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Temporal Trends in Acute Mental Health Problems during the Emergency Medical Team Response to Cyclone Idai 2019 in Mozambique: Findings from the WHO Emergency Medical Team Minimum Data Set

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Abstract

Objective: In 2017, the World Health Organization introduced an international standardized medical data collection tool for disasters, known as the Emergency Medical Team (EMT) Minimum Data Set (MDS). The EMT MDS was activated for the first time in 2019 in response to Cyclone Idai in Mozambique. The present study aimed to examine the daily and phase trends in acute mental health problems identified by international EMTs during their response to Cyclone Idai and reported using the EMT MDS.

Methods: Joinpoint regression analysis was used to examine daily trends in acute mental health consultations. Trends were also examined by phases, which were identified using joinpoints.

Results: During the 90-day EMT response period following Cyclone Idai, 94 acute mental health consultations were reported. The daily trend analysis showed a significant increase in the daily number and percentage of acute mental health consultations from response onset until day 13, followed by a gradual decline ($P<0.05$). The phase trend analysis showed a consistent decrease across the identified phases (P for trend<0.001).

Conclusions: The findings of this study provide insight into the need for mental health support in the immediate aftermath of natural disasters and how that need may change over time.

The incidence of natural disasters is increasing worldwide, resulting in considerable economic losses and human suffering.[1] In particular, mental health problems among people affected by natural disasters are a serious public health concern and a critical consideration in disaster preparedness.[2] Extensive research has highlighted the association between natural disasters and adverse mental health outcomes, including an increased prevalence of depression and long-term psychological distress such as post-traumatic stress disorder (PTSD) among disaster victims.[3,4]

Despite this, little attempt has been made to investigate temporal trends in mental health problems in the immediate aftermath of disasters. Only a few previous studies have examined daily trends in mental health problems during the acute phase (i.e., within the first month[5]) of natural disasters in Japan.[5,6] To the best of our knowledge, no previous study has examined such trends in low- and middle-income countries (LMICs), which may differ significantly from those in high-income countries such as Japan owing to disparities in resources and healthcare infrastructure. Moreover, previous studies analyzed daily trends, but not phase trends in mental health problems.[5,6] Daily trend insights capture rapid fluctuations in mental health problems immediately following a disaster, identifying acute mental health problems and urgent needs.[5,6] By contrast, phase trend insights provide a comprehensive understanding of psychological responses and trajectories over time, which is essential for planning sustained mental health interventions and effectively allocating resources in each phase. While psychological responses to natural disasters are often described using theoretical frameworks for psychological phases of a disaster[7-9]—such as the impact, heroic, honeymoon, disillusionment, and reconstruction phases—these phases vary in duration and intensity, depending on the nature, scale, and context of the disaster as well as the affected community's resources and resilience. Thus, it is essential to

identify phase trends in mental health problems using data-driven approaches, enabling a more precise and scientifically grounded understanding of phase trends in disaster-related mental health problems.

Epidemiological evidence on temporal trends in mental health problems, as identified by Emergency Medical Teams (EMTs) in the immediate aftermath of disasters, remains limited due to challenges in data collection. EMTs play a pivotal role in disaster response, providing not only clinical care for physical symptoms but also mental health and psychosocial support.[10] Collecting information from the medical records of EMTs is crucial for effective resource allocation, EMT deployment, and forecasting health care needs during disaster response. However, consolidating such information is challenging, as EMTs deployed by various organizations, including governments, militaries, non-governmental organizations, and international humanitarian networks, all arrive onsite with, and sometimes without, their own medical record forms and reporting systems.[11,12] To address these challenges, in 2017 the World Health Organization (WHO) developed the EMT minimum dataset (MDS) as a standardized medical data collection tool for use during disasters and public health emergencies. This serves as a framework for the collection of consistent and comparable information by EMTs during disaster response. The EMT MDS was first used in 2019 in Mozambique during response to Cyclone Idai, one of the deadliest tropical cyclones in the Southern Hemisphere.[13]

Therefore, the present study aimed to examine the daily and phase trends in acute mental health problems identified by EMTs during their response to Cyclone Idai and reported using the WHO EMT MDS.

Methods

Disaster Setting

Cyclone Idai made landfall near the city of Beira in Sofala Province, Mozambique, on March 14, 2019. The cyclone caused heavy rainfall and strong winds, resulting in severe flooding and widespread destruction. It affected nearly 1.9 million people and caused more than 900 deaths.[14] The government of Mozambique declared a state of emergency on March 19 and the international community responded swiftly to the disaster, providing humanitarian medical aid including the deployment of EMTs. International EMTs were deployed over 1 week later due to logistical and infrastructural challenges.

EMT MDS Daily Reporting Form and Data Collection

Thirteen international EMTs reported data on the number and types of patients treated using the EMT MDS daily reporting form. This form consists of 85 checkbox items categorized into 4 sections: Team Information (14 items); Daily Summary (6 items); MDS Statistics, including information on demographics, health events such as trauma and infectious diseases, procedures, and outcomes (50 items); and Needs and Risks (15 items). The number of patients experiencing each health event and procedure was recorded, and patients were categorized as aged <5 or ≥5 years. Each international EMT aggregated their daily reports and submitted them to the EMT Coordination Cell between March 27 and July 12, 2019.[15] The present study used the aggregated data on the daily reports of patient consultations.

Acute Mental Health Consultations

The EMT MDS daily reporting form includes a specific checkbox item for acute mental health problems, defined as "mental illnesses and psychological disorders that require immediate treatment and/or psychological support." Frontline physicians in EMTs were responsible for identifying patients in need of acute mental health consultations. According to the minimum standards for international EMTs,[10] they typically receive basic training in mental health and psychosocial support, including psychosocial first aid (PFA), to recognize signs of psychological distress and provide immediate support.

Data Analysis

The acute mental health consultations during the 90-day EMT response period were first analyzed according to age category. Joinpoint regression analysis was used to examine temporal trends in the number and percentage of acute mental health consultations among all age groups. A 7-day moving average was calculated for the number of acute mental health consultations and their percentage of the total consultations to smooth out the data and visualize overall trends. The percentage was calculated as the 7-day moving average of acute mental health consultations divided by that of the total consultations. The joinpoint regression model enabled us to identify joinpoints with significant shifts in trends in acute mental health consultations. The daily percentage change (DPC) between these joinpoints was calculated, as described previously.[6,16]

The trends in the percentage of acute mental health consultations of the total consultations were also examined by phases, which were identified using joinpoints. The Cochran–Armitage test for trends was used to determine the significance of the trends across the identified phases. Data analyses were performed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA), Joinpoint Trend Analysis software version 5.0 (National Cancer Institute, Bethesda, MD, USA),[17] and SAS software version 9.4 (SAS Institute, Cary, NC, USA).

Ethical Review

The study protocol was approved by the Ethics Committee of Hiroshima University, Japan (approval number: E-2059) and the study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Results

Table 1 summarizes the health-related consultations reported by the 13 international EMTs. During the 90-day response period, 17 101 consultations were reported, involving 7570 (44.3%) men and 9531 (55.7 %) women. A total of 2327 (13.6%) consultations were for children aged <5 years, and 14 774 (86.4%) were for individuals aged ≥5 years. EMTs reported performing 94 acute mental health consultations (0.55% of the total), 6 in children aged <5 years, and 88 in individuals aged ≥5 years.

Figure 1 illustrates the daily reported number of total consultations and acute mental health consultations by age category. Acute mental health consultations among individuals aged ≥5 years were reported during the first 41 days of the EMT response, whereas those among children aged <5 years were reported during the first 12 days of the EMT response.

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Table 1. Characteristics of health-related consultations reported by Emergency Medical Teams, Cyclone Idai, 2019

	Age categories		
	All	<5 years old	≥5 years old
Sex			
Male	7570 (44.3%)	1162 (6.8%)	6408 (37.5%)
Female	9531 (55.7%)	1165 (6.8%)	8366 (48.9%)
Total number of all consultations	17101 (100%)	2327 (13.6%)	14774 (86.4%)
Acute mental health consultations	94 (0.55%)	6 (0.26%)	88 (0.60%)

The percentage (%) indicates the percentage out of total number of consultations.

Figure 2 shows the results of the joinpoint regression analysis of daily trends in the number of acute mental health consultations, based on a 7-day moving average of the 41 response days during which acute mental health consultations were reported. The daily number of consultations increased significantly from days 1 to 13 (DPC=88.24% from days 1 to 3, $P<0.05$; DPC=5.34% from days 3 to 13, $P<0.05$), and subsequently decreased until day 40 (DPC=28.02% from days 13 to 20, $P<0.05$; DPC=8.18% from days 20 to 40, $P<0.05$).

Figure 3 shows the daily trends in the percentage of acute mental health consultations of the total consultations. This percentage increased significantly from days 1 to 13 (DPC=4.81%, $P<0.05$) and decreased from days 13 to 40 (DPC=21.34% from days 13 to 23, $P<0.05$; DPC=3.38% from days 23 to 40, $P<0.05$).

Figure 4 presents the phase trends, showing a decreasing trend in the percentage of acute mental health consultations among the total consultations during the 3 phases, as identified by joinpoint regression analysis (P for trend <0.001).

Discussion

During the 90-day EMT response period following Cyclone Idai in Mozambique in 2019, 17 101 health-related consultations were reported. These included 94 acute mental health consultations, which accounted for 0.55% of the total. The daily number and percentage of acute mental health consultations initially increased from response onset to day 13 and then gradually declined. Additionally, the investigation of phase trends in the percentage of acute mental health consultations revealed a consistent decrease across the identified phases.

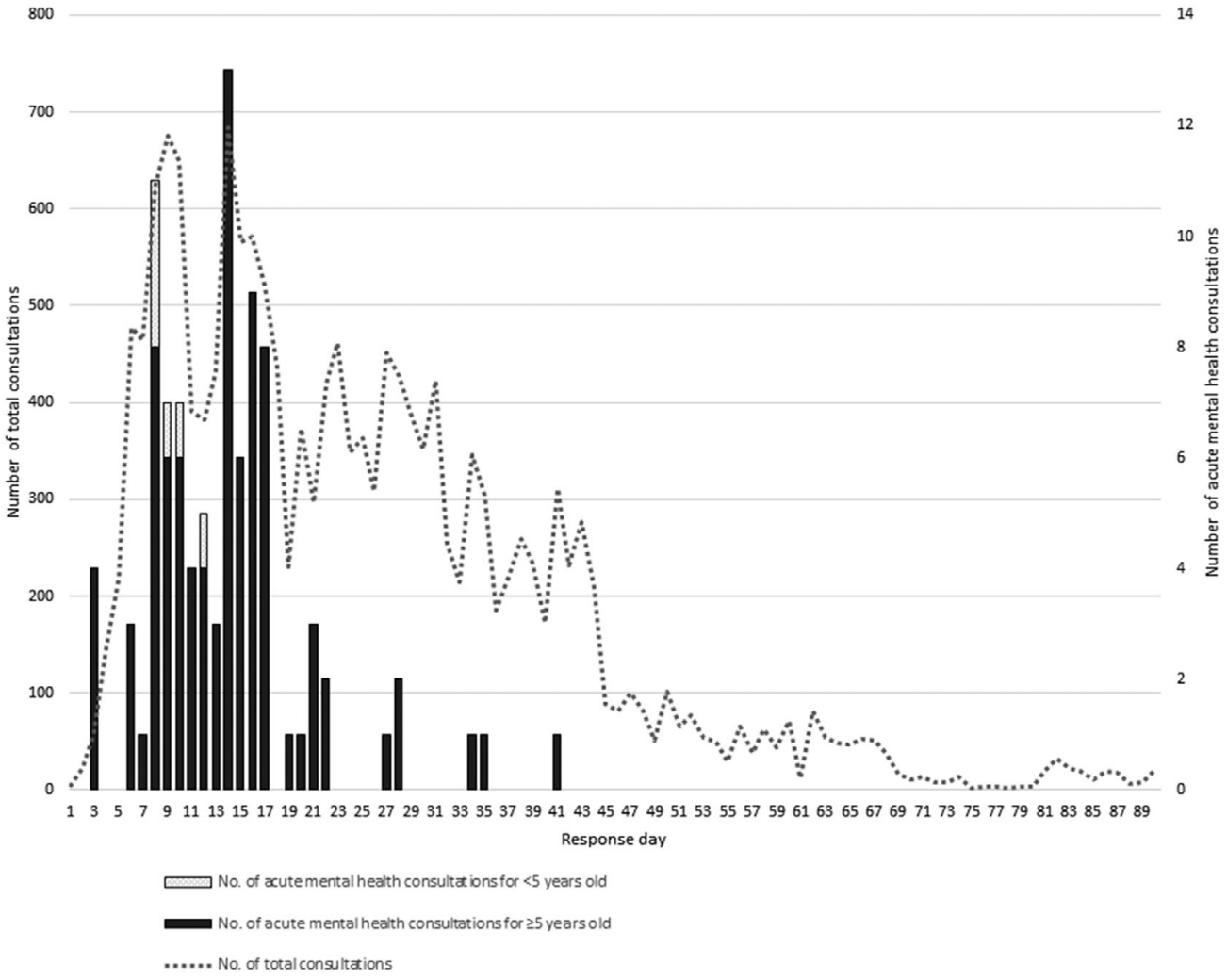

Figure 1. Distribution of health-related consultations reported by Emergency Medical Teams, Cyclone Idai, 2019

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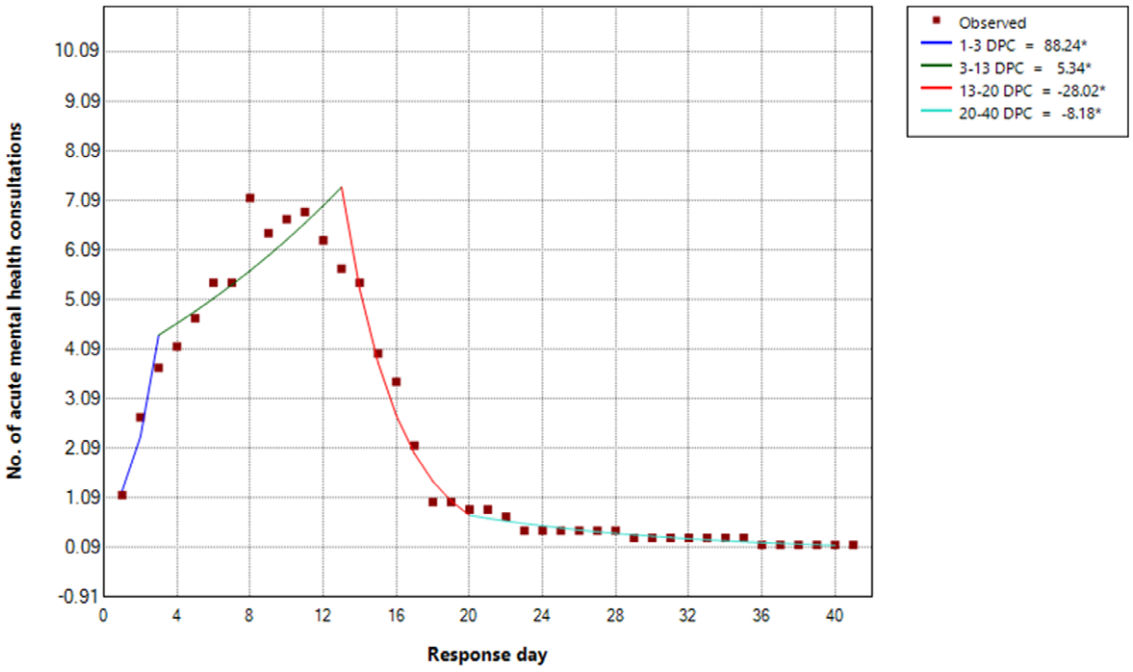

Figure 2. Daily trend in the number of acute mental health consultations. *indicates that Daily Percentage Change (DPC) is significantly different from zero at p-value<0.05

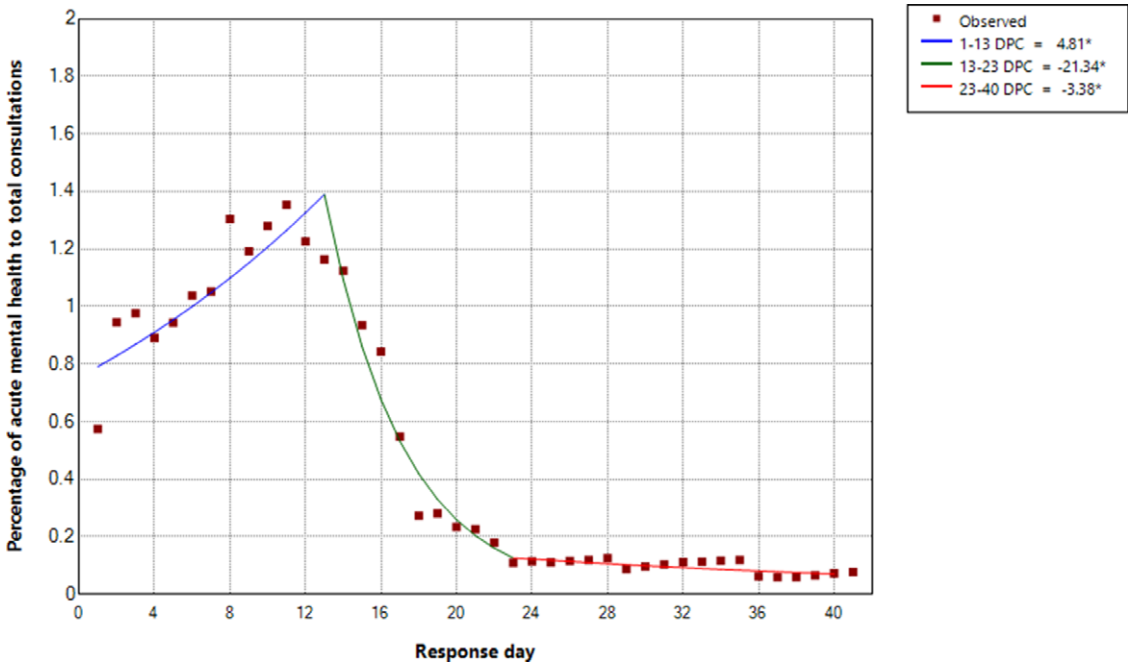

Figure 3. Daily trend in the percentage of acute mental health consultations. *indicates that Daily Percentage Change (DPC) is significantly different from zero at p-value<0.05

Phase	Response days	No. of total consultation	No. (%) of acute mental health consultations		P for trend
Phase 1	Days 1-13	4,543	45	1.0%	<0.001
Phase 2	Days 14-23	4,560	43	0.9%	
Phase 3	Days 24-40	5,254	5	0.1%	

Figure 4. Phase trend in the percentage of acute mental health consultations among total consultations

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There are several possible explanations for the observed daily and phase trends in acute mental health consultations. The initial increase in acute mental health consultations may be explained by the EMT triage system and operating conditions. During a disaster, EMTs establish triage systems to prioritize patients according to their clinical needs,[17,18] meaning that patients with serious physical conditions are more likely to be treated urgently than those who require mental health care, especially during the first few days. In addition, it takes time to deploy and establish international EMTs, and patients not requiring urgent care may wait for the EMTs to become fully operational before seeking mental health support. Both daily and phase trends showed a decreasing trend in acute mental health consultations from the second phase, which may be due to social and community support. Notably, this phase coincided with the "honeymoon phase" of psychological response of a disaster, which typically lasts 1 week to several months following a disaster[7] (Supplementary Figure). During the honeymoon phase, community bonding occurs through a shared catastrophic experience and the giving and receiving of community support,[7-9] and this social support can play a crucial role in helping individuals process their emotions and feel less isolated, providing a sense of belonging and security.[18,19] Furthermore, in the aftermath of a disaster, local mental health services and interventions may become more accessible and widely available as relief and recovery efforts progress.

Only one previous study has examined daily trends in the percentage of mental health consultations as identified by EMTs during the acute phase of a natural disaster.[6] This study was conducted following heavy rain disaster in West Japan in 2018, which showed V-shaped trend in the percentage of mental health consultations, with a decrease from days 1 to 19 of the EMT response period, followed by a gradual increase.[6] These results were inconsistent with the findings of the present study. There are several possible explanations for the discrepancy in the observed trends. First, in the present study, mental health problems were defined as those that required immediate treatment or psychological support, whereas the previous study also included mild mental health symptoms such as headaches and dizziness. Second, the EMT response in the present study was delayed by the need for international EMT deployment, which took more than 1 week, whereas the national EMT response in the previous study was initiated on the first day of the disaster.[19] Third, LMICs and high-income countries may differ in terms of cultural norms and perceptions of mental health. A recent review of 35 studies documented barriers to the provision and utilization of mental health services in LMICs, such as a lack of knowledge regarding mental health problems and social and self-stigma.[20] These barriers may have existed in Mozambique and may have influenced how individuals sought and received mental health support. Another potential explanation is that the language barrier encountered by international EMTs in the present study may have made the identification of mental health problems more challenging, while having less of an effect on the identification of physical symptoms. This supposition is supported by the findings of a previous study, which revealed that language barriers, lack of communication, and information challenges faced by international EMTs resulted in insufficient coordination of medical care activities.[21] These challenges may have led to the under-reporting of acute mental health problems in the EMT MDS daily reports after Cyclone Idai in Mozambique, thereby affecting the observed trends of acute mental health consultations. Furthermore, the ability of EMTs to identify psychological needs can be influenced by the level and consistency of training in mental health and psychosocial support. EMTs deployed in disaster settings are generally prepared with basic training in mental health and psychological support, commonly including PFA training, which equips them to provide immediate support and recognize common psychological reactions to disasters.[10] However, the extent and focus of this training may vary widely between EMTs, especially in international deployments where EMTs are operated across diverse settings and are deployed from various countries. This may affect the capacity of EMTs to identify more subtle or complex mental health issues. In the context of this disaster setting, such variability in training, compounded by cultural differences and logistical challenges, might have influenced the accuracy and completeness of the mental health assessments conducted by EMTs. Therefore, it is crucial to consider these factors when interpreting observed trends in mental health consultations in different disaster settings.

The findings of the present study have several implications. The increasing trend in acute mental health consultations during the initial days of the EMT response highlights the need for greater provision of mental health resources in the immediate aftermath of a disaster. Early intervention can help relieve the burden associated with mental health problems and potentially prevent adverse long-term outcomes, such as PTSD.[22] Moreover, the decreasing trend may indicate a successful transition of mental health services from EMTs to the community health system. While the data of the present study do not show day-by-day mental health improvements in individual patients, the decline in new patients seeking consultations over time may be more plausibly attributed to distressed individuals instead receiving social and community support as relief efforts progress. A smooth handover of services from EMTs to community health systems is vital for addressing both immediate and long-term mental health problems. Finally, these findings highlight the importance of a phase-based approach to mental health interventions that adapts to the evolving needs of affected populations over time. Implementing such a strategy ensures that mental health support remains effective and responsive to the changing needs of disaster victims.

The strength of this study is its use of real-time data derived from daily reports on mental health consultations provided by international EMTs. However, this study has several limitations. First, aggregated data from the daily reports of EMTs were used. No individual-level data were used, owing to availability and the burden of data extraction and submission. Second, the number of acute mental health problems may have been underestimated for several reasons, such as the challenges faced by international EMTs in identifying mental health problems and the barriers to mental health in LMICs. Finally, these findings were based on only one disaster; thus, they should be generalized with caution.

Conclusion

This study provides valuable insights into the temporal trends in acute mental health problems identified by EMTs during their response to Cyclone Idai in Mozambique in 2019, highlighting the critical importance of prompt and sustained mental health support in the immediate aftermath of natural disasters. Further research across different settings is required to confirm the observed trends and facilitate a better understanding of acute mental health problems following natural disasters.

Supplementary material. The supplementary material for this article can be found at http://doi.org/10.1017/dmp.2025.29.

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Competing interest. All authors declare no competing interests.

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