Experiences and occupational trajectories of older adults in a disaster context

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Abstract

Objective: To understand the experiences and occupational trajectories of older adults who experienced the mining-dam collapse disaster in the city of Brumadinho. *Method:* A qualitative study based on thematic oral history as a data-collection strategy was conducted between June and July 2023. The sample was selected by convenience sampling using the snowball technique and key informants. Older adults aged over 60 years, of either sex, who were born in and lived in the districts of Brumadinho and survived the 2019 disaster were included. Interviews were audio-recorded, transcribed, subjected to content analysis, and underwent data triangulation. *Results:* A total of 17 older adults took part in the study. The analysis identified two categories – "(Re)living the disaster" and "Changes in daily life and well-being" – comprising four subcategories each. The disaster affected participants´ health status and mental health. After the event, important changes in daily life were observed, particularly reduced and reorganized leisure activities, with repercussions for the occupational trajectories of the older adults interviewed. Despite adversity, participants demonstrated the ability to adapt, rebuild, and re-signify everyday life through engagement in meaningful occupations. *Conclusion:* The impacts of the disaster extend beyond environmental, physical, and social dimensions, affecting the occupational trajectories and everyday lives of survivors. The findings reinforce the need for continuing care for affected vulnerable populations and highlight the positive contributions of Occupational Therapy in the post-disaster context.

Keywords: Human-induced disaster. Occupational Therapy. Aging. Older Adults. Post-disaster recovery.

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INTRODUCTION

Disasters are natural or human-induced events that affect vulnerable ecosystems, causing human, material, and environmental damage, as well as social and economic losses, whose effects may persist for long periods[1].

On January 25, 2019, the city of Brumadinho, Minas Gerais state, Brazil, was affected by the collapse of the B1 iron-ore tailings dam at the Córrego do Feijão mine, constituting the largest disaster recorded in the country. The event resulted in 272 deaths, and two individuals are still missing[2]. The immediate damage and overload of health services led to a complex scenario of health risks and adverse outcomes[3].

In the post-disaster period, older adults were one of the most vulnerable groups, presenting more symptoms of anxiety and a worsening of chronic conditions, such as systemic arterial hypertension and diabetes mellitus, as well as a higher occurrence of hospitalizations and mortality from cardiovascular diseases[3-6].

Maintaining functional capacity, self-care, family and social relationships, community support, and social participation is essential for rebuilding the lives of older adults in post-disaster contexts[7-10,11]. Occupational trajectories refer to the repertoire of occupations developed over time and are understood as a structured life project associated with personal meanings and values[12]. In this context, occupations are considered central elements in identity-building, belonging, and in the organization of daily life that are influenced by temporal and biographical dimensions[12]. Thus, disaster situations disrupt these trajectories, affecting livelihood, housing, mobility, social interaction, and routines, with repercussions for health and well-being, especially among socially vulnerable populations[5].

Occupational therapists investigate how people engage in occupations and the effects of occupational engagement on health, social life, and communities[13]. The participation of older adults in meaningful occupations contributes to occupational justice and to recognition of their needs during post-disaster reconstruction[14].

Previous studies of the Brumadinho disaster have shown repercussions for the health of the population affected, including psychological distress and psychiatric symptoms, multimorbidity, hypertension, diabetes, as well as changes in demand for health services, in hospitalizations, and patterns of morbidity and mortality[2,6,15,16]. The literature also reports the vulnerability of older adults in post-disaster contexts and the importance of functioning, self-care, support networks, social participation, and rebuilding everyday lives[7-10].

However, investigations of the repercussions of the disaster on the occupational trajectories of older adults remain scarce, especially regarding impacts on their repertoire of occupations and the meanings of daily activities, social roles, and life projects. In addition, there is a lack of studies that give older adults a direct voice, preventing their needs from being understood from the perspective of caregivers and disaster-response teams alone[10]. Thus, the present study sought to address these gaps by investigating, from an occupational perspective, disruptions and reorganizations experienced by older adults while rebuilding their everyday lives in the wake of the Brumadinho disaster.

Therefore, the objective of the study was to understand the experiences and occupational trajectories of older adults who experienced the mining-dam collapse disaster in Brumadinho, Minas Gerais, in 2019.

METHOD

A qualitative, exploratory, cross-sectional study was conducted between June and July 2023. The study was approved by the Research Ethics Committee of the Federal University of the Triângulo Mineiro (UFTM; Opinion No. 5,922,790). Thematic oral history was used as the data-collection method. This method is based on social actors' accounts of a given phenomenon during a defined period, fostering the sharing of experiences and preservation of collective memory[17].

After ethical approval, a pilot study was conducted with a 67-year-old woman living in Brumadinho who was selected from a social-support group to assess

the applicability of the interview guide and refine the conduct of interviews. After reading and signing the Informed Consent Form, the interview took place in the participant's home and lasted approximately 50 minutes. The session was audio-recorded, transcribed, and analyzed by the researchers, allowing adjustments to interview procedures and refinement of the guide.

The main study was conducted in Brumadinho, Minas Gerais state, Brazil, situated approximately 60 km from the city of Belo Horizonte. Brumadinho is characterized by diverse fauna and flora and mining activity. The city was marked by the tailings-dam collapse, whose impacts remain evident years after the disaster.

The sample was selected by convenience sampling using the snowball technique. Two key informants, selected because of their community involvement and engagement in advocating for the rights of older adults, identified the initial participants for inclusion, who subsequently suggested further members of their social networks[17].

Individuals who were older than 60 years at the time of the disaster, born in Brumadinho, and lived in one of the districts of the city were included, regardless of sex. The final sample was defined by saturation, reached when new accounts no longer added relevant information.

Interviews were conducted face to face, individually, and at locations chosen by the participants. In two cases involving participants without formal schooling, a family member was present at the interview as a listener. Interviews were conducted by a single researcher, an occupational therapist with professional and technical experience in qualitative research and in care for older adults. The interviewer was also a disaster survivor and worked professionally with older adults in Brumadinho.

There were no interruptions or discomfort during the interviews, which were marked by emotion, tears, silence, anger, and indignation. Mean duration was 30 minutes, ranging from 15 to 90 minutes. After signing the Informed Consent Form, participants completed a sociodemographic questionnaire collecting information on age, place of birth, duration and place of residence, sex, race/skin color, marital status, religion/spiritual practice, education, family composition, main profession or occupation, and presence in the city at the time of the dam collapse on January 25, 2019.

Thematic oral history was obtained through a semistructured interview guided by questions developed specifically for this study. The questions covered the participant's life history; important occupations and activities and the older adult's routine before the dam collapse; important current occupations, activities, and routine; memories of the day of the dam collapse; perceived changes in occupations and daily life after the collapse; and, if desired, a closing statement or message. The researcher's impressions and observations were recorded in a field diary.

Interviews were audio-recorded, transcribed, coded, and organized into thematic categories and subcategories[17-19]. Content analysis was used, encompassing pre-analysis, exploration of the material, coding, and treatment and interpretation of results[18]. Analysis was inductive, using the semantic criterion for classification and grouping data according to meaning. To preserve anonymity, participants were identified by the names of gemstones.

Following categorization, investigator triangulation was conducted to increase analytical consistency and reduce interpretive bias[20-22]. Two researchers independently analyzed and categorized the data, and a third compared results, examined disagreements, and refined the final organization of categories.

USE OF ARTIFICIAL INTELLIGENCE

No Artificial Intelligence (AI) tools or resources, including generative AI, were used at any stage of the research, data analysis, preparation, writing, revision, or editing of this manuscript.

DATA AVAILABILITY

The data underpinning the findings of this study are available from the corresponding author upon request and are not publicly available because of privacy or ethical restrictions.

RESULTS AND DISCUSSION

The sample comprised 17 older adults living in all districts investigated. Mean age was 72 years. The sample comprised predominantly female participants who were married, had incomplete primary education, were Catholic, and lived in the central district. Most were at home at the time of the disaster. Occupational backgrounds were diverse and included farm workers, public employees, teachers, and homemakers. Detailed sociodemographic characteristics are presented in Table 1.

Content analysis identified two categories, each comprising four subcategories (Table 2). The first category, "(Re)living the disaster," brought together experiences related to memories of the collapse and associated feelings, memories of those who died, spirituality, and indignation toward the company responsible. The second category, "Changes in daily life and well-being," addressed the effects of the disaster on physical and mental health, occupations, social interaction, and the reassigning of meaning to everyday life.

Table 1. Sociodemographic profile of older adults participating in the study (n=17). Brumadinho, Minas Gerais state, Brazil, 2023.

Variables	N (%)
Age mean (SD)	72 (7.12)
Districts	
Aranha	1 (5.88%)
Conceição de Itágua	2 (11.76%)
Piedade do Paraopeba	3 (17.65%)
São José do Paraopeba	4 (23.53%)
Central district	7 (41.18%)
Sex	
Female	12 (70.59%)
Male	5 (29.41%)
Skin color	
White	7 (41.18%)
Brown	8 (47.06%)
Black	2 (11.76%)
Marital status	
Married	7 (41.18%)
Divorced	2 (11.76%)
Single	2 (11.76%)
Widowed	6 (35.30%)
Religion	
Catholic	16 (94.12%)
Evangelical	1 (5.88)
Practices religion	
Yes	16 (94.12%)
No	1 (5.88)

to be continued

Continuation of Table 1

Variables	N (%)
Education	
No formal schooling	3 (17.65%)
Primary incomplete	8 (47.06%)
Complete secondary	2 (11.76%)
Technical/vocational education	2 (11.76%)
Incomplete higher education	1 (5.88%)
Postgraduate level	1 (5.88%)
Descendants	
Children	2.65 (SD=2.64)
Grandchildren	3.29 (SD=0.71)
Great-grandchildren	4.04 (SD=1.36)
Location on day of dam collapse	
At home	13 (76.48%)
In Brumadinho, but away from home	2 (11.76%)
Outside Brumadinho	2 (11.76%)
Profession	
Machinist	1 (5.88%)
Homemaker	4 (23.53%)
Public employee	3 (17.65%)
Street cleaner	1 (5.88%)
School cafeteria worker	1 (5.88%)
Domestic worker	1 (5.88%)
Driver	1 (5.88%)
Farm worker	3 (17.65%)
Teacher	2 (11.76%)

Table 2. Categories and subcategories related to occupational trajectories and experiences of the older adults after the disaster and its consequences. Brumadinho, Minas Gerais state, Brazil, n=17, 2023.

Categories	N (%)
A. (Re)living the disaster	
Memories and feelings	17 (100%)
Memories of those who died	11 (64.71%)
Spirituality	11 (64.71%)
Indignation toward the company	04 (23.53%)
B. Changes in daily life and well-being	
Effects on physical and mental health	15 (88.26%)
Disruptions in occupations after the collapse	14 (82.35%)
Restrictions on social interaction and personal relationships	07 (41.18%)
Re-signifying occupations after the collapse	07 (41.18%)

The findings showed that the effects of the Brumadinho dam collapse extended beyond isolated changes in daily activities, affecting older adults' occupational trajectories, understood as lifelong patterns of occupational engagement connected to experiences, social roles, routines, relationships, values, identity, and personal projects.[12] In the category "(Re)living the disaster," the collapse emerged as a biographical and occupational landmark, reshaping ways of living, participating, belonging, and making sense of one's own history. Narratives revealed impacts on meaningful occupations, social relationships, movement through the territory, and community participation, as well as sadness, fear, anguish, indignation, memories of those who died, and anger toward the mining company. At the same time, spirituality and other forms of reconstructing everyday life were mentioned as coping resources, while memory of the disaster also took on the meaning of not forgetting and of preserving social belonging.

First, the category "(Re)living the disaster" referred not only to recalling a traumatic event but also to a way of situating the experience in personal and collective trajectories, preserving ties to people, places, and interrupted occupations. For older adults, whose life histories are deeply connected to territory, family, work, and community relationships, the dam collapse affected material, symbolic, and emotional dimensions that sustained continuity of everyday life.

Older adults reported vivid memories of the day of the collapse, expressing grief over human losses and the consequences for physical and emotional health. One participant described the situation:

> "That day, […]the street was already bustling with people. People headed to the footbridge to protect themselves. Everyone was experiencing that anguish. People started thinking of those who worked there; […]it was that distress." (Tourmaline, 67 years old, Central district).

In the subcategory "Memories and feelings," expressions of sadness, anguish, indignation, and longing for family members, friends, neighbors, and acquaintances were frequent. Experiences of suffering, exposure to stressors, and changes in life roles and mental health are relevant in disaster situations and should be understood as occupational impacts[23]. Losses of life, material losses, and symbolic losses can interrupt the roles, habits, activities, and routines that structure everyday life[11,24].

In the subcategory "*Memories of those who died*," human losses occupied a central position in the narratives. Participants expressed fear, sadness, and longing when remembering friends, relatives, and acquaintances who died in the disaster:

> "There was at least one friend who used to come here and sit with me, and I was very fond of him. We asked him whether he was working at the dam and how things were; he said everything was fine. But he died there. I lost many other friends too. I felt my friend's death so deeply." (Quartz, 75 years old, São José do Paraopeba).

Memories of those who died reveal that human losses also represent occupational losses. The absence of relatives, friends, neighbors, and acquaintances changed shared activities, celebrations, gatherings, support networks, and forms of social interaction that had previously been part of daily routines. Thus, grief was expressed not only through the absence of significant people but also through interruption of occupations performed together and transformation of community social spaces.

Faith, religious beliefs, and spiritual practices constituted important means of coping with the losses and difficulties experienced. Participants reported that spirituality promoted emotional balance, hope, and strength in the face of suffering.

> "I think that a person with a serene spirituality can overcome any obstacle. What helps us overcome things, to have strength, is prayer and the faith we have. […] When we have faith, we can hold on through life's challenges and help our brothers and sisters become stronger too." (Jade, 68 years old, Central district).

Spirituality was described not only as a coping strategy but also as a meaningful activity capable of promoting emotional reorganization and support for others. Spirituality is related to the meaning

attributed to life and to the beliefs and values that sustain one's lifestyle[25]. Studies show that religious involvement can be a relevant resource for people experiencing psychological distress[26].

In the context investigated, spirituality was associated with hope and personal and community strengthening. It enabled preservation of connections with values and beliefs that had historically formed part of participants' identities[26]. Thus, besides representing an individual coping resource, spirituality emerged as a meaningful occupation capable of sustaining continuity in occupational trajectories and contributing to processes of rebuilding everyday life[27].

Indignation toward the company responsible for the dam was also strongly present in the interviews, as observed in the subcategory "Indignation toward the company". Participants related this indignation to the persistent impacts of the disaster, the information received before the collapse, and the perception that risks may have been known in advance:

> "Before the dam collapsed, the company had been there and left a folder […] saying: if anything happens, leave your land titles and personal documents on top of the refrigerator. This gave the impression that they knew this was going to happen. […] Because it was already taking steps in case something happened." (Topaz, 73 years old, Central district).

The Parliamentary Commission of Inquiry report indicated that the collapse was related to drainage problems resulting from excessive volume in the dam[28]. This information, together with reports produced previously by the company, reinforced participants' perceptions of negligence and indignation. The accounts also revealed perceived violations of rights and human dignity, particularly regarding reparations and compensation processes. Participants considered that psychological, social, and lifestyle-related damage had received less recognition than physical or material damage.

This context reinforces processes of occupational injustice, characterized by restrictions of rights and inequalities in opportunities for participation[28]. From the perspective of occupational justice, restricted participation opportunities, loss of social spaces, interruption of meaningful occupations, and compromised autonomy constitute situations of injustice that particularly affect vulnerable populations[24,28,29]. Among older adults, these effects may be intensified because they affect trajectories consolidated over decades and deeply related to territory, work, family, and community.

In the category "Changes in daily life and well-being," disruptions and reorganizations of occupational trajectories were evident after the disaster. Changes in physical and emotional health, reduced social interaction, changes in leisure, decreased willingness to work, and the need to re-signify everyday activities altered older adults' engagement in occupations. These changes showed that the disaster compromised continuity of daily life, understood as the space in which habits, routines, roles, relationships, and belonging are expressed. Analysis of occupational trajectories made it possible to understand that the impacts of the collapse persisted over time, affecting daily practices, perceived restrictions, and attempts to rebuild life.

Participants expressed concerns about the environmental consequences of the disaster and possible effects on physical and emotional health.

> "Many of our brothers and friends developed skin problems and depression […], as well as having heavy metals in their blood. [...] Who knows, I may be full of heavy metals and not even know it. So, we do not know what the consequences may be in two, five years from now." (Jade, 68 years old, Central district).

Changes in emotional health were also reported, including fear, stress, anxiety, and reactions triggered by disaster-related stimuli, as illustrated in the category "Effects on physical and mental health":

> "When we hear the sound of a helicopter, an airplane, or a siren, it gives us chills. We feel that trauma all over again, and it floods back to our minds. [...] My life changed in that sense, especially psychologically. I suffered a great deal, and it continues to affect my life to this day." (Rubellite, 67 years old, Central district).

Disasters can trigger or intensify changes in physical and mental health[11,30,31]. Catastrophes are associated with mental disorders, increased substance use, and a higher incidence of cardiovascular and respiratory diseases[32]. These effects may persist for years and should be continuously monitored. Among self-reported symptoms, psychological distress, depression, sleep disturbances, fear, intrusive thoughts, and cognitive changes were prominent. Longitudinal studies conducted in Brumadinho after the disaster identified hypertension, high cholesterol, and depression among the most frequently self-reported conditions, with prevalences higher than the state averages[15,16,31].

Concerns about the presence of metals in the tailings mud and the Paraopeba River were also highlighted, particularly because of uncertainty regarding the future effects of environmental exposure[2,31]. These concerns influenced perceptions of safety and contributed to persistent fear and insecurity in everyday life. Participants described profound changes in activities related to work, domestic care, leisure, and engagement in meaningful occupations.

In the subcategory "Disruptions in occupations after the collapse," narratives indicated occupational losses related to emotional limitations, environmental changes, and transformations in the community's social dynamics.

> "Before the dam collapse, I had the energy to work. I was in excellent health. I would arrive here in Brumadinho at six in the morning and get home at five in the afternoon. Once I got home, I would still do the laundry, make dinner, take a shower, and sleep peacefully. […] Now, since the tragedy, everything has changed." (Sapphire, 67 years old, Central district).

Within this subcategory, it was also observed that, regardless of their district of residence, the disaster disrupted participants' daily activities and hindered their autonomy. Activities that had previously been carried out with ease became marked by physical limitations, emotional distress, insecurity, and changes in the social environment. Accordingly, activities such as work, domestic care, leisure, mobility within the municipality, and family life were identified as key occupations affected by the disaster.

Sapphire's narrative highlights a rupture in occupational continuity, understood as the ability to maintain life patterns, roles, and activities that supported autonomy, a sense of competence, and well-being. The perception that "everything was affected" after the disaster emerged across different accounts, showing that the dam collapse disrupted the continuity of everyday experiences and the sense of stability.

The weakening of interpersonal relationships was widely reported. Participants reported changes in leisure activities, family life, community participation, and personal relationships.

> "We used to have very close family contact […] And my nephew, who unfortunately passed away, was the one who did the barbecuing for us. […] Our routine has changed a great deal. […] Nowadays, our time together is more routine; it is no longer marked by love, celebration, and togetherness. […] You look around and see that people are missing." (Opal, 71 years old, Conceição de Itágua)

Restrictions on social interaction and personal relationships interrupted meaningful occupations and altered personal and community relationships. Disaster situations can reduce the performance of valued occupations, create occupational imbalance, and compromise the sense of control over one's life[30]. Occupational disruptions imposed by external factors are often accompanied by feelings of injustice and frustration[33]. The reduction in leisure activities may also compromise mental health, given their importance for managing anxiety and distress[34]. Accordingly, family gatherings, barbecues, celebrations, visits, interactions with neighbors, and participation in community spaces were transformed by the absence of those who had died, collective suffering, and the symbolic changes that occurred in the territory.

For older adults, these occupations play a fundamental role in maintaining health, identity, and a sense of continuity in life[33]. Their reduction

may lead to isolation, sadness, and the feeling that everyday life has lost some of its spontaneity and meaning. Thus, restricted social interaction should be understood as a central dimension of the occupational disruptions produced by the disaster.

Despite losses, accounts also showed efforts to rebuild everyday life, observed in the subcategory "Re-signifying occupations after the collapse". Participation in community organizations, caring for plants, domestic activities, informal work, listening to the radio, spirituality, and supporting others appeared as ways to reorganize life and recover a sense of continuity.

> "My routine is […] at home, doing household chores. […] I am involved with three NGOs […] I have a little bar at home. […] I really like listening to the radio […] I love plants—my plants are my passion. […] They completely fill my life. Look, my life has been turned upside down, because it has never been the same again." (Tourmaline, 67 years old, Central district).

When occupations are interrupted, individuals seek to reorganize their choices and opportunities, preserve or redefine their roles, and find new ways of regaining meaning, purpose, and belonging[30]. Resignification does not entail a complete return to life as it was before the disaster; rather, it reflects the capacity to construct new possibilities for participation amid the imposed changes. The resignification of occupations reinforces the understanding of occupation as an adaptive mechanism capable of promoting health and well-being, even in adverse contexts[24]. Engagement in new occupations, or resumption of meaningful ones, may yield benefits for both individuals and communities[11,13]. In this sense, occupational trajectories are neither static nor linear, but are transformed in response to losses, restrictions, and new living conditions.

Engagement in meaningful occupations, even within a disrupted everyday life, constitutes a strategy for coping and rebuilding one's life after the disaster. The findings therefore underscore the importance of promoting opportunities that support the reconstruction of older adults' occupational trajectories in disaster contexts. Thus, maintaining routines and engaging in meaningful occupations may contribute to the resumption of life projects, the strengthening of social bonds, and the restoration of a sense of continuity.

Among the study limitations, interviews were conducted approximately four years after the collapse, which may have influenced narratives through processes of remembering, forgetting, or re-signifying experiences over time. Convenience sampling, snowball sampling, and key informants may have favored inclusion of participants more connected to community networks and initial contacts. In addition, the scarcity of research on older adults' occupational trajectories in disaster contexts limited comparison with similar investigations, although it also reinforces the study's originality and relevance.

The researcher's proximity to the context is another relevant methodological consideration. The researcher has worked with the older population in Brumadinho for 15 years and has ties to the disaster context. In qualitative research, the researcher's trajectory, position, and presence in the field are not neutral elements, as prior experiences, subjectivity, and established relationships may influence data production, interpretation, and analysis[35].

This recognition relates to reflexivity, understood as a continuing critical practice through which researchers examine how their position, assumptions, and relationship with the field shape the research process[35]. The researcher's proximity to the territory may have fostered rapport, trust, and participants' openness, contributing to richer, more sensitive, and contextually grounded narratives. To minimize potential bias and strengthen the credibility of the findings, systematic content-analysis procedures, discussions among the researchers, and investigator triangulation were adopted[21].

CONCLUSION

The findings demonstrate that the Brumadinho disaster extends beyond environmental, social, and physical impacts, also affecting older adults' occupational trajectories by disrupting routines, roles, relationships, participation spaces, and meaningful

occupations. At the same time, the narratives reveal processes of resilience, adaptation, and re-signification through which participants sought to rebuild meanings for everyday life. Understanding these findings through occupational trajectories broadens analysis of disaster impacts beyond material, environmental, and physical damage to include the occupational disruptions experienced by older adults.

This perspective reinforces the importance of occupational therapists as members of disaster-management teams, particularly in identifying occupational disruptions, promoting participation, and developing strategies that support continuity and reconstruction of everyday life after disasters. Future studies should develop and evaluate Occupational Therapy interventions for older adults affected by disasters, focusing on resumption of meaningful occupations. Longitudinal studies are also recommended to monitor changes in the occupational trajectories of older adults affected by the Brumadinho disaster.

AUTHORSHIP

- Marcelo B. Souza – Study conception; data curation; data analysis and interpretation; writing—original draft; and approval of the final manuscript version.
- Jurema R. L. Gonçalves – Data curation; data analysis and interpretation; writing—review and editing; supervision; and approval of the version to be published.
- Daniela M. Santos – Data analysis and interpretation; writing—review and editing; and approval of the version to be published.
- Fabiana C. M. S. Dutra – Study conception; supervision; methodology; data analysis and interpretation; writing—review and editing; and approval of the final manuscript version.

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