

**Original Research**

**Psychological Stress Triggered by Storm Daniel as a Catalyst for Vitiligo Activity : A post -Disaster Clinical Assessment**

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**ABSTRACT:**

Vitiligo is a chronic autoimmune disorder in which psychological stress is recognized as an important trigger for disease activity. In September 2023, Storm Daniel caused catastrophic flooding in Derna, Libya, resulting in severe psychological trauma among survivors. This study aimed to assess the impact of disaster-related psychological stress on vitiligo activity among affected patients. A cross-sectional survey-based study was conducted in Derna involving patients with a confirmed diagnosis of vitiligo who experienced the storm. Data



regarding disease characteristics, distribution patterns, and self-reported changes in disease activity following the disaster were collected and analyzed. A total of 49 patients participated, of whom 66.7% reported disease progression after the storm. Non-segmental generalized vitiligo showed a significantly higher rate of progression compared to localized and segmental forms ( $p = 0.003$ ). These findings suggest that severe psychological stress following natural disasters may contribute to increased vitiligo activity, particularly in immunologically active non-segmental forms. Psychological support and close dermatological follow-up should be considered essential components of post-disaster healthcare for patients with vitiligo.

**KEYWORDS:** Vitiligo, Psychological Stress, Natural Disaster, Non-Segmental Vitiligo, Storm Daniel.

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## INTRODUCTION

Vitiligo is a condition where the skin loses its natural colour in patches because the pigment-producing cells (melanocytes) are destroyed by the body's own immune system. It affects about 0.5–2% of people worldwide<sup>1</sup>. The most common type, non-segmental vitiligo (NSV), is closely linked to immune activity, oxidative stress, and psychological triggers (1,2). Stressful events and environmental pressures can play a major role, especially in people who are genetically predisposed.

Psychological stress is now widely recognised as a factor that can trigger or worsen vitiligo. Several studies from the Middle East and North Africa (MENA) region have shown that stressful life events, trauma, conflict, and acute emotional pressure are associated with worsening vitiligo and other immune-related skin conditions (3-6). For example, a study in

Saudi Arabia found that 62% of patients reported their vitiligo became active after emotional stress . Similar findings have been reported in Egypt and Iraq, where stress was linked to greater disease severity and reduced quality of life<sup>4–6</sup>.

In September 2023, Storm Daniel struck eastern Libya, causing catastrophic flooding in Derna. More than 10,000 lives were lost, and survivors faced displacement, grief, and extreme psychological trauma. The humanitarian impact was profound. Yet, until now, no study has examined how such a disaster might affect people living with vitiligo.

Given the established link between stress and immune dysregulation, it is plausible that the psychological trauma caused by Storm Daniel contributed to worsening vitiligo among those affected. This study set out to evaluate whether the storm was associated with disease progression in patients living in Derna.

## **MATERIALS AND METHODS**

## **RESULTS**

### ***Study Design and Setting***

A cross-sectional, survey-based study was conducted in Derna, Libya, following Storm Daniel (September 2023). Patients with a known diagnosis of vitiligo were recruited from the local community and outpatient settings.

### ***Participants***

#### **Inclusion criteria:**

Confirmed diagnosis of vitiligo  
Resident in Derna during and after Storm Daniel  
Able to complete the survey

### ***Data Collection***

Patients completed a structured questionnaire that included:

Age  
Onset of vitiligo  
Lesional distribution  
Family history  
Past and current treatments  
Self-reported effect of Storm Daniel on vitiligo (progressive vs not progressive)  
Lesional distribution was recategorised for analysis as:  
Non-segmental generalised (vulgaris, acrofacial)  
Localised (focal)  
Segmental  
Unknown

This study represents a post-disaster clinical assessment. A total of 49 patients participated. The mean age was 28.6 years, and mean duration since disease onset was 7.4 years. Lesional distributions were:

Non-segmental generalised: 27 patients (55.1%)

Localised focal: 9 patients (18.4%)

Segmental: 2 patients (4.1%)

Unknown: 3 patients (6.1%)

Among the 36 patients with known storm effect, there were 24 (66.7%) reported their disease became progressive and 12 (33.3%) reported no progression. Moreover, a statistically significant association was found between distribution category and storm-related progression ( $\chi^2$ ,  $p = 0.003$ ).

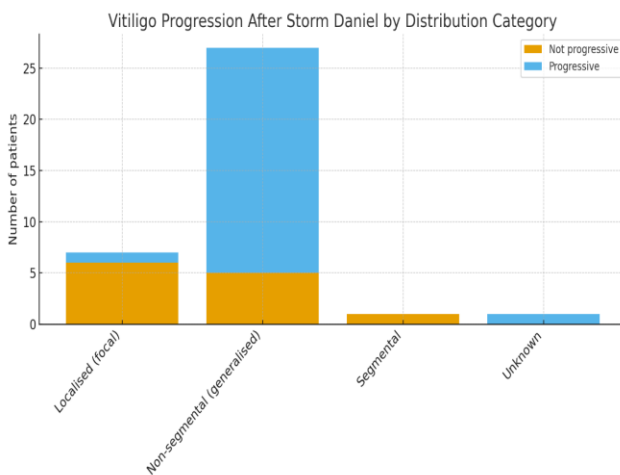
In this study, progression rates by group were Non-segmental generalized including 22/27 (81.5%), Localized: 1/7 (14.3%), segmental: 0/1 (0%), and unknown: 1/1 (100%).

Thus, patients with non-segmental generalised patterns were markedly more likely to report worsening following Storm Daniel.

**Table 1.** Distribution category vs effect of Storm Daniel (known cases only, n = 36)

Distribution category	Not progressive	Progressive	Total
Localised (focal)	6	1	7
Non-segmental (generalised) (vulgaris/acrofacial)	5	22	27
Segmental	1	0	1
Unknown	0	1	1

Chi-square test (4×2): p = 0.0032 (≈ 0.003) significant.



**Figure. 1.** Vitiligo Progression after Storm Daniel by Distribution Category

## DISCUSSION

This study demonstrates a strong relationship between vitiligo activity and psychological stress in the aftermath of Storm Daniel. Two-thirds of patients with known outcomes reported progression, consistent with prior evidence linking stress and vitiligo exacerbation.

### *Comparison with Regional Literature*

Studies from the MENA region support our findings. Research from Saudi Arabia and Iraq identified emotional stress as a major trigger for vitiligo activation and flare-ups. An Egyptian cohort similarly showed high rates of disease worsening following psychological distress and social trauma. Our Libyan data align with this pattern, suggesting that populations exposed to disaster-related stress may be at increased risk for autoimmune destabilisation.

### *Higher Susceptibility of Non Segmental Vitiligo to Stress*

Non-segmental forms are more immunologically active and more sensitive to systemic triggers. Stress can elevate catecholamines, increase oxidative stress, and intensify autoimmune melanocyte destruction. Localised/segmental vitiligo, by contrast, is often neurologically mediated and less reactive to psychological influences.

## CONCLUSION

Following Storm Daniel, a substantial proportion of vitiligo patients in Derna reported worsening of their disease, with non-segmental vitiligo particularly affected. These findings highlight the potential impact of severe psychological stress on autoimmune skin conditions and underscore the need for psychological support and dermatological follow-up in disaster-affected communities.

Future studies should incorporate longitudinal designs, objective scoring tools, and assessment of stress biomarkers to better understand stress–vitiligo interactions in vulnerable populations.

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## ETHICS

Ethical approval for this study was obtained from the department of dermatology at alwahda derna hospital. All participants provided informed consent prior to data collection. The study was conducted in accordance with the principles of the declaration of Helsinki.

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## المخلص

البهاق اضطراب مناعي ذاتي مزمن، يُعدّ فيه الإجهاد النفسي عاملاً محفزاً هاماً لنشاط المرض. في سبتمبر/أيلول 2023، تسببت عاصفة دانيال في فيضانات كارثية في درنة، ليبيا، مما أدى إلى صدمة نفسية شديدة بين الناجين. هدفت هذه الدراسة إلى تقييم تأثير الإجهاد النفسي الناتج عن الكوارث على نشاط البهاق لدى المرضى المتضررين. أُجريت دراسة مسحية مقطعية في درنة شملت مرضى تم تشخيص إصابتهم بالبهاق وتعرضوا للعاصفة. جُمعت بيانات حول خصائص المرض، وأنماط انتشاره، والتغيرات التي أبلغ عنها المرضى أنفسهم في نشاط المرض بعد الكارثة، ثم حُللت. شارك في الدراسة 49 مريضاً، أفاد 66.7% منهم بتفاقم حالتهم بعد العاصفة. أظهر البهاق المعمم غير القطاعي معدل تفاقم أعلى بشكل ملحوظ مقارنةً بالأشكال الموضعية والقطاعية ( $p = 0.003$ ). تشير هذه النتائج إلى أن الإجهاد النفسي الشديد الذي يلي الكوارث الطبيعية قد يُسهم في زيادة نشاط البهاق، لا سيما في الأشكال غير القطاعية النشطة مناعياً. يُعدّ الدعم النفسي والمتابعة الجلدية الدقيقة عنصرين أساسيين في الرعاية الصحية لمرضى البهاق بعد الكوارث.

**الكلمات المفتاحية:** البهاق، الضغط النفسي، الكوارث الطبيعية، البهاق غير القطاعي، إعصار دانيال.

