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Original article

Adult Survivors and Displaced Populations After the Daniel Flood in Libya: A Qualitative Study on Psychological Impact

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Abstract
Floods are among the most devastating natural disasters, with well-documented physical impacts but comparatively underexplored long-term psychological consequences in low-resource and humanitarian settings. The Daniel storm-induced floods in Derna, Libya, caused large-scale loss, displacement, and trauma, yet empirical evidence on adult survivors' mental health remains limited. This study aimed to explore the psychological experiences of adult flood survivors displaced from Derna to Tripoli six months after the disaster. A qualitative grounded theory design was employed. Semi-structured interviews were conducted with 15 displaced adults aged 18–40 in April 2024. Participants were recruited through collaboration with mental health services and humanitarian organisations. Data were analysed using open and axial coding, constant comparison, and memo-writing. Interviews continued until thematic saturation was achieved. Seven interrelated themes emerged: trauma and post-traumatic stress, grief and loss, altered self and identity, disruption of daily life, coping and support mechanisms, mental health diagnosis and treatment experiences, and persistent need for psychological support. Support systems played a pivotal role in moderating recovery trajectories. Flood-related trauma resulted in enduring psychological distress among displaced adults. Recovery was strongly influenced by the availability and continuity of psychosocial support. These findings underscore the need for sustained, culturally appropriate mental health services for disaster-affected populations in Libya.
Keywords. Floods, Psychological Trauma, Displacement, Grounded Theory, PTSD.

Introduction

On September 10, 2023, the city of Derna in eastern Libya experienced the effects of Storm Daniel. Within hours, heavy rainfall caused massive flooding that led to the collapse of both dams in the valley, Sidi Abu Mansour and Al-Bilad. This catastrophic event fundamentally altered the city's landscape through extensive destruction that claimed thousands of lives and caused massive material losses, including the destruction of buildings, major highways, and private property. This disaster is the worst natural catastrophe in Libya's history [1].

While the physical injuries and material losses have been documented, the disaster's impact on survivors' mental health has not been thoroughly described. The disaster is likely to have had significant psychological consequences for survivors, which may vary between individuals. This study therefore aimed to explore the psychological experiences of adults displaced from Derna to Tripoli approximately six months after the disaster. Natural disasters are increasingly recognised as significant determinants of mental health, reshaping communities' psychological resilience and social structures. This study therefore aimed to explore the psychological experiences of adults displaced from Derna to Tripoli approximately six months after the disaster. A 2012 community-based study in Jeddah, Saudi Arabia, involving 450 flood-exposed residents, revealed a high prevalence of post-traumatic stress symptoms, including flashbacks, avoidance, and hyperarousal [3]. The authors emphasised the need for both infrastructure improvement and mental health support systems in flood-prone regions. In the United Kingdom, a qualitative longitudinal study of residents after the 2007 Hull floods found that the prolonged recovery process, rather than the flood event alone, was often the most difficult aspect to cope with, and examined the implications for local-level resilience [4].

A clinical case study of seven schoolboys in Ghardaia, Algeria, conducted mbach am Inn examined the mental health of children and adolescents, identifying stressors such as parental coping, concern for relatives, and uncertainty during the flood, and protective factors such as conversations with trusted people, family support, restoration of normality, and helping with cleanup [6,7]. Young adults who had experienced that flood as adolescents also requested mental health care in schools beyond the immediate aftermath [7]. Collectively, these findings underscore the universal psychological toll of floods and other disasters, while highlighting the role of pre-disaster planning, psychosocial support, and resilience-building in recovery. Within this global context, the Derna flood disaster in Libya represents a critical case for examining the psychological status of displaced adults and understanding the community's adaptive responses following catastrophic flooding. These studies collectively emphasise that natural disasters profoundly impact mental health and social functioning, while also presenting opportunities for resilience. Consistent recommendations point to the urgent need for community-based psychosocial support**,** early and sustained interventions, and strengthening of social ties and infrastructure to mitigate long-term psychological consequences [2-7]. However, empirical evidence on the psychological experiences of adult flood survivors in Libya remains limited, and this study aims to address that gap.

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Methods

Study Design

This study employed a qualitative research design to explore the psychological experiences of adults who survived the Daniel storm floods in Derna and were displaced to Tripoli, Libya. Semi-structured interviews were developed using purposive sampling in collaboration with clinical psychologists at Razi Psychiatric and Neurological Hospital and the Libyan Red Crescent Society. Fifteen participants aged 18-40 were interviewed in April 2024, six months after the flooding, in line with internationally recommended periods for assessing post-traumatic psychological symptoms [8]. A psychiatrist was available during and after interviews to minimise the risk of retraumatization. Participants were recruited through purposive sampling in coordination with mental health professionals and humanitarian organisations providing services to displaced individuals. Inclusion criteria were adults aged 18–40 who directly experienced the Derna floods and subsequent displacement to Tripoli. Recruitment continued until thematic saturation was reached, defined as the point at which no new codes or conceptual categories emerged from successive interviews.

Interviews

The interview guide was structured around five principal themes, each explored through open-ended questions designed to elicit rich, participant-driven accounts. The first theme, post-flood condition, invited participants to articulate their current feelings six months following the crisis. The second theme, stages of psychological recovery, focused on participants' descriptions of the recovery stages and symptoms they had experienced since the disaster. The third theme, support systems, examined the role of social and professional support in participants' recovery processes. The fourth theme, grief and loss, explored participants' experiences of losing family members. Finally, the fifth theme, current psychological needs, addressed participants' ongoing mental health requirements. Interviews were conducted at participants' homes or secure locations, lasted 30-90 minutes (average 40 minutes), and were audio-recorded. The recorded audio was secured in a safe location. The authors received approval from the Ethical Research Committee of the Department of Public Health/Faculty of Medical Technology. Transcriptions were made from the Libyan dialect to classical Arabic, and relevant citations were translated into English. Recordings were deleted after transcription to ensure participant safety.

Data Collection

Participants were recruited voluntarily, and verbal consent was obtained to record the interviews. A volunteer doctor from the Libyan Red Crescent was directly present for eight interviews and indirectly available for the remaining sessions. In two interviews, the study psychiatrist was accessible via video call. Detailed reports after each interview were prepared immediately.

Data Analysis

Grounded theory guided data analysis, facilitating the development of concepts and theoretical insights directly from participants' experiences [9]. This approach is particularly suitable for disaster-related mental health research because it allows themes to emerge inductively, rather than being imposed by preconceived frameworks. Through iterative coding, constant comparison, and memo-writing, participant narratives were distilled into categories and sub-themes that reflected their lived experiences of trauma, displacement, and recovery [10].

Open coding

During open coding, participants' responses were summarised into short labels representing key thoughts, feelings, or actions. These labels were then systematically categorised into sub-themes, allowing patterns, concepts, and relationships to emerge inductively from the data [9,10]. This process is central to grounded theory methodology, as it enables researchers to build theory directly from participants' experiences rather than imposing preconceived frameworks.

Sub-themes

Through iterative coding and analysis, the psychological impact of the Daniel flood disaster on adult survivors was systematically explored, allowing for the identification of coherent patterns and critical areas for support and recovery. This process, central to grounded theory methodology, ensures that the emerging sub-themes reflect participants' lived experiences while supporting the development of a conceptual framework for understanding trauma and coping strategies [9-11].

Researcher Reflexivity and Methodological Rigour

The research team consisted of public health academics with prior experience in qualitative research and disaster-related health studies. To minimise researcher bias, reflexive memo-writing was conducted throughout data collection and analysis, documenting analytical decisions, emerging assumptions, and interpretive reflections. Regular discussions were held among the authors to review coding decisions and resolve discrepancies through consensus. The study adhered to established grounded theory principles, including constant comparison and iterative category development. Interviews were conducted until no new concepts or categories emerged, indicating thematic saturation. An audit trail was maintained through interview summaries, coding notes, and analytic memos to enhance transparency and confirmability.

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Results and Discussion

Themes from Qualitative Data

The coding process yielded 19 concepts, grouped into 7 categories (Table 1), with 2-3 concepts per category. These categories reflect the multifaceted psychological impact of the Daniel flood disaster:

Themes and Sub-Themes of Psychological Impact

The analysis of interviews with adult survivors of the Daniel flood disaster in Derna, displaced to Tripoli, revealed seven major themes reflecting their psychological experiences. These themes were developed through open and axial coding in accordance with grounded theory methodology, ensuring that findings are directly derived from participants' lived experiences [9,10].

Trauma and Post-Traumatic Stress

Participants reported recurring nightmares, sleep disturbances, panic attacks, anxiety, and water-related phobias. These findings align with prior research demonstrating that exposure to natural disasters frequently results in post-traumatic stress disorder (PTSD) symptoms and heightened anxiety levels [12,13].

Grief and Loss

Loss of family members, participation in mourning rituals, and significant emotional changes were central experiences. Consistent with disaster literature, bereavement and emotional distress are common consequences of catastrophic events [14].

Altered Self and Identity

Several participants described a transformation in personal identity and notable emotional and behavioural changes, such as increased irritability and sensitivity. Trauma can disrupt self-concept and daily functioning, which has been documented in post-disaster qualitative studies [15].

Impact on Daily Life

Participants expressed fear of daily activities, changes in eating habits, and disruption of routines. This is consistent with findings from other post-flood studies highlighting the broad effect of trauma on daily functioning and psychosocial adjustment [16].

Coping and Support

Engagement in medical help, reliance on medication, and spousal or family support were reported as key coping mechanisms. These strategies are consistent with research emphasising the protective role of social support in disaster recovery [10,17].

Mental Health Diagnosis and Treatment

Participants described receiving diagnoses of PTSD and phobias, partial engagement with treatment, and varied perceptions of treatment effectiveness. Previous studies show that adherence to therapy and the availability of psychiatric support strongly influence recovery outcomes [11,18].

Need for Psychological Support

The ongoing need for counselling and barriers to accessing care were emphasised. These results underscore the importance of long-term psychosocial interventions, echoing findings from global disaster mental health literature [16,18].

Table 1. Themes and Sub-Themes from Qualitative Data

Theme	Sub-Themes
Trauma and Post-Traumatic Stress	Nightmares & sleep disturbances; Panic attacks & anxiety; Phobias related to water
Grief and Loss	Loss of family; Mourning & rituals; Change in emotional state
Altered Self and Identity	Identity transformation; Emotional &behavioural changes
Impact on Daily Life	Fear of daily activities; Changes in eating habits; Disruption of routine
Coping and Support	Seeking medical help; Reliance on medication; Spousal support
Mental Health Diagnosis & Treatment	Diagnosis of PTSD & phobias; Partial engagement with treatment; Effectiveness of treatment
Need for Psychological Support	Continued need for counselling; Challenges in accessing support

Correlation and Axial Coding

Analysis revealed patterns linking trauma to psychological symptoms and recovery:

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Traumatic Experiences
Cases with trauma exhibited sleep and eating disturbances, PTSD, and anxiety (Cases 1, 2, 4, 6, 13).

Sleep and Eating Disturbances
Recurring nightmares and loss of appetite were common (Cases 1, 2, 3, 4, 6, 10, 11, 13, 15).

Grief and Depression
Grief often co-occurred with depression and social isolation (Cases 6, 10, 12, 13, 14).

Support and Recovery
Community, family, and NGO support facilitated recovery (Cases 3, 8, 11, 15).

Fear and Phobias
Specific phobias, such as fear of water or weather changes, were reported (Cases 2, 4, 9).

Inadequate Support
Lack of support led to prolonged distress and hindered recovery (Cases 4, 6, 7, 12, 13, 14).

Grounded Theory Synthesis
The study proposes the following theoretical framework:
Trauma → Symptoms
Exposure to flood trauma leads to sleep disturbances, eating disturbances, grief, depression, anxiety, and phobias.

Support Systems
Effective support (family, community, or psychological services) promotes recovery, whereas inadequate support prolongs distress.

Outcome
Recovery is achieved with adequate support and coping strategies; continued distress occurs when support is lacking.

Reliability and Validity
Reliability
Consistency was ensured through standardised interviews, triangulation of data sources (interviews, observations, literature), and detailed interview reports.

Validity
Credibility was achieved through prolonged engagement with participants; transferability was enhanced by detailed descriptions of experiences and context.

Ethical Considerations
Ethical approval was obtained from the Ethical Research Committee of the Department of Public Health, Faculty of Medical Technology, University of Tripoli. Written informed consent was obtained from all participants before data collection. Participants were informed about the study objectives, confidentiality, voluntary participation, and their right to withdraw at any time without consequences. Given the sensitive nature of trauma-related interviews, psychological support was made available during and after interviews through collaboration with mental health professionals. Audio recordings were securely stored during transcription and deleted thereafter to protect participant confidentiality, while detailed transcripts, summaries, and analytic memos were retained to ensure auditability.

Conclusion
This grounded theory highlights the complex psychological impact of flood-related trauma and underscores the critical role of support systems in recovery. Sleep and eating disturbances, grief, depression, and phobias were central manifestations of trauma. Effective support from family, community, and mental health services significantly facilitated recovery, whereas inadequate support prolonged distress. These findings provide valuable guidance for healthcare providers, counsellors, and policymakers to design interventions that enhance resilience and recovery among disaster survivors.

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Conflicts of Interest

The authors declare that there are no direct or indirect financial, personal, or professional conflicts of interest that could have influenced the outcomes or interpretation of this study. All authors affirm that the research was conducted independently and objectively.

Ethics and Informed Consent

This study was conducted in accordance with ethical standards for research involving human participants and received approval from the relevant institutional ethics review board. All participants were fully informed about the study's purpose, procedures, and potential risks. Written informed consent was obtained before participation, and participants were assured of their right to withdraw at any time without consequences. Measures were taken to ensure the confidentiality and anonymity of all participants, and all data were handled in compliance with ethical research guidelines.

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