

HOLISTIC NURSING MANAGEMENT OF DIABETIC KETOACIDOSIS: A CASE STUDY BASED ON OREM'S SELF-CARE DEFICIT THEORY

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Abstract

Background: Diabetic ketoacidosis (DKA) is a life threatening metabolic emergency commonly associated with insulin omission in individuals with Type 1 diabetes mellitus. Comprehensive nursing management is essential to ensure recovery and prevent recurrence.

Case Presentation: This report describes a 28-year-old male with Type 1 diabetes who presented with severe DKA precipitated by insulin non-compliance. The patient exhibited classic symptoms of metabolic decompensation, confirmed through laboratory evaluation.

Intervention: Acute management followed established clinical guidelines, while holistic nursing care was guided by Orem's Self-Care Deficit Nursing Theory and Gordon's Functional Health Patterns.

Outcome: The patient stabilized clinically, demonstrated improved understanding of self-care practices, and was discharged with an individualized education plan.

Conclusion: This case highlights the value of theory-guided nursing interventions in managing DKA and preventing recurrence.

INTRODUCTION

Diabetic Ketoacidosis represents an acute, life-threatening complication of diabetes mellitus, primarily affecting individuals with Type 1 Diabetes due to absolute or relative insulin deficiency, though it can also manifest in Type 2 Diabetes (Elendu et al., 2023). This critical metabolic decompensation is characterized by hyperglycemia, ketonemia, and metabolic acidosis, arising from an uncontrolled catabolic (Mohajan and Mohajan, 2023). This condition necessitates prompt and comprehensive management to mitigate morbidity and mortality. It

is often precipitated by factors such as infection, trauma, surgery, or, as observed in this case study, non-compliance with insulin therapy (Mahendran et al., 2024). Understanding the patient's self-care deficits and applying a robust theoretical framework like Orem's Self-Care Deficit Theory can illuminate the underlying contributors to such non-compliance and guide holistic nursing interventions (Almutairy, 2025). This paper presents a case study of a young adult presenting with severe DKA, exploring the clinical manifestations, diagnostic findings, and the

application of Orem's Self-Care Deficit Theory to formulate a holistic nursing care plan (Ny'Nika, 2023). This approach facilitates a deeper understanding of the patient's individual self-care requisites and deficits, thereby enabling targeted nursing interventions that promote optimal health outcomes and prevent recurrence (Yip, 2021). This case study further underscores the critical role of nursing assessment and intervention in managing DKA, particularly in high-risk populations (Umpierrez and Kitabchi, 2003). It highlights the imperative for nurses to possess specialized knowledge and skills in DKA management to reduce associated morbidity and mortality (Kajembula et al., 2024). Given the complexity of DKA and its frequent occurrence, particularly in Type 1 Diabetes, it is crucial for healthcare providers to develop comprehensive management strategies (Ehrmann et al., 2020).

This case study examines the holistic management of a patient presenting with classic DKA symptoms. By integrating clinical data with Gordon's Functional Health Patterns and Orem's nursing theory, this report aims to provide a comprehensive view of the transition from critical illness to stable discharge.

2. Theoretical Framework: Orem's Self-Care Deficit Theory

To analyze the non-compliance contributing to this patient's admission, Dorothea Orem's Self-Care Deficit Nursing Theory (SCDNT) was selected as the conceptual framework. Orem's theory posits that nursing is required when an individual is unable to continuously maintain the amount and quality of self-care necessary to sustain life and health (Isik and Fredland, 2023).

In the context of Mr. X:

1. **Universal Self-Care Requisites:** The patient failed to maintain a balance between activity and rest (fatigue) and water intake (dehydration).
2. **Health Deviation Self-Care Requisites:** The patient lacked the knowledge or motivation to modify his regimen when he "felt fine," leading to skipped doses.
3. **Nursing System:**
 - *Wholly Compensatory System:* Required upon admission (ER) when the patient was unstable.
 - *Partially Compensatory System:* Utilized during the stabilization phase.
 - *Educative-Supportive System:* Applied during discharge planning to address the knowledge deficit regarding chronic disease management.

3. Case Presentation

3.1 Demographic and Social Profile

Mr. X, a 28-year-old married shopkeeper residing in Lahore, Pakistan, was admitted on October 12, 2025. He is a practicing Muslim from a low socioeconomic background. He was diagnosed with Type 1 Diabetes Mellitus (T1DM) five years ago but has a history of recurrent hyperglycemia. He lives in a rented house and follows a high-carbohydrate diet typical of his socioeconomic context, with frequent consumption of sugary tea.

3.2 Clinical History

The patient presented with a chief complaint of breathlessness, vomiting, diffuse abdominal pain, and excessive urination persisting for two days. History of Present Illness (HPI) revealed classic symptoms of osmotic diuresis (polyuria, polydipsia) and metabolic decompensation (fruity breath, Kussmaul respirations). Crucially, the patient reported missing insulin doses for three consecutive days prior to admission because he "felt fine," illustrating a critical gap in health literacy.

3.3 Physical Assessment (Gordon's Functional Health Patterns)

Holistic assessment utilizing Gordon's framework revealed significant deviations:

- **Nutritional-Metabolic:** Severe dehydration evidenced by dry mucosa, poor skin turgor, and weight loss.
- **Elimination:** Polyuria secondary to osmotic diuresis.
- **Activity-Exercise:** Generalized weakness and fatigue prohibiting work.
- **Cognitive-Perceptual:** Dizziness and mild confusion (GCS 14/15), indicative of cerebral dehydration or acidosis.
- **Coping-Stress Tolerance:** The patient admitted to ignoring symptoms due to anxiety, a maladaptive coping mechanism.

Physical Examination Findings:

The patient appeared ill and dehydrated. Vital signs indicated hemodynamic instability: Temperature 37.8°C, Tachycardia (118 bpm), Hypotension (90/60 mmHg), and Tachypnea (30 breaths/min) with deep, rapid Kussmaul respirations intended to blow off carbon dioxide to compensate for metabolic acidosis.

4. Diagnostic Evaluation

Laboratory results confirmed the diagnosis of DKA based on the American Diabetes Association (ADA) criteria (Motes et al., 2021);

- **Hyperglycemia:** Random Blood Sugar of 420 mg/dL.
- **Acidosis:** Arterial pH of 7.12 and Serum Bicarbonate (HCO_3) of 10 mEq/L.
- **Ketosis:** Ketonemia and Ketonuria (+++).

- **Electrolyte Imbalance:** Hyponatremia (130 mEq/L) likely due to dilutional effect of hyperglycemia, and normal-high Potassium (4.8 mEq/L) masking total body potassium depletion caused by acidosis.
- **Chronic Control:** HbA1C of 10% indicated prolonged poor glycemic control.

5. Therapeutic Management

5.1 Acute Phase Management (First 1–2 Hours)

The priority was stabilization using the ABC (Airway, Breathing, Circulation) approach.

1. **Fluid Resuscitation:** Aggressive hydration with 0.9% Normal Saline (15–20 mL/kg) was initiated to restore intravascular volume and improve renal perfusion.
2. **Insulin Therapy:** A fixed-rate intravenous insulin infusion (0.1 units/kg/hr) was started to suppress lipolysis and ketogenesis.
3. **Electrolyte Correction:** Although serum potassium was 4.8 mEq/L, insulin therapy shifts potassium intracellularly. Therefore, KCl (20–30 mEq/L) was added to IV fluids once urine output was assured to prevent fatal hypokalemia.

5.2 Nursing Care Plan Application

Based on the assessment, the primary Nursing Diagnosis was *Deficient Fluid Volume related to osmotic diuresis*.

- **Intervention:** Hourly monitoring of vitals, strict intake/output charting, and assessment of skin turgor.
- **Evaluation:** Within 24 hours, the patient stabilized hemodynamically (BP 110/70, HR 88), and signs of dehydration resolved.

5.3 Pharmacological Interventions

Alongside Insulin and fluids, the patient received:

- *Ondansetron (4mg IV)* for nausea.
- *Ceftriaxone (1g IV)* empirically for suspected infection (mild leukocytosis).

Dextrose 5% was added once blood glucose dropped below 250 mg/dL to prevent hypoglycemia while clearing ketones.

Follow-Up and Outcomes

Within 24 hours, the patient's vital signs stabilized and metabolic parameters improved. Prior to discharge, the patient demonstrated understanding of insulin adherence, hydration, and symptom recognition. No complications were observed during hospitalization.

Discussion

In accordance with the CARE (CAseREport) reporting guidelines, this subsection contextualizes the present case by comparing clinical presentation, management strategies, and nursing outcomes with findings from previously published studies, thereby enhancing transparency, rigor, and external validity (Souza et al., 2017, Riley et al., 2017).

The clinical presentation of this patient closely parallels patterns described in prior studies, wherein young adults with Type 1 diabetes commonly present with classical features of diabetic ketoacidosis (DKA), including polyuria, polydipsia, vomiting, abdominal pain, fruity breath, and Kussmaul respirations following insulin omission (Ehrmann et al., 2020). Insulin non-compliance due to perceived wellness, as observed in this case, has been widely reported as a predominant precipitating factor among young adults and is frequently associated with limited illness perception and inadequate health literacy (Ouzouni et al., 2019, Randall et al., 2011).

Laboratory findings in the present case marked hyperglycemia, metabolic acidosis, ketonemia, and electrolyte imbalance—are consistent with American Diabetes Association diagnostic criteria and align with findings from previous clinical studies documenting dilutional hyponatremia and pseudo-normokalemia masking total body potassium depletion during acute DKA (Kitabchi et al., 2009, El-Remessy, 2022). Furthermore, the elevated HbA1c observed in this patient mirrors evidence identifying poor long-term glycemic control as a strong predictor of recurrent DKA episodes and hospital readmissions (Ehrmann et al., 2020).

From a therapeutic standpoint, the acute management approach employed—early aggressive fluid resuscitation, intravenous insulin infusion, and vigilant electrolyte replacement—reflects internationally recommended treatment protocols and is consistent with large-scale clinical reviews and

consensus guidelines (Kitabchi et al., 2009). However, unlike many case reports that primarily emphasize medical stabilization, this case uniquely integrates a structured nursing theory framework throughout the continuum of care.

The application of Orem's Self-Care Deficit Nursing Theory distinguishes this case from reports that focus predominantly on biomedical outcomes. Previous studies have demonstrated that theory-guided nursing interventions improve patient engagement, self-efficacy, and adherence to diabetes self-management behaviors (Kumar, Taylor and Renpenning, 2011). In this case, the staged use of wholly compensatory, partially compensatory, and educative-supportive nursing systems enabled targeted identification and correction of self-care deficits related to insulin adherence, hydration, and symptom recognition.

Additionally, the integration of Gordon's Functional Health Patterns facilitated a multidimensional assessment addressing physiological instability, maladaptive coping mechanisms, and socioeconomic influences on dietary practices. This holistic approach is supported by evidence advocating for biopsychosocial models in diabetes care, particularly in low-resource settings where social determinants significantly influence treatment adherence and outcomes (Gordon, 2014).

In contrast to studies reporting recurrent DKA due to inadequate discharge education, the present case emphasizes structured discharge planning grounded in Orem's educative-supportive system. Nurse-led education interventions have been shown to significantly improve diabetes self-care behaviors and reduce preventable DKA readmissions, reinforcing the importance of comprehensive discharge planning (Chrvala et al., 2016, Ehrmann et al., 2020). Thus, this case contributes meaningful insight by demonstrating how theory-based nursing interventions can bridge the gap between acute stabilization and long-term self-management.

Overall, when compared with existing literature, this case supports current evidence regarding DKA pathophysiology and acute management while adding value through the practical application of nursing theory in a real-world clinical context. In alignment with CARE guidelines, the detailed clinical timeline, diagnostic reasoning, intervention

rationale, and outcome evaluation enhance the educational and clinical relevance of this case report (Riley et al., 2017).

Conclusion

This case underscores the critical importance of timely recognition and comprehensive management of diabetic ketoacidosis, particularly in young adults with Type 1 diabetes who exhibit insulin non-compliance. The integration of evidence-based medical management with theory-guided nursing care, specifically Orem's Self-Care Deficit Nursing Theory, enabled effective stabilization and addressed underlying self-care deficits contributing to disease recurrence. A holistic, patient-centered nursing approach that incorporates thorough assessment, targeted education, and structured discharge planning is essential to improving self-management, reducing preventable readmissions, and optimizing long-term outcomes in individuals at high risk for diabetic ketoacidosis.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report.

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