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Immunosuppression in a Worker with Cancer in the Desert Environment According to Hans Selye's General Adaptation Syndrome Theory

الكبت المناعي لدى العامل المصاب بالسرطان في بيئة صحراوية وفق نظرية متلازمة التكيف العام لهانز سيلي

BOUALI Ouarda[1], BOUCHAOUR Zahra Nawal[2]

[1]University of Ahmed DRAIA Adrar, Education and Development Lab,
bouali.ouarda@univ-adrar.edu.dz
[2]University of Ahmed DRAIA Adrar, Education and Development Lab,
naw.bouchaour@univ-adrar.edu.dz

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Abstract

This study examined the psychological, social, occupational, and health pressures experienced by a worker with cancer in a desert environment through Hans Selye's General Adaptation Syndrome theory. An exploratory clinical case-study approach involved a 52-year-old man diagnosed with prostate cancer. Data were collected using semi-structured clinical interviews, clinical observation, and the Perceived Stress Scale. The participant scored 28/40 and displayed emotional, behavioral, and physical indicators of stress amid overlapping illness, family, occupational, and environmental pressures. The findings were interpreted through the potential relationship between prolonged stress and immune response, without establishing causal proof of immunosuppression since laboratory findings were not independently reviewed and information about immune impairment was based on the participant's account. The study emphasizes an integrated psycho-environmental understanding of these workers' experiences and the importance of appropriate psychological support

Keywords: Immunosuppression; Cancer; Desert Environment; Hans Selye's General Adaptation Syndrome Theory; Perceived Stress.

الملخص: تناولت هذه الدراسة الضغوط النفسية والاجتماعية والمهنية والصحية التي يواجهها عامل مصاب بالسرطان في بيئة صحراوية، وذلك في ضوء نظرية متلازمة التكيف العام لهانز سيلي .واعتمدت الدراسة منهج دراسة الحالة العيادية الاستكشافية، وشملت رجلاً يبلغ من العمر 52 عاماً شُخِّص بسرطان البروستات .جُمعت البيانات باستخدام المقابلات العيادية نصف الموجهة، والملاحظة العيادية، ومقياس الضغط النفسي المدرك .حصل المشارك على درجة28/40 ، وأظهر مؤشرات انفعالية وسلوكية وجسدية مرتبطة بالضغط النفسي، في سياق تداخل الضغوط المرضية والأسرية والمهنية والبيئية .وفُسِّرت النتائج في ضوء العلاقة المحتملة بين استمرار الضغط النفسي والاستجابة المناعية، دون إثبات أن الضغط النفسي تسبب في الكبت المناعي، إذ لم تُراجع النتائج المخبرية بصورة مستقلة، واستندت المعلومات المتعلقة بضعف المناعة إلى إفادة المشارك . وتؤكد الدراسة أهمية الفهم النفسي والبيئي المتكامل لتجربة هذا العامل، وأهمية توفير الدعم النفسي المناسب له

الكلمات المفتاحية: الكبت المناعي؛ السرطان؛ البيئة الصحراوية؛ نظرية متلازمة التكيف العام لهانز سيلي؛ الضغط النفسي المدرك.

Corresponding author: BOUALI Ouarda. e-mail: bouali.ouarda@univ-adrar.edu.dz

1. INTRODUCTION

The environment serves as a direct determining factor of human health, as climatic and geographical conditions significantly influence individuals' physical and psychological performance. This influence is further compounded by exposure to nuclear radiation, for which the province of Adrar, specifically the Reggane region, has historically served as a site. In this context, desert environments represent some of the most challenging settings due to extreme temperatures, severe water scarcity, and sharp climatic fluctuations. Such conditions impose continuous physiological and psychological demands on human organisms. These stressors are not limited to the physical environment alone; they extend to encompass socio-economic pressures, thereby escalating chronic stress levels and compromising the body's capacity to adapt to harsh conditions.

Recent medical and psychological research demonstrates that chronic stress exerts a direct negative impact on human health, particularly on the immune system. Prolonged exposure to stressors induces a state of immunosuppression, reducing the immune system's efficacy in detecting and eliminating abnormal cells, including malignant cancer cells (Liu et al., 2022; Alotiby, 2024). Consequently, the body becomes increasingly susceptible to chronic diseases and clinical complications. For an individual already diagnosed with cancer who experiences persistent stress within a desert workplace setting, disease severity is compounded, leading to severe exhaustion, compromised recovery rates, and an elevated risk of mortality.

In this context, Selye's stress theory provides an analytical framework for understanding the impact of chronic stress on vital physiological functions. Selye conceptualized the General Adaptation Syndrome (GAS), which progresses through three distinct stages: the alarm reaction stage, the resistance stage, and the exhaustion stage. During these stages, the body's adaptive capacity progressively declines, leading to adverse effects on vital organs, including the immune system (Selye, 1956). Within this theoretical framework, it becomes possible to elucidate how persistent stress arising from living or working in desert environments can attenuate immune responses in workers with cancer, thereby aggravating disease-related health complications (Yan et al., 2023).

Given the specific circumstances of cancer-diagnosed workers employed in desert environments, and considering the complex interplay of pathological, psychological, social, and occupational factors in their experience, this study was undertaken to examine and analyze the nature of the stressors faced by cancer-diagnosed workers through the lens of the General Adaptation Syndrome, with a particular focus on perceived psychological stress and its potential clinical implications for psychological and physiological equilibrium.

1.1 Problem Statement

A cancer diagnosis imposes a complex clinical and psychological burden on an individual. This suffering can be further exacerbated when the diagnosed individual works in a desert environment characterized by unique climatic and occupational conditions. A worker with cancer must simultaneously navigate the demands of the illness and its treatment alongside severe working conditions, separation from family, socio-economic pressures, and pervasive anxieties regarding their health and professional future.

In the case under study, multiple sources of psychological stress intersected, including the cancer diagnosis itself, occupational conditions associated with desert employment, and concurrent familial and social pressures. Clinical data revealed high levels of perceived psychological stress in the case, accompanied by a range of emotional, somatic, and behavioral manifestations associated with psychological distress.

Furthermore, this study adopts the theoretical perspective that sustained psychological stress interacts with the physiological processes governing the stress response, a dynamic framed by Selye's theory through the stages of adaptive response. However, as a clinical case study utilizing psychological and clinical instruments, this investigation does not aim to establish a direct causal relationship between the desert environment and immunosuppression. Rather, it seeks to understand the case within the framework of interacting stress factors and to discuss the interpretation of observed data in light of the theoretical relationship between chronic stress and immune function.

Accordingly, the core research problem can be formulated through the following primary question:

What is the nature of the psychological stressors experienced by a cancer-diagnosed worker in a desert environment, and how can their potential reflections on psychological and physical well-being be understood in light of Hans Selye's General Adaptation Syndrome theory?

From this primary question, the following sub-questions emerge:

What is the nature of the impact exerted by the environmental, occupational, social, and pathological conditions of working in a desert environment on the level of perceived psychological stress in a worker with cancer?

How can the level of perceived psychological stress in a cancer-diagnosed worker be interpreted through the stages of Hans Selye's General Adaptation Syndrome, and what are its potential implications for immunological balance?

1.2 Research Hypotheses

Given the exploratory and clinical nature of this study, the hypotheses are formulated as explanatory expectations rather than established causal relationships:

It is expected that the multiplicity of environmental, occupational, and health stressors experienced by a cancer-diagnosed worker correlates with elevated levels of perceived psychological stress.

It is expected that the clinical case data and perceived psychological stress levels will enable an understanding of the subject's stress response through the stages of the General Adaptation Syndrome, while providing a framework to discuss potential implications for immune function in light of Selye's theory and relevant literature.

1.3 Research Objectives

The objectives of this research are identified as follows:

To identify the nature of environmental stressors in desert regions and their impact on the health of workers diagnosed with cancer.

To determine the manifestations of immunosuppression among patients working in desert environments.

To apply the General Adaptation Syndrome theory to understand neuroendocrine and immunological alterations during exposure to chronic environmental stress.

To propose adaptive and preventive strategies aimed at enhancing immunity and improving the quality of life for this population.

1.4 Significance of the Study

The significance of this study is framed through two primary dimensions:

Theoretical (Academic) Significance

It contributes to the literature by analyzing the relationship between desert environments, chronic stress, and immunosuppression grounded in Hans Selye's theoretical model.

Applied (Practical) Significance

It aids in the development of targeted support strategies for cancer-diagnosed personnel working in extreme desert environments, ultimately enhancing their quality of life.

3) Societal Significance

Public Health Awareness: Raising health awareness regarding the critical impact of environmental factors and chronic stress on general health and immune function.

2. THEORETICAL FRAMEWORK

2.1 Summary Table of Previous Studies

Table 1. Summary of Previous Studies

Study Title	Authors / Year / Country	Methodology	Sample	Research Tools	Key Findings
The Effect of Stress on Immunosuppression	Adwan & Ahman, 2012, Algeria	Comparative Descriptive	479 individuals (132 healthy + 347 patients)	Psychological Stress Test (Developed by the researcher)	Females are more susceptible to stress; stress negatively affects white blood cell count; degrees of immunosuppression vary according to stress levels.

Study Title	Authors / Year / Country	Methodology	Sample	Research Tools	Key Findings
Network between Cytokines, Cortisol and Occupational Stress in Gas and Oilfield Workers	Reale et al., 2020	Cross-sectional observational study	80 healthy male oil and gas workers	Occupational stress and anxiety questionnaires; salivary cortisol; blood counts; cytokine assays and gene-expression analysis	Higher salivary cortisol was associated with higher plasma IL-6 and altered immune-cell cytokine responses.
Stress and cancer: The mechanisms of immune dysregulation and management	Liu et al., 2022, China	Narrative literature review	Published clinical studies; no study sample	Analysis of published literature	Reported stress-related effects include increased inflammatory cytokines (e.g., TNF-α and IL-6), impaired NK-cell and cytotoxic T-cell function, and reduced chemotherapy-induced tumor-cell apoptosis in experimental models.
Corticosteroid-Mediated CD8+ Exhaustion in Lung Cancer	Zheng et al., 2025, China	Experimental	Lab-induced chronic stress mouse model	Corticosterone measurement, Flow Cytometry, gene expression analysis	Elevated corticosterone levels led to exhaustion of CD8+ cells and increased tumor growth.

2.2 Commentary on Previous Studies

2.2.1 Commentary on Arab Studies

Table 2. Commentary on Arab Studies

Methodology	Objective	Sample	Research Tools	Findings
Varied in terms of research methodology used across the studies.	Aligned regarding the primary topic and objective of investigating factors leading to immunosuppression.	Differed in sample composition; each study utilized a sample specific to its research context.	Differed in terms of the measurement tools and instruments utilized in the study.	Each study yielded distinct results; however, all findings aligned toward a unified direction, specifically immunosuppression or immune dysregulation.

2.2.2 Commentary on Foreign Studies

Table 3. Commentary on Foreign Studies

Methodology	Objective	Sample	Research tools	Findings
Foreign studies aligned in methodology, consistently relying on experimental designs.	Aligned in terms of objective, focusing on investigating the underlying causes of immune dysregulation.	Differed in sample composition, as foreign studies focused on animal experiments (laboratory mice models) alongside clinical cancer patient data.	Foreign studies differed in instruments used, relying on biological data, clinical patient records, and laboratory analyses.	Aligned in terms of results, reaching the key finding that chronic stress is the primary factor driving immune dysregulation.

2.3 Position of the Current Study Relative to Previous Studies

By reviewing the similarities and differences between previous studies (both Arab and foreign), it is evident that the present study aligns with prior literature regarding its primary topic and overall objective. However, it diverges in specific aspects that constitute the scientific gap addressed by this research. Specifically, this study investigates immunosuppression among cancer-diagnosed workers in desert environments through the theoretical framework of Hans Selye's General Adaptation Syndrome (GAS). Employing a clinical methodology (case study approach), the investigation utilized the following tools: clinical interviews, clinical observation, and the Perceived Stress Scale. The study concluded that chronic stress, resulting from multiple intersecting factors, led the case under investigation to the onset of the exhaustion stage, thereby demonstrating state-level immunosuppression.

2.4 Definition of Terms

Desert Environment

According to Fajjal's (2002) definition, the desert environment refers to regions characterized by rainfall levels that do not support any form of agriculture, extremely low atmospheric humidity, significant diurnal temperature variations between day and night, and high solar radiation levels (Fajjal, 2002, p. 31).

Environmental, Social, Economic, and Health Impacts According to MHWB:

MHWB indicates that evidence suggests psychological health and mortality in harsh (desert) environments are multidimensional, involving complex

interactions among environmental, social, economic, psychological, and health factors. When these factors exert continuous influence over extended periods, their impact on human physical and psychological health is associated with increased rates of anxiety, depression, psychological exhaustion, and feelings of helplessness and despair, alongside potential impairment of immune function.

Desert Environmental Impacts on Cancer-Diagnosed Workers:

Because the environment represents a dynamic, living system rather than a mere physical space, it structures how an individual organizes time and fulfills expected roles. Consequently, environmental contexts vary significantly across geographical regions. The desert environment in this study governs how a worker with cancer feels, thinks, and behaves within this setting, particularly in developing coping strategies to navigate environmental stressors, including climate, geographical location, and surrounding conditions.

Effects of Desert Environment on Immunosuppression in Cancer-Diagnosed Workers According to Hans Selye:

As previously noted, the desert environment impacts individuals through a multiplicity of psychological and physiological factors. In this context, Hans Selye conceptualizes these factors as stressors that act as health impediments. Based on the stress they induce, they drive the organism toward exhaustion across the stages of the General Adaptation Syndrome. Consequently, an average worker, or a worker diagnosed with cancer, reaches a state of immunosuppression (or immune inhibition), wherein the functional activity of a specific physiological system is suppressed below its baseline capacity. This functional suppression impairs recovery, facilitates disease metastasis to other body parts, and may ultimately result in mortality (The Researcher).

Immunosuppression

Immunosuppression is a term used to denote the weakening, reduction, impairment, or functional inactivation of the body's defense mechanisms against various pathogens. This condition occurs under the pressure of multiple factors, often neuro-endocrine or hormonal in nature, where the removal of these underlying stressors typically resolves the state of immune inhibition or suppression (Ahman, 2019, p. 97).

Operational Definition of Immunosuppression

In this study, immunosuppression is operationally defined as a constellation of psychological and clinical indicators manifested by a cancer-diagnosed worker subject to sustained health, familial, occupational, and environmental stressors. These manifestations are interpreted within the theoretical framework linking chronic psychological stress to alterations in immune function. This state is inferred through data gathered via clinical interviews, clinical observation, and perceived stress levels, utilizing Hans Selye's General Adaptation Syndrome theory to explain the trajectory of the stress response.

Definition of Immunity

Immunity refers to the organism's resistance to threats arising from exposure to harmful microorganisms. Immunity can develop through natural or acquired mechanisms. Certain forms of natural immunity are transferred from mother to child at birth or through breastfeeding; however, this form of immunity is temporary. Additionally, natural immunity can be acquired through infection, as the body develops long-term immunity against specific infectious agents.

Conversely, acquired immunity is obtained through vaccination, wherein children are immunized against various diseases, such as diphtheria, pertussis, measles, and poliomyelitis, thereby conferring long-term protection that renders secondary infection highly improbable (Taylor, 2007, p. 93).

2.5 Mechanisms of Immunosuppression

Inhibition of Immune Cell Proliferation: The immune response relies on the proliferation of mature T-cells and B-cells. Certain immunosuppressive agents, such as Azathioprine and Mycophenolate mofetil, inhibit DNA synthesis within these cells, thereby preventing their activation and functional response.

Disruption of T-Cell Activation: T-cells constitute the essential component of cell-mediated immunity. Pharmacological agents such as Cyclosporine and Tacrolimus inhibit the secretion of cytokines, particularly Interleukin-2 (IL-2), which is necessary for T-cell activation and proliferation. This process occurs through the inhibition of the calcineurin enzyme, which is responsible for activating genes that drive the immune response.

Regulation and Inhibition of Cytokines: Certain immunosuppressants inhibit the production or action of pro-inflammatory cytokines, such as TNF-α, IL-1, and IL-6. For example, corticosteroids:

Impair cytokine synthesis.

Prevent the migration of immune cells to inflammatory sites.

Alter vascular permeability.

Inhibition of B-Cell Activity and Antibody Production: Specific targeted therapies, such as Rituximab, target the CD20 protein expressed on B-cells, leading to B-cell depletion.

Depletion or Cytotoxicity of Immune Cells: Biologic therapies (such as monoclonal antibodies) operate by:

Directly inducing cell death in T or B lymphocytes.

Opsonizing target cells for clearance by the immune system.

Impairment of Antigen Presentation: Certain factors compromise the ability of Antigen-Presenting Cells (APCs), such as dendritic cells, to:

Capture antigens.

Present antigens to mature T-cells.

Initiate adaptive immune responses (Physiological Immunosuppression).

Natural Immunosuppression

Immunosuppression can occur naturally without medical or pharmacological intervention under conditions such as malnutrition and chronic stress. This is directly relevant to the current study on immunosuppression among cancer-diagnosed workers in desert environments, where harsh environmental stressors impose persistent demands, culminating in chronic stress (Abbas et al., 2021).

2.6 The Relationship Between Selye's Theory and Immunosuppression in Desert-Based Cancer Workers

Selye's theory posits that chronic exposure to environmental stressors progressively depletes the organism's vital physiological resources across the three stages of the General Adaptation Syndrome. Initially, the organism mobilizes natural defense mechanisms; however, during subsequent stages, the immune system becomes exhausted. Immunosuppression occurs as a direct consequence of sustained neuroendocrine activation, particularly elevated cortisol levels.

This dynamic mechanism is outlined below:

Figure 1. Mechanism of Immunosuppression Across the Three Stages of Hans Selye's Theory in Cancer-Diagnosed Workers in Desert environments

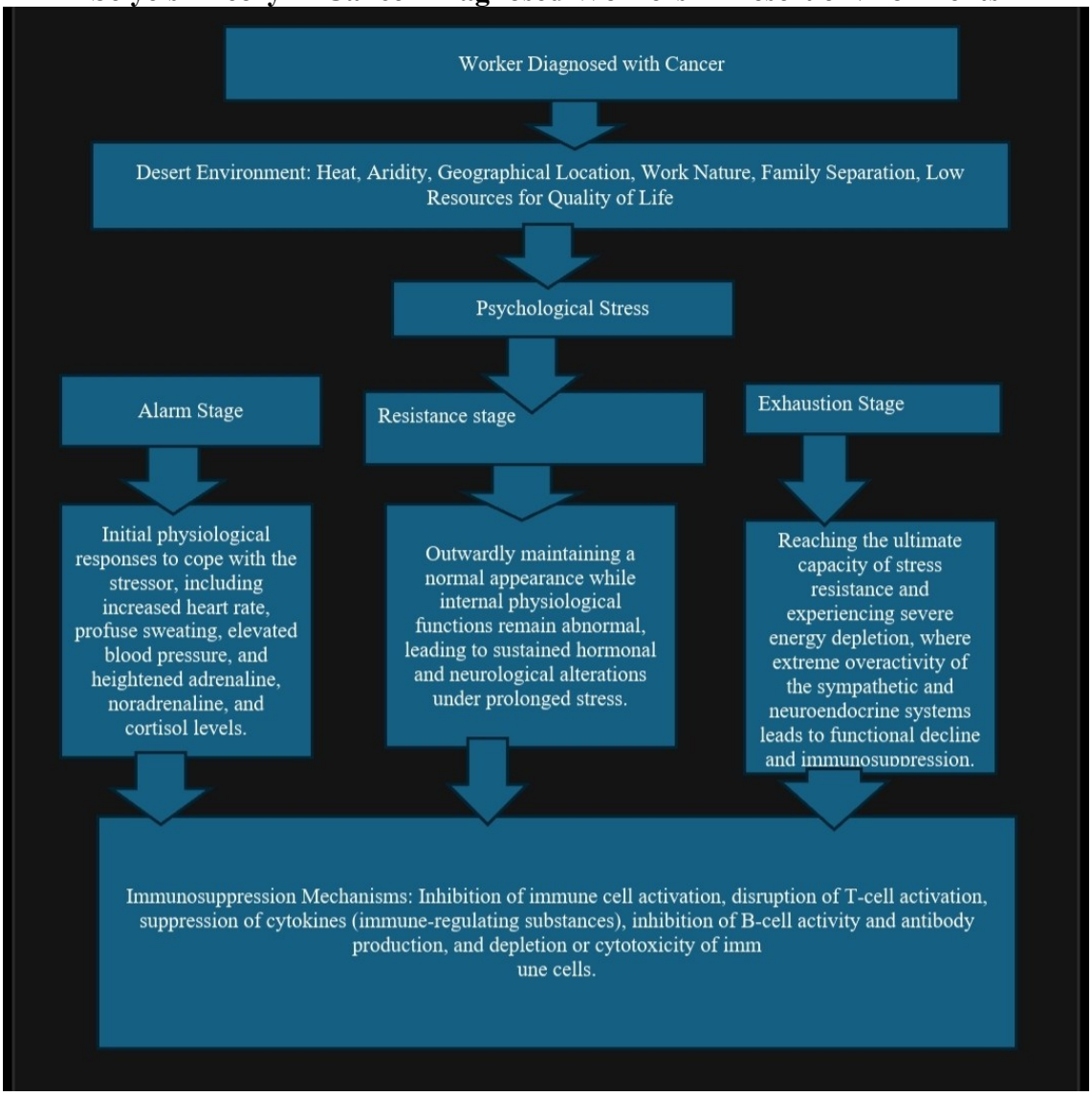


Diagram: Mechanisms of immunosuppression across the three stages of General Adaptation Syndrome in a cancer-diagnosed worker in a desert environment; Developed by the researcher).

2.7 General Adaptation Syndrome Theory (Hans Selye)

Hans Selye's General Adaptation Syndrome (GAS) is considered one of the foundational theories providing an explanatory framework for physiological

responses to stressors. Selye developed this model to understand how the organism responds to various environmental stressors. The theory posits that the organism constantly strives to maintain internal homeostasis through a cascade of adaptive responses, and that prolonged exposure to stress, or an increase in its intensity, can lead to transitions from one stage of response to another (Selye, 1950).

The General Adaptation Syndrome comprises three primary stages: the alarm reaction stage, the resistance stage, and the exhaustion stage. These stages are delineated as follows:

1. Alarm Reaction Stage

The alarm stage represents the initial response that occurs when an individual is exposed to a stressor. During this phase, a series of neurological and hormonal responses are activated to prepare the body to cope with the threatening situation. During this stage, distinct physiological alterations may manifest, such as increased heart rate, sweating, and elevated arousal levels, enabling the organism to confront or manage the stressor (Al-Simran & Al-Masa'eed, 2014, pp. 31-32).

2. Resistance Stage

If exposure to the stressor persists, the body transitions to the resistance stage, where it attempts to adapt to the stressful situation and maintain a degree of functional equilibrium. In this phase, the individual may appear capable of continuing normal activities despite the persistence of physiological alterations associated with stress. The organism's capacity to maintain resistance relies on psychological and physical resources and its adaptive capacity. However, if exposure to stress continues without adequate recovery periods, the body gradually loses its ability to maintain these adaptive mechanisms (Al-Simran & Al-Masa'eed, 2014, pp. 32-33).

3. Exhaustion Stage

The exhaustion stage occurs when stress persists for extended periods or when stress demands exceed the individual's adaptive capacity, leading to a progressive decline in adaptive resources. This stage is associated with increased fatigue, disruption of physiological functions, compromised immune responses, and continued elevation of stress hormones. Prolonged exposure during this

phase can directly impair physiological and biological systems (Al-Simran & Al-Masa'eed, 2014, pp. 33-34).

Based on the foregoing, the present study utilizes the theoretical framework of the General Adaptation Syndrome to interpret the cancer-diagnosed worker's response to the multiple stressors encountered, while taking into account that identifying the stage ,the physiological condition is definitively determined by direct biological markers and cannot be inferred solely from the level of perceived psychological stress.

2.8 Definition of Cancer

Cancer is a broad medical term encompassing a wide group of diseases characterized by the abnormal growth of cells. Cancer originates within the body's primary cells, which constitute the essential elements of tissues and organs. Normally, cellular division occurs in an organized manner; new cells are generated as the body requires them, while old or damaged cells undergo programmed cell death. However, in cancerous pathology, this controlled process is disrupted: new cells form when the body does not need them, and old cells fail to die at their designated time. This accumulation of surplus cells leads to the formation of a tissue mass known as a tumor, which is classified into two primary types, as outlined in the table below:

Table 4. Benign and Malignant Tumors

Benign Tumors (Non-Cancerous)	Malignant Tumors (Cancerous)
- Rarely life-threatening.	- Commonly life-threatening due to their potential toxicity.
- Can usually be surgically removed without recurring.	- Can often be surgically removed, but frequently recur.
- Do not invade surrounding tissues.	- Invade adjacent cells, tissues, and healthy organs, causing structural damage.
Do not metastasize to other body parts.	Can metastasize (spread) to distant organs and tissues via detachment.

Source: Al-Aqeel (2013), All You Need to Know About Cancer (1st ed.); table adapted by the researcher.

Operational Definition of the Cancer-Diagnosed Worker

In the present study, the cancer-diagnosed worker operationally refers specifically to the clinical case under investigation: a 52-year-old male worker

employed at a national company located in a desert environment, diagnosed with prostate cancer for four months at the time of data collection. Data were gathered through semi-structured clinical interviews, clinical observation, and the Perceived Stress Scale.

3. STUDY PARAMETERS AND DELIMITATIONS

Objective Parameters

Include the core variables addressed in this research: immunosuppression, cancer, desert environment, and Hans Selye's General Adaptation Syndrome theory.

Human Delimitations

The research instruments were administered to a single clinical case of a male worker diagnosed with prostate cancer at a national company operating in a desert environment.

Temporal Delimitations

The research was conducted from early November 2025 to early December 2025.

Spatial Delimitations

The research instruments were administered to the case at Hakim Saadan Hospital in Biskra.

3.1 Research Methodology (Case Study Approach)

A clinical case study methodology was utilized as it aligns with the nature of the research problem. This approach allows for a comprehensive, in-depth evaluation of the individual case (whether normal or pathological), examining the subject's personality and behavior based on historical background, present status, diagnostic clinical instruments, and disease prognosis, ultimately guiding the selection of appropriate therapeutic pathways (Hafni Al-Tabaqi, 2001, p. 31).

3.2 Study Sample

The sample comprises a single individual: a worker employed in a desert environment, receiving care at Hakim Saadan Hospital (Oncology Ward). The case was selected purposefully to ensure compatibility with the study's core parameters.

3.3 Research Instruments

The study utilized the Perceived Stress Scale (Cohen et al., 1983), clinical interviews, and clinical observation.

Perceived Stress Scale (PSS)

Objective: Designed to measure perceived psychological stress levels in the subject.

Description: Developed by Sheldon Cohen (an American psychologist), along with Robin Mermelstein and Thomas Kamarck. First published in 1983 in a study measuring perceived stress, a 10-item version (PSS-10) was later adapted by Chaaya et al. (2010). This version is widely utilized in health and psychological research. It features clear, accessible phrasing suitable for Arab populations, conforms to standard psychological translation protocols, and possesses established psychometric validity and reliability.

Rationale for Scale Selection

Selected due to its clinical utility in assessing patients' perceived stress related to chronic organic illness, as well as harsh environmental and social conditions.

Administration Instructions

The subject reads each item and indicates frequency over the past month by marking (X). The 10-item scale evaluates three dimensions:

Loss of control over life events.

Feelings of stress and agitation.

Perceived ability to cope with stress (reverse-scored items).

Responses are recorded on a 5-point Likert scale (0 = Never, 1 = Seldom, 2 = Sometimes, 3 = Often, 4 = Always).

Clinical Interview (Semi-Structured):

Defined as "a goal-directed face-to-face interaction conducted with an individual to elicit specific information for research, diagnostic, or therapeutic purposes" (Ben Khenis, 2006, p. 124). The information concerning immune status and treatment interruption was obtained through the participant’s oral account during the clinical interviews.

Clinical Observation

Serves as the primary diagnostic tool in clinical psychology, allowing the researcher to gather qualitative observations regarding emotional manifestations, physical posture, and behavioral indicators (Hanan Boukherissa et al., 2021).

Clinical Approach

Defined by Dr. Pagès as "a method enabling the clinician to understand the subject's life history, attitudes, coping mechanisms, and underlying psychological conflicts" (Benoui Chaheoub, p. 16).

4. CASE PRESENTATION

4.1 Socio-Demographic Data

Table 5. Socio-Demographic Data

Parameter	Case details
Code / Identifier	M. T. (م. ط)
Age	52years
Gender	Male
Educational Level	Intermediate Education
Marital status	Divorced
Occupation	Security Guard at a Company
Diagnosis	Prostate cancer
Disease duration	4 months (since initial diagnosis)

4.2 Perceived Stress Scale Scores

Table 6. Perceived Stress Scale Scores

Item	Score	Item Type
1	4	Regular
2	4	Regular
3	4	Regular
4	3	Reverse scored
5	4	Regular
6	3	Reverse scored
7	3	Regular
8	4	Reverse scored
9	4	Regular

Item	Score	Item Type
10	4	Reverse scored
Total score	28/40	---

Scoring & Interpretation:

Reverse Items: Items 4, 6, 8, and 10 are reverse-scored.

Sum of Regular Items: 24

Sum of Reverse Items: 4

Final Total Score: 28 out of 40.

Stress Level Categories:

0-13: Low Stress

14-26: Moderate Stress

27-40: High Perceived Stress (The subject falls into this category).

4.3 Semiotics / Case Description

Table 7. Case Description

Dimension	Description / Clinical Findings
General Appearance	Average height; black hair; dark eyes; pale, yellowish skin tone; frail build; neat clothing; exhibited visible signs of severe fatigue, appearing older than his chronological age.
Social / Marital Status	Divorced; father of five children (two sons and three daughters); custody was retained by the ex-wife via khula (divorce initiated by the wife).
Medical History	Initial symptoms included dysuria (burning sensation) and urinary hesitancy. Initially relied on herbal remedies without improvement. Following clinical deterioration, hospital evaluation confirmed prostate cancer via diagnostic workup: PSA > 40 ng/ml, Prostatic MRI, and Bone Scintigraphy (Latoulie). Medical records confirm initiation of chemotherapy and Zytiga (Abiraterone Acetate).

4.4 Clinical Interview Protocol and Sessions Overview

Session 1: Introductory Session

Table 8. Session 1: Introductory Session

Topics / Title	Session Objectives	Session Techniques & Methods	Session Content	Duration
Establishing Cooperative Rapport	- Mutual introduction between the researcher, the subject, and all medical staff present in the department. - Reviewing the subject's medical record. - Establishing a consensus on the structure and progression of sessions. - Introducing the scale.	Dialogue and Discussion	- Welcoming by the medical staff following the researcher's self-introduction and presentation of the study background and participant consent form (Subject M. T.). - Discussing the upcoming session schedule in coordination with the subject and the attending oncologist to align with the subject's health status. - Providing a simplified explanation of the Perceived Stress Scale. - Concluding the session.	45min

Presentation of Conducted Clinical Interviews

Session 2: Health Awareness Level of the Subject

Table 9. Session 2: Health Awareness Level of the Subject

Topics / Title	Session Objectives	Session Techniques & Methods	Session Content	Duration

Topics / Title	Session Objectives	Session Techniques & Methods	Session Content	Duration
Biopsychosocial Interpretation of Prostate Cancer	Establishing a scientifically sound baseline of information regarding the perception of this cancer type based on the biopsychosocial model.	- Socratic Dialogue - Educational Presentation - Detailed explanation of the illness by the specialist oncologist in oncology, which aided the researcher in clinical observation. - Guiding the subject into a relaxation state to relieve anxiety related to disease prognosis.	- Enhancing patient awareness regarding the role played by psychological interventions in alleviating psychological stress caused by the disease and fears associated with... - Presenting a comprehensive overview of the biopsychosocial model and the interaction of biological, psychological, and social factors that serve to elevate patient psychological stress.	45min

Session 3: Patient Perception of Illness in Light of Prevailing Beliefs in the Desert Environment

Table 10. Session 3: Patient Perception of Illness

Topics / Title	Session Objectives	Session Techniques & Methods	Session Content	Duration
Patient's Illness Perceptions	- Identifying negative cognitive beliefs and their impact on affect and behavior. - Educating the subject on more logical, positive, and constructive coping rules for the diagnosed condition.	- Educational Presentation - Dialogue - Discussion	- Discussing cognitive-cultural beliefs regarding the disease. - Assessing emotional reactions accompanying these thoughts. - Psychoeducating the patient by instilling positive thoughts about the disease, treatment efficacy, and recovery rates for this cancer type upon treatment adherence.	35min

Sessions 4 & 5: Individual Case Profile and Administration of the Perceived Stress Scale

Table 11. Sessions 4 and 5: Individual Case Profile and Perceived Stress Scale

Topics / Title	Session Objectives	Session Techniques & Methods	Session Content	Duration
Exploring Social, Familial, and Occupational Factors and Applying the Perceived Stress Scale to Assess Stress Levels	- Allowing the patient to express suffering stemming from familial, occupational, social, and health factors. - Administering the Perceived Stress Scale to evaluate perceived psychological stress in the subject, which interprets stress levels across Hans Selye's three stages and identifies the current stage reached by the case.	- Active Listening - Supportive Dialogue - Emotional Catharsis - Administering the Perceived Stress Scale (Cohen et al., 1983)	- Discussing the primary problems resulting from multiple intersecting stressors. - Assisting the subject in acquiring cognitive coping strategies to confront stressors directly affecting health status, thereby promoting recovery potential.	50min

(These tables detail the contents of the five clinical interview sessions; Prepared by the researcher).

4.5 Observations During Clinical Interviews

Table 12. Observed Clinical Indicators

Category	Observed Clinical Indicators
General Appearance	Clean, neat attire; visible facial markers of fatigue and physical exhaustion.
Behavioral Manifestations	Hand-wringing, intermittent silence, frequent water consumption.
Physiological Symptoms	Diaphoresis (excessive sweating), facial pallor, dry mouth.
Visual Contact	Severely limited eye contact; frequent gaze fixated on the ceiling or adjacent window.
Emotional Symptoms	Episodic weeping accompanied by deep sobbing, akin to childhood crying.

4.6 Clinical Summary of Interviews and Observations

(Summary Table of Observations Noted During the Case Assessment; Prepared by the Researcher).

Summary of Interviews:

Following the five clinical sessions conducted with the subject, it became evident that the patient experiences multiple compounding stressors, with the most severe impact on psychological well-being arising from marital dissolution (divorce initiated via khula by his wife, the mother of his five children). The patient expressed profound feelings of rejection and isolation, stating: "I feel as though my soul has been rejected; even my children do not ask about me."

Additionally, the subject failed to attend to his deteriorating health during its early stages, initially relying on herbal remedies without clinical benefit. This delay culminated in advanced diagnostic findings and immediate initiation of chemotherapy, further compounding his psychological distress due to a lack of health awareness regarding disease progression. Furthermore, his medical termination from a desert-based company heightened his sense of helplessness and burden, as reflected in his remark about feeling like a burden on his siblings, one of whom accompanies him during hospital stays (gard malade).

Behaviorally, intense anxiety and tension were observed during clinical interactions; the subject frequently exhibited hand-wringing, fell silent for several minutes, consumed water repeatedly, maintained poor eye contact, and fixated his gaze on the ceiling or windows. Emotionally, he displayed severe distress, including sobbing, facial pallor, dry mouth, and profuse sweating.

5. DISCUSSION

5.1 Discussion of Perceived Stress Scale Results (Biopsychosocial Model)

The participant scored 28/40 on the Perceived Stress Scale. Adwan and Ahman (2012) reported associations between psychological stress and immune measures, providing context for discussing possible relationships among perceived stress, demanding environmental conditions, and immune function.

These findings further align with existing theoretical literature regarding the relationship between psychological stress and oncological progression, demonstrating that sustained stress exposure alters neuroendocrine and immunological pathways. Prior studies indicate that chronic stress correlates with

alterations in systemic immune responses in cancer patients, while experimental studies confirm that chronic stress accelerates tumor growth and immune dysregulation in animal models.

The subject's elevated perceived stress score can be comprehensively interpreted through the Biopsychosocial Model, which views health status as an emergent outcome of continuous interactions among biological, psychological, and social factors:

Biological Level: The physical burden of prostate cancer, treatment-related side effects, and persistent health worries serve as primary physiological stressors.

Psychological Level: The subject exhibits marked indicators of tension, grief, death anxiety, and emotional distress surrounding the diagnosis.

Social Level: Marital dissolution (divorce), loss of custody, geographic separation from children, and lack of family support during medical treatment constitute major psychosocial stressors.

Additionally, occupational and environmental factors, specifically medical termination from employment in a desert environment characterized by harsh climatic and working conditions, further overburdened the subject's adaptive capacity. Consequently, the patient's elevated perceived stress score reflects a cumulative interaction across biological, psychological, social, occupational, and environmental domains.

From the perspective of Selye's General Adaptation Syndrome, this accumulation of stressors can be understood as a continuous adaptive burden that requires the individual to mobilize psychological and physiological resources for coping. This approach facilitates understanding the subject's elevated perceived stress within the dynamics of the stress response.

Accordingly, the current findings generally align with the trajectory emphasized in previous literature regarding the significance of psychological stress, environmental conditions, and social factors in the illness experience. As demonstrated by the Biopsychosocial Model, the suffering of a cancer-diagnosed worker cannot be reduced to organic pathology alone; rather, it is shaped through the interaction between health status, psychological responses, social relationship networks, working conditions, and environment. Within the context of the present investigation, the relationship between these stressors and

immunosuppression remains a potential explanatory relationship rather than an established causal relationship, given the exploratory nature and instrumentation of this clinical study.

5.2 Discussion of Hypotheses

5.2.1 Discussion of the First Hypothesis

The first hypothesis posits that "The multiplicity of environmental, occupational, social, and health stressors experienced by a cancer-diagnosed worker is expected to correlate with elevated levels of perceived psychological stress."

The empirical findings indicate that this hypothesis was supported by clinical observations and interviews, as the subject achieved a high score on the Perceived Stress Scale (28/40), alongside multiple stress sources identified through clinical interviews and observations. The subject's distress correlated with the cancer diagnosis and associated medical concerns, compounded by occupational conditions in the desert environment, as well as familial and social pressures resulting from marital separation, distance from his children, and a heightened need for familial support during illness.

This outcome concurs with the study by Adwan and Ahman (2012), which indicated a relationship between psychological stress levels and specific immunological alterations, and aligns with literature examining the impact of exposure to harsh environmental conditions on immune responses.

This result can be interpreted through the Holistic/Biopsychosocial Model: the subject's elevated psychological stress does not appear to stem from the illness in isolation, but rather from the interaction of biological, psychological, social, and occupational factors. This interplay demonstrates that the illness experience of a cancer-diagnosed worker in a desert environment is constructed within a multidimensional framework. Consequently, the available clinical data support the first hypothesis within the scope of this exploratory study, indicating that multiple concurrent stress sources coincide with high perceived stress levels, without implying a direct causal relationship between each individual factor and stress elevation.

5.2.2 Discussion of the Second Hypothesis

The second hypothesis posits that "Clinical case data and perceived psychological stress levels are expected to enable an understanding of the subject's stress response through the stages of the General Adaptation Syndrome, while providing a framework to discuss potential implications for immune function."

The subject demonstrated high perceived psychological stress accompanied by distinct emotional, somatic, and behavioral manifestations, including severe fatigue, diaphoresis, facial pallor, sobbing, and restricted eye contact. Interpreted through Selye's theory, these clinical indicators reflect a heavy adaptive burden. However, definitively identifying the exhaustion stage from a strictly physiological standpoint remains untenable without direct biological markers.

Multifactorial issues have placed the subject in this deteriorated health condition. This is affirmed by Hans Selye's General Adaptation Syndrome (GAS) theory across its three stages: the alarm reaction stage, the resistance stage, and the exhaustion stage. The subject's score of 28/40 on the Perceived Stress Scale reflects a level of chronic stress associated with illness and harsh working conditions in the desert environment. Consequently, the high level of perceived psychological stress measured by the scale serves as an indicator that heightens overall physical vulnerability, signaling that the subject’s experience may be interpreted through the concept of exhaustion, without confirming a physiological stage.

Accordingly, chronic psychological stress leads to elevated levels of cortisol and stress hormones. This physiological response can cause partial immunosuppression, thereby increasing the risk of weakened defenses against infectious diseases, particularly in cancer patients who already present with compromised immunity.

Evidence confirming that the subject is at the onset of the exhaustion stage is demonstrated by his non-adherence to the regular treatment schedule due to low immunity, which prevents him from continuing chemotherapy. This hinders his recovery process and may compound his suffering if the disease metastasizes to other organs.

Reale et al. (2020) identified associations between salivary cortisol and cytokine profiles among healthy oil and gas workers. Their findings provide a

basis for discussing possible relationships between occupational stress and immune regulation, without establishing that desert heat caused immunosuppression in the present case.

Hence, the first hypothesis has been supported: the current field investigation demonstrated an impact of desert environmental factors on the immune suppression of the cancer-diagnosed worker, thereby reinforcing previous literature and Hans Selye's theory.

5.3 The Relationship Between Selye's Theory and Immunosuppression in a Cancer-Diagnosed Worker in a Desert Environment

Selye's theory explains that chronic responses to environmental stressors gradually deplete the body's vital resources across the three stages of General Adaptation Syndrome. Initially, the organism activates natural defense mechanisms; however, in subsequent stages, the immune system becomes fatigued. Immunosuppression emerges as a direct consequence of sustained hyper-hormonal stimulation, particularly elevated cortisol levels.

6. CONCLUSION

This exploratory case study suggests that the illness experience of a worker with cancer in a desert occupational environment should be understood through the interaction of medical, psychological, social, and occupational circumstances. Clinical interviews and observations documented psychological distress and fatigue in the context of cancer, treatment demands, family difficulties, and occupational concerns. The Perceived Stress Scale provided an additional description of the participant's perceived stress.

In light of the Biopsychosocial Model, the case illustrates the importance of considering disease characteristics alongside individual experiences, social relationships, and occupational and environmental circumstances. The participant's account identified several overlapping sources of distress. However, the study does not establish the independent contribution of each factor or demonstrate a causal relationship between desert conditions and health outcomes.

The participant reported that chemotherapy had been interrupted because of low immunity. This information was obtained through his oral account, and laboratory results were not independently reviewed. It therefore provides context for his illness experience but does not independently confirm the nature or severity of immune impairment. Laboratory assessment and review of relevant medical records would be needed to clarify his immune status; such evidence alone would not establish that psychological stress caused any impairment.

Hans Selye's General Adaptation Syndrome provided a theoretical framework for interpreting the adaptive demands described by the participant. The observed distress and fatigue, together with the participant's report of treatment interruption attributed to low immunity, support interpreting his experience through Selye's concept of exhaustion. Although the exact relationship between the participant's psychological distress and immune function requires further investigations.

The case highlights the importance of psychological and social support alongside medical care for workers with cancer in demanding settings. Findings from this single case cannot be generalized. Future studies using larger samples, comparative designs, and biological measures could examine relationships among occupational and environmental pressures, perceived stress, and immune function.

6.1 Recommendations

Enhancing Psychological Accompaniment: Strengthen continuous psychological support services provided to cancer-diagnosed workers within petroleum institutions.

Integrating Psychological Evaluation: Incorporate formal psychological assessments into routine medical follow-up protocols for workers diagnosed with cancer.

Providing Psychosocial Support Mechanisms: Establish accessible psychosocial support structures to assist workers in navigating illness requirements alongside occupational duties.

Professional Specialized Training: Train clinical psychologists and occupational health practitioners on the specific requirements of managing oncology cases operating within harsh desert petroleum environments.

Encouraging Further Research: Promote future empirical studies on larger sample sizes to validate these clinical findings and develop tailored psychological intervention models for this population.

Stress Management Strategies: Implement stress management interventions in the workplace, specifically tailored for individuals with chronic illnesses such as cancer.

Environmental Stress Reduction: Mitigate environmental stressors affecting workers in harsh (desert) conditions.

Educational & Therapeutic Programs: Establish psychoeducational and therapeutic awareness programs to assist individuals managing chronic diseases.

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