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1 Psychological impact of the Alhaouz earthquake: Study in 1 the municipality of Ouled Berrehil, Morocco 2 Abstract 3 The Alhaouz earthquake, which struck Morocco in September 2023, has sparked 4 increasing interest in its psychological repercussions on affected individuals. This 5 study aims to analyze 1 the psychological impact of this disaster in the Ouled Berrehil 6 commune. 7 The study was conducted one week after the earthquake and included forty-seven 8 victims. A semi-structured questionnaire was used to collect socio-economic and 9 medical information, while the Peritraumatic Distress Inventory and Peritraumatic 10 Dissociative Experiences Questionnaire were administered to assess psychological 11 responses. 12 The results revealed a significant correlation between material damage and housing 13 need with participants' emotional distress. Additionally, a link between family and 14 associative support with dissociative reactions was observed. These findings 15 highlight the importance of social support and material assistance in managing the 16 1 psychological impact of natural disasters. 17 This study underscores the urgency of post-disaster interventions integrating 18 psychological and social aspects to support the resilience of individuals affected by 19 traumatic events such as the Alhaouz earthquake. These findings provide valuable 20 insights to guide crisis management policies and mental health interventions in 21 regions affected by natural disasters. 22

2 Key words: Peritraumatic distress, Natural disasters, Psychosocial support 23 24 Introduction: 25 Earthquakes cause major material destruction and lasting psychological trauma, 26 requiring prolonged mental health support for victims. [1]. 27 On 8 September 2023, an earthquake struck the High Atlas Mountains in Morocco: 28 3,000 people lost their lives and around 5,500 others were injured [2]. 29 According to the United Nations Office for the Coordination of Humanitarian Affairs 30 (UNOCHA), the disaster affected approximately 500,000 people across the region, 31 including isolated and hard-to-reach communities [3]. 32 The affected area included the historic city of Marrakech, as well as rural areas in the 33 provinces of Al Haouz, Taroudant and Chichaoua [4]. 34 2 The Al

Haouz earthquake caused profound psychological suffering, exacerbated by 35 the loss of relatives, the destruction of homes and a feeling of insecurity. 36 Understanding its impact on mental wellbeing is essential to supporting victims and 37 guiding prevention and assistance policies. 38 Objectives: 39 This study examines the peritraumatic and dissociative responses of victims of the AI 40 Haouz earthquake based on their sociodemographic characteristics, exposure to 41 damage, and social support, in order to guide the development of strategies to 42 strengthen resilience and recovery. 43

3 Materials and Methods: 44 The study was a cross-sectional analytical study conducted in the rural area of the 45 municipality of Ouled Berrehil, located in Morocco, which was directly affected by the 46 AI Haouz earthquake that occurred on 8 September 2023. 47 Forty-seven earthquake victims were interviewed on 17th September 2023, one 48 week after the event, enabling their immediate reactions to be analysed. The 49 interviews, conducted in Arabic and Amazigh by mental health professionals with the 50 assistance of non-governmental organisations, took place face-to-face in sometimes 51 difficult conditions. A preliminary explanation was provided to participants to ensure 52 confidentiality, anonymity, and voluntary participation. 53 A semi-structured questionnaire was designed to collect socio-economic and 54 medical data, exploring in depth 1 the **psychological impact of** the earthquake, 55 particularly peritraumatic distress and dissociation. 56 - Peritraumatic Distress Inventory (PDI): a questionnaire composed of 13 items to be 57 answered on a 4-point Likert scale (0 = not at all, 4 = extremely true). The results are 58 added together to give a total score ranging from 0 to 52. A score of ≥ 15 is used to 59 identify individuals in significant distress [5]. The questionnaire includes two 60 subscales: experiences of life-threatening situations (six items) and negative 61 emotions (seven items) [6]. 62 - Peritraumatic Dissociation Experiences Questionnaire (PDEQ): a questionnaire 63 consisting of 10 items assessing the presence of dissociative symptoms during or 64 immediately after a traumatic event. Items are rated on a Likert scale (1 = not at all 65

4 true, 5 = extremely true) and added together to create a total score ranging from 10 66 to 50. A score ≥ 15 indicates individuals with peritraumatic dissociation [7]. 67 The data were analysed using IBM SPSS 21 programme. 68 Ethics Statement: This research protocol was reviewed and approved by the Ethics 69 Committee of the Faculty of Medicine and Pharmacy of Tangier, Abdelmalek 70 Essaadi University (Approval number: XXX). 71 Given the post-disaster emergency context, the high illiteracy rate in the affected 72 rural areas, and the need to avoid adding administrative burden on survivors, verbal 73 informed consent was obtained from all participants. This procedure, including the 74 use of verbal consent, was explicitly approved by the Ethics Committee. Participation 75 was voluntary, anonymity was assured, and no personal identifiers were collected. 76 The study adhered to the ethical principles of the Declaration of Helsinki. 77 Results: 78 Descriptive results: 79 The average age of participants was 51 years with a standard deviation of 18.972 80 years. The majority of participants were women (70.2%). The majority of participants 81 were married (63.8%) with an average number of children per family of 3. 82 A significant proportion of participants were illiterate (68.1%). The vast majority of 83 participants (93.6%) lived in temporary tents. 70.2% of participants reported 84 receiving family support, and 42.6% reported receiving assistance from associations. 85 Regarding exposure to the earthquake, 2.1% reported injuries within their family, and 86

5 17% lost family members. As for material damage, 40.4% of respondents reported 87 partial destruction of their homes, and 17% reported total destruction. 88 10.6% of participants expressed an immediate need for clothing, 19.1% reported a 89 need for food, and 57.4% expressed an urgent need for housing. 90 The median scores of the assessment tools show the levels of distress and 91 dissociation. The PDI median score was 25, and the PDEQ median score was 20 92 (Table I). 93 Table I: Summary table of results. 94

	Sample	PDI (25[21 - 33])	PDEQ (20[13 - 28])	Value P	Value P
Gender	Female	33	0,226	0,825	
	Male	14			
Age	51,57 +/-	18,97	-0,046	0,76	0,317

Educational level Illiterate 32 0,018 0,902 0,027 0,859 Primary school 9 Middle school
3 High school 2 University 1 Marital status Single 9 0,792 0,304

6 Divorced 1 Married 30 Widowed 7 Children 3[1 - 4] -0,255 0,084 0,102 0,496 Property
damage None 15 0,013 0,174 Cracks 5 Partial destruction 19 Total destruction 8
Displacement No 3 0,107 0,665 Yes 44 Local housing Tent 44 0,107 0,665 Household 3
Dégât humain None 38 0,452 0,386 Family member injured 1 Family member deceased 8
immediate need for Housing No 20 0,045 0,983 Yes 27 Immediate need for Food No
38 0,059 0,076

7 Yes 9 Immediate need for Clothing No 42 0,271 0,137 Yes 5 Family Support No
14 0,514 0,004 Yes 33 Association Support No 27 <0,001 0,004 Yes 20 95 Analytical
results: 96 The results of the analysis confirmed the existence of a statistically significant
97 association between material damage experienced and the PDI score ($p = 0.013$). 98
Similarly, an immediate need for housing was significantly linked to the PDI score ($p = 0.045$).
100 In terms of social support, a significant association was observed between
family 101 support and the PDEQ score ($p = 0.004$). Furthermore, community support
showed a 102 significant relationship with both the PDI score ($p < 0.001$) and the PDEQ
score ($p = 0.004$) (Table I). 104 A positive correlation was observed between material
damage and human damage 105 ($p = 0.024$). Similarly, a significant positive correlation
was found between the 106

8 participants' current housing situation and displacement ($p < 0.001$). Finally, a 107
positive correlation was identified between the PDI and the PDEQ ($p = 0.001$). 108
Discussion: 109 Previous studies show that psychological distress increases with material
losses, 110 and that immediate residential insecurity after **1 a disaster is a** major stress
factor [8,9]. 111 The work of Galea et al. (2005) indicates that residential insecurity is
strongly 112 correlated with post-disaster psychological distress. The urgent need for

housing can 113 increase psychological vulnerability [10]. 114 The results confirm the protective role of family support in reducing dissociative 115 reactions, improving communication, and potentially attenuating derealization during 116 crises. In addition, research shows the effectiveness of community-based 117 interventions in reducing post-disaster psychological distress [11,12,13]. 118 The correlation between material damage and human casualties is consistent with 119 the literature [14]. Studies show that post-disaster displacement is often linked to 120 precarious housing conditions [15]. The correlation highlights the complexity of post-121 earthquake housing needs and mobility, underscoring the urgency of targeted 122 interventions [10]. The correlation between emotional distress and dissociative 123 reactions is consistent with the trauma theory, highlighting the interrelationship 124 between these two dimensions [16]. 125 The results highlight the need for a holistic post-disaster approach, aligned with 126 recommendations for integrated interventions [17], and taking into account the 127 complexity **1 of** **psychological responses to disasters.** 128

9 The interventions aimed at strengthening family and community support are 129 consistent with previous research by Galea et al. (2005) on the importance of social 130 support in post-disaster resilience, taking into account the variability of individual 131 responses [17]. 132 Emphasizing the immediate need for housing **1 underlines the importance of** rapid 133 action for well-planned reconstruction policies, highlighting the variability of individual 134 responses to material losses [15]. 135 Further studies with larger samples are needed to generalize the findings. The 136 unique characteristics of each disaster may influence psychological responses. 137 Comparative research with other seismic contexts is needed. 138 Conclusion: 139 Understanding the links between material losses, **3 social support, and mental health** 140 is crucial for effective post-disaster interventions. The results show a major 141 psychological impact of the Alhaouz earthquake, highlighting the need for targeted 142 interventions addressing the psychological and social dimensions of victims. 143 Acknowledgments: 144 The authors

would like to thank all the earthquake survivors of Ouled Berrehil who 145 generously agreed to participate in this study despite the difficult circumstances. 146 We are grateful 1 to the mental health professionals and volunteers who assisted with 147 data collection, as well as the local non-governmental organizations that facilitated 148 access to the affected areas. 149 The authors also acknowledge the support of the field teams who ensured the 150

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