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### RESEARCH ARTICLE

## PSYCHOLOGICAL IMPACT OF THE ALHAOUZ EARTHQUAKE: STUDY IN THE MUNICIPALITY OF OULED BERREHIL, MOROCCO

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#### Abstract

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

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#### Introduction:-

Earthquakes cause major material destruction and lasting psychological trauma, requiring prolonged mental health support for victims. [1]. On 8 September 2023, an earthquake struck the High Atlas Mountains in Morocco: 3,000 people lost their lives and around 5,500 others were injured [2]. According to the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the disaster affected approximately 500,000 people across the region, including isolated and hard-to-reach communities [3]. The affected area included the historic city of Marrakech, as well as rural areas in the provinces of Al Haouz, Taroudant and Chichaoua [4]. The Al Haouz earthquake caused profound psychological suffering, exacerbated by the loss of relatives, the destruction of homes

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and a feeling of insecurity. Understanding its impact on mental wellbeing is essential to supporting victims and guiding prevention and assistance policies.

### Objectives:-

This study examines the peritraumatic and dissociative responses of victims of the Al Haouz earthquake based on their sociodemographic characteristics, exposure to damage, and social support, in order to guide the development of strategies to strengthen resilience and recovery.

### Materials and Methods:-

The study was a cross-sectional analytical study conducted in the rural area of the municipality of Ouled Berrehil, located in Morocco, which was directly affected by the Al Haouz earthquake that occurred on 8 September 2023.

Forty-seven earthquake victims were interviewed on 17th September 2023, one week after the event, enabling their immediate reactions to be analysed. The interviews, conducted in Arabic and Amazigh by mental health professionals with the assistance of non-governmental organisations, took place face-to-face in sometimes difficult conditions. A preliminary explanation was provided to participants to ensure confidentiality, anonymity, and voluntary participation. A semi-structured questionnaire was designed to collect socio-economic and medical data, exploring in depth the psychological impact of the earthquake, particularly peritraumatic distress and dissociation.

- Peritraumatic Distress Inventory (PDI): a questionnaire composed of 13 items to be answered on a 4-point Likert scale (0 = not at all, 4 = extremely true). The results are added together to give a total score ranging from 0 to 52. A score of  $\geq 15$  is used to identify individuals in significant distress [5]. The questionnaire includes two subscales: experiences of life-threatening situations (six items) and negative emotions (seven items) [6].- Peritraumatic Dissociation Experiences Questionnaire (PDEQ): a questionnaire consisting of 10 items assessing the presence of dissociative symptoms during or immediately after a traumatic event. Items are rated on a Likert scale (1 = not at all true, 5 = extremely true) and added together to create a total score ranging from 10 to 50. A score  $\geq 15$  indicates individuals with peritraumatic dissociation [7]. The data were analysed using IBM SPSS 21 programme.

**Ethics Statement:** Given the post-disaster emergency context, the high illiteracy rate in the affected rural areas, and the need to avoid adding administrative burden on survivors, verbal informed consent was obtained from all participants. Participation was voluntary, anonymity was assured, and no personal identifiers were collected. The study adhered to the ethical principles of the Declaration of Helsinki.

### Results:-

#### Descriptive results:

The average age of participants was 51 years with a standard deviation of 18.972 years. The majority of participants were women (70.2%). The majority of participants were married (63.8%) with an average number of children per family of 3. A significant proportion of participants were illiterate (68.1%). The vast majority of participants (93.6%) lived in temporary tents. 70.2% of participants reported receiving family support, and 42.6% reported receiving assistance from associations. Regarding exposure to the earthquake, 2.1% reported injuries within their family, and 17% lost family members. As for material damage, 40.4% of respondents reported partial destruction of their homes, and 17% reported total destruction. 10.6% of participants expressed an immediate need for clothing, 19.1% reported a need for food, and 57.4% expressed an urgent need for housing. The median scores of the assessment tools show the levels of distress and dissociation. The PDI median score was 25, and the PDEQ median score was 20 (Table I).

**Table I: Summary table of results.**

	Sample	PDI (25[21 - 33])		PDEQ (20[13 - 28])	
		Value	P-Value	Value	P-Value
<b>Gender</b>					
Female	33		0,226		0,825
Male	14				
<b>Age</b>	51,57 +/- 18,97	-0,046	0,76	0,149	0,317
<b>Educational level</b>					

Illiterate	32	0,018	0,902	0,027	0,859
Primary school	9				
Middle school	3				
High school	2				
University	1				
<b>Marital status</b>					
Single	9		0,792		0,304
Divorced	1				
Married	30				
Widowed	7				
<b>Children</b>	3[1 - 4]	-0,255	0,084	0,102	0,496
<b>Property damage</b>					
None	15		0,013		0,174
Cracks	5				
Partial destruction	19				
Total destruction	8				
<b>Displacement</b>					
No	3		0,107		0,665
Yes	44				
<b>Local housing</b>					
Tent	44		0,107		0,665
Household	3				
<b>Degât humain</b>					
None	38		0,452		0,386
Family member injured	1				
Family member deceased	8				
<b>immediate need for Housing</b>					
No	20		0,045		0,983
Yes	27				
<b>Immediate need for Food</b>					
No	38		0,059		0,076
Yes	9				
<b>Immediate need for Clothing</b>					

No	42		0,271		0,137
Yes	5				
<b>Family Support</b>					
No	14		0,514		<b>0,004</b>
Yes	33				
<b>Association Support</b>					
No	27		<b>&lt;0,001</b>		<b>0,004</b>
Yes	20				

**Analytical results:**

The results of the analysis confirmed the existence of a statistically significant association between material damage experienced and the PDI score ( $p = 0.013$ ). Similarly, an immediate need for housing was significantly linked to the PDI score ( $p = 0.045$ ). In terms of social support, a significant association was observed between family support and the PDEQ score ( $p = 0.004$ ). Furthermore, community support showed a significant relationship with both the PDI score ( $p < 0.001$ ) and the PDEQ score ( $p = 0.004$ ) (Table I). A positive correlation was observed between material damage and human damage ( $p = 0.024$ ). Similarly, a significant positive correlation was found between the participants' current housing situation and displacement ( $p < 0.001$ ). Finally, a positive correlation was identified between the PDI and the PDEQ ( $p = 0.001$ ).

**Discussion:-**

Previous studies show that psychological distress increases with material losses, and that immediate residential insecurity after a disaster is a major stress factor [8,9]. The work of Galea et al. (2005) indicates that residential insecurity is strongly correlated with post-disaster psychological distress. The urgent need for housing can increase psychological vulnerability [10]. The results confirm the protective role of family support in reducing dissociative reactions, improving communication, and potentially attenuating derealization during crises. In addition, research shows the effectiveness of community-based interventions in reducing post-disaster psychological distress [11,12,13]. The correlation between material damage and human casualties is consistent with the literature [14]. Studies show that post-disaster displacement is often linked to precarious housing conditions [15]. The correlation highlights the complexity of post-earthquake housing needs and mobility, underscoring the urgency of targeted interventions [10]. The correlation between emotional distress and dissociative reactions is consistent with the trauma theory, highlighting the interrelationship between these two dimensions [16].

The results highlight the need for a holistic post-disaster approach, aligned with recommendations for integrated interventions [17], and taking into account the complexity of psychological responses to disasters. The interventions aimed at strengthening family and community support are consistent with previous research by Galea et al. (2005) on the importance of social support in post-disaster resilience, taking into account the variability of individual responses [17]. Emphasizing the immediate need for housing underlines the importance of rapid action for well-planned reconstruction policies, highlighting the variability of individual responses to material losses [15]. Further studies with larger samples are needed to generalize the findings. The unique characteristics of each disaster may influence psychological responses. Comparative research with other seismic contexts is needed.

**Conclusion:-**

Understanding the links between material losses, social support, and mental health is crucial for effective post-disaster interventions. The results show a major psychological impact of the Alhaouz earthquake, highlighting the need for targeted interventions addressing the psychological and social dimensions of victims.

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