

# The impact of psychological health on acute lymphoblastic leukemia: A case report

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## Case Report

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# Abstract

Acute lymphoblastic leukemia (ALL) is a common childhood cancer that affects both physical and psychological well-being. Understanding the connection between psychological and physical health is crucial for optimal treatment outcomes. We present a case of an ALL patient where psychological health significantly influenced treatment, prognosis, and overall outcome. The patient underwent chemotherapy with supportive radiation therapy. Emotional distress extended the initial session of treatment to six months. Over the subsequent sessions, the patient was provided with emotional and psychological support, which participated in the completion of treatment as scheduled. Psychological health plays a vital role determining the disease prognosis and treatment response. This case highlights the significance of psychological impact during the course of treatment. We observed that the patient's condition showed fluctuations corresponding to his emotional state, with positive outcomes observed during periods of good psychological health, while emotional distress corresponded to a deterioration in overall status.

## Introduction

Leukemia is defined as the accumulation of abnormal white blood cells in the bone marrow and lymphatic tissues [1]. The most common type of leukemia in children is acute lymphoblastic leukemia (ALL) [2]. The stability of the psychological health in leukemic patients plays a crucial role affecting the physical health, prognosis, and the treatment response [3]. Understanding the links between psychological and physical health is the first step in developing strategies to support those suffering from psychological distress [4]. We present a case of a leukemic child where psychological health plays a crucial role determining the course of treatment, prognosis, and overall outcome.

## Case presentation

A 7-year-old male presented to the hospital in 2019 with complaints of fever, nausea, vomiting, weight loss, anorexia, fatigue and abdominal pain. Physical examination revealed jaundiced skin and sclera, purpura, enlargement of the right submandibular and bilateral inguinal lymph nodes.

Laboratory test demonstrated a significant increase in the white blood cells (WBCs) count, which was  $210 \times 10^3/\mu\text{L}$ , with lymphocytes accounting for 67%. Hemoglobin level was 10g/dL, and platelets count was  $56 \times 10^3/\mu\text{L}$ .

Based on the flow cytometry result, the hematologist diagnosed the patient with pre-B acute lymphoblastic leukemia (ALL), and started the patient on chemotherapy with supplemented radiation therapy.

The initial session of treatment was intended to span two months, however, due to the patient's emotional distress, dealing with the newly discovered disease, the session extended to six months. The disease not only affected his daily life in school, leading to bullying and social avoidance; but also affected his

relationship with his father. It was a stressful period for both the patient and his parents to accept the disease and deal with it.

During the course of the treatment, the patient's condition fluctuated in response to his psychological health. When his psychological health was good, his treatment progressed well and showed positive outcomes in his medical tests. However, during periods of emotional distress, his overall status deteriorated.

Over the subsequent three years, with significant support from his parents, school, the medical staff, and the cognitive therapy that has been used, the patient experienced significant improvement in his psychological health. And thus, chemotherapy sessions were successfully completed as scheduled, and his laboratory tests demonstrated remarkable recovery.

In June 2023, the patient's latest laboratory tests indicated remission, with a WBCs count of  $7.2 \times 10^3/\mu\text{L}$ , hemoglobin level of 15.1g/dL, and platelets count of  $285 \times 10^3/\mu\text{L}$ . The patient's overall condition has shown significant improvement.

## Discussion

Acute lymphoblastic leukemia is a blood cancer caused by the neoplastic transformation of cells of the lymphoid lineage with uncontrolled multiplication and accumulation of immature lymphocytes [5]. The rapid progression and intensive treatment of ALL have significant effects on both physical and psychological health [6].

Children with ALL often experience higher levels of anxiety and depression compared to healthy children. This can be attributed to their vulnerability to depression, disease characteristics, and environmental stressors [7]. Negative emotions, fear of the disease, and the environmental pressure can undermine treatment adherence and impact the effectiveness of interventions, thereby affecting the patient's physical and psychological health [8].

As observed in our case, the patient's physical health deteriorated dramatically due to his impaired psychological health. He struggled to complete a full session of treatment, faced bullying at school, and lacked the necessary support from his parents; all of which profoundly affected him.

ALL has also a negative effect on the caregivers. Parents of patient with ALL experience health problem, alcohol abuse, social withdrawal and work-related difficulties [6]. The high cost of treatment often leads to financial burdens, with 65% of parents ending up in debt. Furthermore, parents also experience anxiety, difficulty concentrating and feeling of guilt; while lacking the necessary social and emotional support. To sum up, the higher the levels of anxiety and depression among caregivers, the lower the quality of life for the children [7].

Psychological interventions, such as cognitive therapy and progressive muscle relaxation, promotes patient's quality of life and relieve their diverse distress [9]. These interventions contribute to the reduction in Cortisol levels, altered leukocyte expression, including downregulation of proinflammatory and metastasis-related genes and upregulation of type I interferon response genes [10]. In addition, these interventions reduce the side effects of cancer treatments and enhance cognitive and emotional functions [9].

In our case, the patient's psychological and mental health recovery played a major role in completing the treatment successfully and achieving favorable outcomes. Consequently, there was a significant improvement in the patient's overall quality of life.

## **Conclusion**

The rapid progression and challenging treatment of ALL can be alleviated by addressing psychological and mental health factors. Our case emphasizes the crucial role that psychological health plays enhancing the physical health outcomes. By recognizing and addressing the psychological needs of patients and caregivers, healthcare professionals can optimize treatment effectiveness, improve patient adherence, and enhance the overall quality of life for both patients and their caregivers.

## **Declarations**

### **Ethics approval and consent to participate:**

The Research Ethics Committee at Al-Sham Private University and the ethical committees at the relevant Al-Sham Private University approved the study protocol. Verbal informed consent was obtained from the participant All procedures performed in studies involving the participant and human subjects were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### **Consent for publication:**

Not applicable.

### **Availability of data and materials:**

All data related to this paper's conclusion are available and stored by the authors. All data are available from the corresponding author on a reasonable request.

### **Conflict of interest:**

The authors declare that they have no conflict of interest

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### **Authors' contributions:**

J.A and A.M conceptualized the study J.A and A.M wrote the study protocol, performed the statistical analysis, participated in data collection, and did the literature search. M.A participated in the literature search, interpret the results, wrote the main manuscript. G.N. revised the draft. All authors read and approved the final draft.

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I am Dr Ghena Najati I am the manager of the psychological support system at Alissar association for supporting cancer kids I would like to let you know that I am supervising the psychological therapy of Suliman Herb who is fighting cancer, and I am using cognitive behavioral therapy techniques during his chemical therapy.

I have his parents permission to publish his case study.

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