's family members, the addition of some new members to your family because of the death of their family, and so on indicate that one of the most difficult experiences of the participants after the earthquake was their emotional relationships.

Farnaz described her tough emotional experience in the days after the earthquake,

"Narjes ... she was one of our family friends' daughter ... I liked her very much ... we were playmates, she lost her family members but her father ... she lived with us for a long time... One day, I was insisting that I wanted to hug my mom and sleep by her ... My mom was to let me know that it was not OK... She finally took me to a corner and told me, "Narjes ... she has no mom now... if you come by my side, Narjes also wishes to be by her mother ... you break her heart."

In another example, *Fatemeh*, who could not even visit her mother's grave, pointed out this issue as one of the emotional difficulties of those days,

"Everyone was involved, and they did not take me to the graveyard at all. I was not feeling well. ... I was in the center of attention, but they did not take me to the graveyard, No! ... It was a highly tough period."

Sub-theme III.II: Obligatory Migration

In the very first days after the earthquake, most of the survivors were forced to emigrate, either temporarily or permanently. They referred to such a migration to cope with the event first and then return to the scene and rebuild their lives. In many cases of emigration, each family member had emigrated to a different city to live with a relative or friend. Immediately, the family members ended up being far from each other. This was one of the main hardships in the days after the earthquake: mourning for lost beloved ones, away from other beloved ones.

In this regard, *Sadaf* said,

"They took my brother and me to Zahedan to my mother's aunt for a few days. We were there for a week or two. My father took my aunt and uncle, who were injured, to a hospital in Yazd... After two weeks, my father came after us and took us to a friend's house in Yazd. We were living away from my mom and dad from January to March."

Except for five of the participants who recounted the obligatory migrations with unpleasant feelings and unhappiness, one of the participants considered the migrations as a turning point in her life. *Sadaf*, who migrated from Bam to Yazd forever after the earthquake, notes,

"I was in Yazd, and it was very good for me. During the secondary school period, when girls know themselves little by little, thus having a great effect on their personalities, it was very good for me to leave Bam for the lovely Yazd. My perceptions of many issues changed a lot. Yazd was a very good and big city, and the bigger the cities are, individuals are more cultured, and everything is different. These points were good to me. But this does not mean that the earthquake itself was good."

Sub-theme III.III: Shortage of resources

According to the participants, the days after the earthquake, nothing was right. Nothing! No proper food, no proper medical and health conditions, no warm and safe shelters, and no other things. *Farnaz* talked about the life hardships after the earthquake,

"We lived in a tent ... I was a child, and it was less hard for me. But I remember it was very difficult for my mother... I remember those who were tall could not stand up in the tent, and they had to bend down. In terms of food ... I remember we always ate canned beans and fish ... I remember when my uncle came and told us ... "I want to make new food for you. Smoked fish ... When we wanted to eat different food, we used to eat this food. Or ... my dad was involved in the Red Crescent Movement... He brought me a toy. There was no one to bring anything just to me. But when I was showing it to the others, I heard them saying that I had the toy because his father is in the Red Crescent Movement. When I heard this issue, I no longer wanted to have toys."

Many of the Bam earthquake victims were not concerned with economic problems even after the earthquake since they had date businesses, and they only suffered from the shortage of resources. *Elaheh*, however, had a different experience,

"My dad had a bookstore and a stationery shop center. Well, during the earthquake, our shop was completely destroyed, and nothing was left."

Elsewhere, *Elaheh* referred to the shortage of educational resource,

"The earthquake affected everything. It even had an impact on the study major we wanted to choose. No school, but a magnet school, had mathematics. We went there, studied, and were humiliated. We were finally accepted to be registered by a school that was only teaching biological sciences. There were no even a school, but they were some shelters, which were called school. The earthquake really ruined everything. I still think about it after 16 years."

Theme IV: Back to Life

In spite of all the hardships of the first days of the earthquake and all the pressure, mourning, and difficulties, individuals finally come back to life and adapt to new conditions. In this section, we see how each of the participants were back to life and created new grounds for themselves.

Sub-theme IV.I: First positive events

Getting rid of the challenging mental conditions caused by the earthquake was associated with a positive event for each of the participants. The first positive event that happened after the earthquake and they still remember it reveals a kind of turning point in this story. It was the first hope emerged, telling the victims that life was still going on. IN other words, the positive events tell life is going on again.

Najmeh considered her brother's birthday as the first positive event after the earthquake,

"When my mom passed away in the earthquake, my father remarried a woman whom I liked. I was happy that my father was no longer alone. We have a brother from this marriage, who is now 13 years old. We are very intimate."

For *Mahin*, referring to a psychologist was one of the main events after the earthquake. She said that she felt much better after meeting a psychologist,

"I'm a little better now because I just started psychotherapy sessions. I'm a little more comfortable ... I'm very glad to help myself."

Sub-theme IV.II: Membership in new Families: Earthquake Victims

In this theme, an interesting point was how joining a new group called the Earthquake Victims helped the earthquake survivors. About all the participants referred to this point, indicating that living along with the other survivors and witnessing their suffering helped them a lot to return to normal conditions.

Mahin described her experience as follows:

"I had experienced something not many individuals have experienced. We returned to Sirjan for a while after the earthquake. In Sirjan, I see myself as someone who experienced something difficult that no one else in this city had experienced. But when I am in Bam, I do not have the same feeling because I know some of my friends were under the rubble. Some lost their families and their parents. In Bam, I think I think of myself as one with no problem as they have much more experience."

Regarding the relationship with the interviewer, as one of the survivors of the Bam earthquake, *Farnaz* said,

"Some events are not pleasant to be reminded of, and I have always avoided remembering and narrating them. But it was not difficult for me to narrate them because you yourself had the same experience. I feel you can understand me."

Interestingly, all the participants stated that talking about the details of this event and its difficulties with a person having the same experience was much easier and more pleasant than talking with others.

Sub-theme IV.III: Effective coping strategies

According to the literature on psychoanalytic studies, the set of psychosocial behaviors, which were adopted by the participants after the earthquake and helped them return to life, can be called effective coping strategies. They are psychological behaviors helping individuals cope better with a traumatic event such as an earthquake and start a new life. One of the most common strategies is denial. *Fatemeh*, who had adopted the denial mechanism in a fantasy about her mother's death, stated,

"Can you believe it?... Sometimes I fantasize, many persons or some corpses were lost in the earthquake, I tell myself that my mother might have lost her memory and was lost in the hospital. This means I am still waiting for her to be found after many years! I make some stories! It seems I still do not believe it!"

Another common coping strategy reported by all the interviewees at different stages was the "*magical thinking*". *Farnaz* described using this defense mechanism as follows:

"There is a book on earthquakes. After reading this book, I always think about my body. Now, when I want to do something and it seems to be bad to me, I think about earthquakes. For example, I tell myself if I do something wrong with my foot, something falls down on my feet and I will lose my foot ..."

Sub-theme IV.IV: Others' support

Support from others, including social support, family support, and so on, plays a critical role for the interviewees to return to life. In such traumas, social supports evidently are of paramount importance. *Fatemeh* referred to her experience of others' support, which helped her a lot in different sections of the interview. For example, she mentioned,

"It was very strange to me to know my family and relatives to help us under such a condition because I feel much comfortable with my family and relatives. For example, my aunt seems to be my mother after my mom's death and has not married yet to take care of me. If they were not around me, I am sure many disasters would happen."

Elaheh, said as well,

"After the earthquake, my dad' uncle gave us a house in Kerman, and we lived there for a while. Then my parents returned to Bam to clean up the earthquake rubble. I went to my cousin's house in Kerman. She had two children. Well, it was nice to have them all around..."

Theme V: Fear, a feeling that became more highlighted!

Fear seems to be one of the more lasting effects of the earthquake on the survivors. The fears were noticed throughout the interviewees' life stages in the form of "fear of death" and "fear of intimacy."

Sub-theme VI: Fear of death

Fear of death refers to a set of fears when a traumatized person finds himself in a condition similar to an earthquake, and he is afraid of physical injuries once more. According to the interviews, fears such as fear of storms, fear of earthquakes, fear of physical injuries, and so on are being experienced by the interviewees. Such fears sometimes do not correspond to reality. For example, *Sadaf*, who is now married and has a child, said,

"I often think of an earthquake. When I think that it is really to happen, I do not sleep at night. I am afraid to sleep. I always wonder what will happen to Ali and Ashkan. Such thoughts and fears arouse butterflies in my stomach."

The participants described these fears as an annoying feeling existing from that time.

Sub-theme VII: Fear of intimacy

According to the interviewees, one of their main fears aroused after the earthquake is the fear of closeness, intimacy, and belonging to a new person or a family. They do not intend to let the same events at the time of the earthquake be repeated and experience loss once more. *Mahin* mentioned,

"The earthquake had unpleasant effects on me. I am afraid of losing. The same feeling always existed, but unconsciously. Since I went to psychotherapy, it has become conscious. Since then, I have spent my whole life, relationships, personal life, and work-life dealing with such a fear. This is what the earthquake has left me."

Fatemeh expressed her fear of intimacy as follows:

"I am afraid of intimacy ... I do not let my friends be close. I also do not like being close to anyone at all ... I do not like to let anyone be intimate..."

Fear of loss, as an annoying and boring feeling, was observed in all the interviews.

Theme VI: *An intimate friend, called "regret"*

In all the interviews, the researcher noticed several statements representing the interviewees' regret. The researcher explains this theme using two sub-themes: "Earthquake reconstruction by other narrations" and "Homesickness."

Sub-theme VI.I: Earthquake reconstruction by other narrations

All the interviewees imagined other narrations for the earthquake, which might have helped them get along with this disaster. They may immerse themselves down in fantasy and regrets never coming true. *Mahin* talked about the same issue,

"The night before the earthquake, our landlord was our guest ... At ten o'clock at night, there was a foreshake ... We were very afraid ... We have a garden close to Bam ... My brother urged my daddy to spend the night there. But my father didn't accept. He told my brother that it was not pleasant to go there since they could not take our neighbor, who had no car, with us. I remember my brother repeated this request several times. Sometimes I tell myself that my dad could first take us to the garden and then take the landlord's family. It was just forty minutes. If he had accepted my brothers' request, the landlord and landlady might have been alive."

Sadaf told us about a sad regret for her grandmother, which made her grow another story in her mind,

"The night before the earthquake was my cousin's wedding ceremony. We were prepared to go ... My mom went to my grandma's house. I stayed in the car ... My grandma said you show off tonight. Won't you give me a kiss? I replied that I was going to the wedding ceremony that night. She asked, "Won't you come to sleep in our house later?" I said "No, we will be there until late tonight..." I am still regretful. Well, I used to kiss my grandma. Why didn't I kiss her that night?"

Sub-theme VI.II: Homesickness

According to the participants and their expressed feelings, homesickness was considered one of the main theme's sub-themes, "regret." Homesickness seems to be an experience that expands as time goes on.

Fatemeh says about her childhood house,

"I did not go to our house after the earthquake. My grandma's house was next to ours. I went to my grandma's house, but not to ours. Some time ago, my uncle built my grandmother's house, which has a few stairs. When I was standing upstairs, I suddenly saw our house, and my childhood memories came back."

Najmeh, who is now a mother and has a 7-year-old daughter, also talks about missing her mom in the important events of her life:

"My sister was pregnant last year. I used to visit her a lot because I did not want her to experience the feeling I had. At the time of my delivery, even though everyone was around me, I missed my mom. That's why I didn't want my sister to have the same feeling."

Theme VII: Post-traumatic Growth

The last theme deals with the fact that any event not killing you makes you stronger. Each difficulty, in addition to all suffering bringing to us, is accompanied by some strength. All the participants talked about their personal growth after the earthquake.

Sub-theme VII.I: Increased capacity for compassion

Increased capacity for compassion was one of the positives noticed in most of the interviewees after the earthquake. The interviewees themselves referred to this issue as getting more concerned. In the following text, *Fatemeh's* words are narrated,

"After the earthquake, I realized that I need to be kinder. I became very kind to others. I help others and no longer care what others say. I smile and I see the world so beautiful. It feels excellent. I have this feeling but I do not see it in my friends."

Similarly, *Sadaf* stated,

"When I see an earthquake in a place like Kermanshah or, for example, floods in many places, such as what happened during last Nowrouz, I fully understand them. I feel like to going and being by their side physically to help them. I think individuals who have the same experience can understand and help them better."

Sub-theme VII.II: Insignificance of material issues

Another strength that emerged among the interviewees after the earthquake is the insignificance of material issues to them. This triviality does not mean that they give up; however, it has become easier for them to lose, stand up again, make attempts, and gain once more. In this regard, *Sadaf* said,

"I always suppose that I may not live tomorrow when I sleep at night. That's why I always tell myself I don't have to collect everything in my life for a future that may not come at all. Then I can spend well enough."

Sub-theme VII.III: Enlarged soul

A disastrous incident, in addition to fixing our mental age and stabilizing us at a certain point, evidently promotes our *soul*, i.e. emotional capacity and psychological age, in many cases after a while. According to the interviews, each of the participants had witnessed their enlarged soul in many aspects, including resilience, accountability, psychological strength, high intellectual growth, and others after a while after the earthquake. In this regard, *Najmeh* mentioned,

"The earthquake brought my sister and I independence in Yazd. We made our ends meet. It made us kind of strong. It made it possible for me to live alone and take care of my daughter."

Regarding the same issue, *Mahin* declared,

"I always tell myself that God gave us another chance. That's why I always think we should grasp this opportunity. I do not know how much I have been successful in doing so, but I know that we are given another chance to be appreciated."

Discussion

This study examined the 16-years post-earthquake lived experience of adult female BES. From their perspective, life was classified into seven general themes and twenty-two sub-themes extracted using the interpretive phenomenological analysis method and in accordance with the conceptual framework of trauma. As the first theme, the participants in the pre-earthquake life relied not only on their material properties, including economic status, home, land, garden, and facilities, but also on the support they received from their relationship with their family, friends, neighbors, and the environment. According to the COR theory, such material, relational, and social assets provide the grounds for experiencing traumatic stress (Bakic & Ajdukovic, 2019); hence, losing such assets and inability/failure to regain them operationally means that an individual's reservoir gets empty dramatically. Whether these reservoirs are recovered, replaced over time, or lost forever provides the grounds for the psychological consequences of disasters (Bakic & Ajdukovic, 2019; Hamama-Raz, Palgi, Leshem, Ben-Ezra, & Lavenda, 2017). These assets, expressed as pre-earthquake happiness, have been considered as one of the influential factors in overcoming unpleasant feelings and regaining happiness experience in the coming years (Calvo, Arcaya, Baum, Lowe, & Waters, 2015). Accordingly, the participants' pre-earthquake condition in the chapters of

their lives should be interpreted in the context of their experience of loss, which has determined the future course of their lived experience.

Furthermore, what kept pre-earthquake life memorable in this group of earthquake victims was their expectation of earthquakes after the first aftershocks in the evening of the same day. Earthquake preparedness in different aspects of healthcare (Raissi, 2007) and mental health (Math, Nirmala, Moirangthem, & Kumar, 2015) is considered as one of the main prerequisites of disaster management. Studies in Iran have documented the low level of earthquake preparedness among urban households (Rostami-Moez, Rabiee-Yeganeh, Shokouhi, Dosti-Irani, & Rezapur-Shahkolai, 2020), and, despite favorable assessments at the structural level, there are still several weaknesses to be addressed (Heidari, Heidari, & Jafari, 2020; Hosseini Shokouh et al., 2014). Disaster response programs in developing countries, especially Iran, require further comprehensive considerations (Ejeta, Ardalan, & Paton, 2015). Moreover, targeting the community by using participatory methodologies would play a key role in increasing individual and social capabilities to respond to earthquakes (Jahangiri, Izadkhan, Montazeri, & Hosseini, 2010). It needs to be noted that awareness of the earthquake and its coping strategies can be considered an opportunity to reduce the number of casualties and losses and promote resilience and transition to posttraumatic growth.

The participants' experiences at the time of the earthquake and escaping, environmental conditions after twelve destructive seconds, personal and physical injuries to the adult female BES and their beloved ones, as well as the shock after the earthquake put that support-oriented past in the risk of destruction. The adult female BES became involved in the traumatic experience of an earthquake at an age when their psychological traits were affected. Younger children may respond to posttraumatic stress with symptoms such as stuttering (Jafari, Mohamadi, Haghjoo, & Heidari, 2019); however, these female BES revealed their self-awareness of the shock and their denial of post-earthquake moments, which could critically affect their resilience (Maas, Laceulle, & Bekker, 2019). Studies on the disaster survivors' responses have revealed the lack of protective factors such as social support may contribute to the persistence of posttraumatic stress for the long term and that the female gender is a risk factor predicting symptoms of PTSD (Foa, Stein, & McFarlane, 2006; Paul et al., 2015) and complicated grief (Ghaffari-Nejad, Ahmadi-Mousavi, Gandomkar, & Reihani-Kermani, 2007). However, exposure to different dimensions of earthquake trauma, including the loss of loved ones or house destruction and injury, may result in different consequences for survivors and change their experiences of this disaster (Schwind et al., 2019). Moreover, the experience of disasters and their losses in childhood is recommended to be analyzed not in the child but in the context of his / her mutual relationship with his/her caregiver/parents (Juth, Silver, Seyle, Widyatmoko, & Tan, 2015). Given that only two participants experienced the loss of family members, the earthquake experience was not accompanied by grief for most of these individuals; however, they considered the time of the earthquake as a turning point in their lives.

The days after the earthquake shaped a separate phase of the participants' narration, which was marked by different aspects of disaffected emotions, obligatory migration, and lack of resources. According to some studies, mental health risk factors such as depression for disasters are different in children and

adults; hence, being under rubble, experiencing fear and injury, witnessing the others' injury and death, and noticing weaknesses in the social support system would lead to more severe cases of depression in children (Tang, Liu, Liu, Xue, & Zhang, 2014). Recent studies on Iranian earthquake victims have also indicated that, especially in ten days after the earthquake, the main health needs of earthquake victims were a healthy environment, mental health, and mother and infant and child health, as well as health care requirements such as field hospital, medicine, and epidemic diseases (Peyravi, Ahmadi Marzaleh, & Khorram-Manesh, 2019). Furthermore, more recent studies on resilience also indicate that environmental and social factors, in addition to personal traits, play a key role in recovering the injured person and his growth, especially in younger ages (Amini-Tehrani et al., 2020; Ungar, Ghazinour, & Richter, 2013). The loss of facilities, as one dimension of socioeconomic insecurity in the post-earthquake period, is common in Iran (Forouzan et al., 2013).

Furthermore, some research has claimed that changes in socioeconomic status after the earthquake, which may decrease women's mental health by 80%, would decrease their health status by 46% if accompanied by recreational and community-based programs (Nagai et al., 2017). Accordingly, one of the major needs of vulnerable groups in the post-disaster period is rehabilitation programs considering both their psychological and social dimensions and physical dimensions. This is what need researchers' further attention and emphasis (Sheikhbardsiri, Yarmohammadian, Rezaei, & Maracy, 2017). In the case of women, the multifactorial role of their mental health should be further examined, and the political-legal dimensions and their psychological lifestyle need to be considered comprehensively (Shooshtari, Abedi, Bahrami, & Samouei, 2018). Accordingly, the organized post-earthquake management can be considered as an effective factor in preventing further physical and psychological health complications among survivors (Peyravi et al., 2019).

As one of the participant's life story's main themes, the post-earthquake life provided a ground for passing through the accident by a series of positive experiences. In this condition, not only did they experience a new collective identity as the earthquake victims, but also they could start a new lifestyle by using the positive effects of the defense mechanisms such as denial and magical thinking and receiving social support from relatives.

An interesting point was that although the participants, who stayed along with the other victims in Bam after the earthquake, had fewer resources and far more difficult conditions, they approved being in such conditions and talked about this decision with full satisfaction. On the other hand, those who had migrated to other cities either returned to Bam later or wished to return. This might be because membership in a group with members having the same characteristics and goals and the same philosophy of existence reduces anxiety and brings about a greater sense of improvement. According to some studies, younger age (up to early adolescence) plays a protective role in maintaining mental health in disasters (Jacobs & Harville, 2015), and may partly facilitate PTG (Yoshida et al., 2016). This issue may be due to the provision of support and care systems for children. Be after disasters (Jacobs & Harville, 2015). Moreover, denial and magical thinking can be expressed in the context of "positive illusions" in children, which plays a role in maintaining psychological integrity against the damage

caused by acute traumatic experiences (Taylor & Brown, 1988). In addition, recent studies have highlighted the role of social indicators of resilience in tolerating disasters and have introduced post-disaster social support as the main social indicator affecting survivors' psychological resilience (Rodriguez-Llanes, Vos, & Guha-Sapir, 2013), which predicts a decrease in negative emotions and an increase in happiness in the years after the disaster (Calvo et al., 2015). On the other hand, according to some statistics, the female gender is one of the risk factors associated with low levels of psychological resilience and post-disaster general health (Liang & Cao, 2014; Rodriguez-Llanes et al., 2013). In this regard, the supportive or non-supportive social structure of women before the earthquake also affects their vulnerability and decreased resilience (Thapa & Acharya, 2017).

Considering two different reactions, the adult female BES, on the other hand, referred to their fears of death and fears of intimacy. Fear of death is one of the prominent symptoms in predicting PTSD (Sharma & Kar, 2019); however, in interaction with social support, it can also provide the grounds for PTG in adolescents with life-threatening illnesses (Gunst, Kaatsch, & Goldbeck, 2016). On the other hand, in addition to their fears, a feeling of regret remained for them and provided the grounds for them to make attempts to create different narratives and "wishes" and a feeling of "homesickness" as two active emotional reactions to the "lost past" to accept the traumatic experience of the earthquake in their current life. Studies examining the effect of past narratives on PTSD symptoms have suggested that the content of these narratives if it contains both positive and negative words with less focus on the person, would have a greater effect on decreasing the symptoms (Jaeger, Lindblom, Parker-Guilbert, & Zoellner, 2014). Furthermore, PTSD injuries would remain as symptoms of anxiety and depression over time and, more importantly, have lasting effects on the survivors' interpersonal relations (Thoresen, Birkeland, Arnberg, Wentzel-Larsen, & Blix, 2019). Two years after the earthquake, complicated grief syndrome was estimated to be observed in more than two-thirds of survivors and was more frequent in women with lower levels of education and those who had experienced family injuries and house destruction (Ghaffari-Nejad et al., 2007).

In contrast, some studies have revealed that female adolescent experience better conditions in terms of PTSD symptoms than boys in the long run after disasters (S. H. Lee, Kim, Noh, & Chae, 2018). In some other studies, the more devastating consequences of disasters in the form of PTSD symptoms and depression were more noticed in girls than boys (Orengo-Aguayo, Stewart, de Arellano, Suárez-Kindy, & Young, 2019). Moreover, there was less improvement of symptoms by community-based interventions in young females than males (Jeon et al., 2018). In this regard, some researchers have proposed that the female survivors of disasters are more sensitive to receiving / not receiving social support than the male survivors because of their more severe reactions to the lack of social ties (Norris, Baker, Murphy, & Kaniasty, 2005). Such an active effort to maintain a mental-emotional tie to the past by constructing a different narration can be a special adaptive mechanism adopted by women. It is worth noting that preserving the collective memory of the cities involved in a disaster and connecting the collective memory to the disaster is also one of the main pillars of disaster risk management as it plays a key role in both rehabilitation and effective management measures (De Jong & Van Tilborg, n.d.; Monteil, Barclay, & Hicks, 2020). In this regard, some studies also highlighted women's active role in establishing social

justice (i.e., caring for the injured and the affected region) by symbolizing trauma and mourning (David, 2008). In Iran, relevant studies have suggested that although the female survivors of earthquakes, especially in disadvantaged and rural regions, are exposed to violence and poverty, they also have the potentials to rebuild society and inject vitality into life (Sohrabizadeh et al., 2017). Considering the function of women's active involvement during the post-earthquake period, future studies are recommended to target the memories and techniques of preserving the past, narrated with wishes and homesickness, along with women's life-inspiring actions and examine their role in individual well-being and post-earthquake society.

One of the most prominent findings in this study was reflected in the experiences associated with posttraumatic growth in all the interviewees. Redefining relationships with others helped them to promote further compassion in their interpersonal relationships. Moreover, losing "pre-earthquake life," and its material and spiritual blessings raised the non-centrality of material issues. Finally, despite all the fears and regrets, the experience of psychological strength in the lived experience of the participants questioned the duality of the disorder against post-traumatic growth. Studies on the adolescent population have revealed a weak negative relationship between PTG and PTSD in a year and a half after the earthquake (Yoshida et al., 2016), while a positive relationship between these two seemingly contradictory mental states is documented in general population of survivors (Jin et al., 2014). While in the adult population, pre-disaster PTSD, compared to other psychological problems, predicted post-disaster PTSD more strongly (Fernandez et al., 2017), it is the pre-disaster subjective threat that better predict PTSD in youths (Memarzia, Walker, & Meiser-Stedman, 2021). Overall, children experience three consequences, including resilience, recovery, and chronicity of PTSD symptoms, in response to disasters, among which resilience is shown to be more frequent; while female gender, direct exposure to disaster, dysfunctional coping styles, and lack of social support are reported as the main risk factor of PTSD chronicity (Lai, Lewis, Livings, La Greca, & Esnard, 2017).

Accordingly, the participants' adequate social support and their transition from childhood to adulthood might have changed their experience of stress and its consequences. Furthermore, PTG in adolescents who have survived from disasters has converted trauma to a ground for understanding the meaning of life, escaping from disasters, and having a chance to live once more (Salawali, Susanti, Daulima, & Putri, 2020). This is also reported in the Iranian survived children, so that their predominant strategy is active coping, which mainly emerges in the form of optimism (Dehghan Manshadi, Neshat Doost, Talebi, & Vostanis, 2020). Some other studies claim that women have more access to social communication than men, resulting in their higher level of happiness (Sun & Yan, 2019). This point was also highlighted under the theme "capacity for compassion," implying that multiple interpersonal opportunities contributed to experiencing an evolving human relationship in the participants' PTG experiences.

Traumatic damage from the Bam earthquake is still noticeable among the survivors after 16 years, with about 40 percent of the participants still experiencing PTSD symptoms, including recurring anxiety, fear of earthquake recurrence, and difficulty sleeping. Moreover, 40% of the participants also suffer from depressive symptoms, for which female gender is introduced as one of the risk factors (Divsalar &

Dehesh, 2020). Importantly, children and women concerning the demographic specifications of the participants are considered as "vulnerable groups"(Abbasi Dolatabadi, Seyedin, & Aryankhesal, 2016; Forouzan et al., 2013; Nahar et al., 2014). Some studies on this group have indicated that not only are anxiety and worry more noticeable in this group of earthquake survivors, but also the feelings of panic, agitation, and disturbing thoughts are frequently reported in this group. Regarding children, educational problems, loneliness, and isolation have been the most common consequences of earthquake insecurity (Forouzan et al., 2013). Some researchers have claimed that although this group has been introduced as a vulnerable group in Iran in the disaster management documents, their specific needs in disaster management have not been systematically addressed yet (Abbasi Dolatabadi et al., 2016). Researchers recommend compensating for this vulnerability by woman-oriented approaches so that both risk factors and their specific resources are included in disaster management programs (Işık et al., 2015).

Limitations

The present research used the interpretive phenomenological method; hence, the findings cannot be generalized to the experience of all adult female BES. Moreover, given that the research sample was purposively and voluntarily included in this study to better understand their 16-year post-earthquake life, the study size could not represent the target population. Accordingly, the findings should be interpreted to explore the deeper dimensions of the experience of living with earthquake trauma. Furthermore, the study participants were not included based on the clinical diagnosis of PTSD or PTG; hence, the study findings' clinical implications can only be cautiously interpreted in the general population but not a clinical population. The findings, however, contribute to our understanding of the role of trauma in the lives of adult female BES by delving into the 16-year post-earthquake experience.

Conclusion

An in-depth analysis of the sixteen-year post-earthquake life of adult female BES revealed that their life encompasses different stages, including before the earthquake, at the time of the earthquake, the first days after the earthquake, back to life, fear, regret, and posttraumatic growth. According to the findings, the role of pre-earthquake life and post-earthquake social support, especially the sympathy of the earthquake survivors, are the main dimensions affecting how individuals get along with the earthquake experience. Furthermore, the proximal experiences of fear and regret, as common orientations of traumatized individuals towards the future and the past, were also observed in this group. Nevertheless, all the participants referred to PTG experiences in their current personality, implying some signs of traumatic injury and trauma tolerance. The findings would provide the researchers and practitioners with a deeper understanding of this population's strengths and weaknesses. Policymakers should also include supporting plans for earthquake survivors' resilience in their public health plans.

Declarations

Ethics approval and consent to participate

The study protocol was approved by ethics committee of University of Tehran, Tehran, Iran. Written informed consent was obtained from the participants.

Consent for publication

Not Applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Competing interests

None.

Funding

Nil.

Authors' contributions

RJ: Conceptual design, methodology, data collection, data analysis, and initial drafting. RP: Conceptual design, methodology, and supervision. SB: Data collection and data analysis, and initial drafting. SS: Conceptual design, interpretation, and formal write-up. All authors reviewed the manuscript and contributed intellectually. The final manuscript was approved by all authors.

Acknowledgements

We express our sincerest gratitude to the participants for their valuable engagement.

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