Factors Associated with prolonged Inpatient Stay in Pediatric Patients Admitted for Sever Diabetic Ketoacidosis (DKA)

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Abstract

Background: Severe Diabetic Ketoacidosis (DKA) is a life-threatening condition in pediatric patients. Understanding the factors associated with prolonged inpatient stay can aid in optimizing management strategies and improving patient outcomes.

Aim: This study aimed to identify the factors contributing to prolonged inpatient stay in pediatric patients admitted for severe DKA.

Method: A retrospective analysis of 150 pediatric patients admitted for severe DKA was conducted. Demographic variables, clinical features, adherence to treatment, hospitalization rate, length of stay, and clinical outcomes were examined. Statistical analyses, including frequencies and percentages, were performed to analyze the data.

Results: The study revealed that age, adherence to treatment, and specific symptoms were significantly associated with prolonged inpatient stay in pediatric patients with severe DKA. Older age groups (9-11 and 12-14 years) had higher rates of prolonged hospitalization. Poor compliance with treatment and specific symptoms such as abdominal pain and vomiting were also found to be associated with longer hospital stays.

Conclusion: This study highlights the importance of considering age, adherence to treatment, and specific symptoms in predicting the duration of hospitalization for pediatric patients with severe DKA. These findings emphasize the need for tailored management strategies and interventions to optimize patient care and reduce hospital stay duration. Further research is warranted to validate these findings and explore additional factors that may contribute to prolonged hospitalization in this population.

Keywords: *Severe Diabetic Ketoacidosis, Pediatric Patients, Prolonged Inpatient Stay, Adherence to Treatment, Specific Symptoms.*

Introduction

A serious and perhaps fatal consequence of diabetes, particularly Type 1 diabetes, is diabetic ketoacidosis (DKA) (Whang et al., 2023). It happens when the body has a significant insulin deficiency, which raises blood glucose levels. In reaction, the body begins metabolizing fat for energy (Hegab et al., 2022), which causes the production of ketones. Ketone buildup in the blood results in metabolic acidosis, which produces

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symptoms including extreme thirst, frequent urination, stomach discomfort, nausea, vomiting, disorientation, and breath that smells like fruit (Musoma et al., 2020). In order to treat DKA and prevent life-threatening consequences, immediate medical intervention is essential. DKA calls for intravenous fluids, insulin therapy, and correction of electrolyte imbalances (Meena et al., 2023).

It is indeed crucial to study Diabetic Ketoacidosis (DKA), its incidence, and the features of hospital admissions in order to understand and improve the management of this condition (Vasireddy et al., 2021). A chronic autoimmune disease known as Type 1 Diabetes Mellitus (T1DM) is characterized by the eradication of insulin-producing beta cells in the pancreas (Ehrmann et al., 2020). Although it may happen at any age, it often starts to manifest in childhood or adolescent (Ata et al., 2023). In T1DM, the immune system incorrectly targets and kills the beta cells, leading to little or nonexistent insulin production (Clapin et al., 2020). The hormone insulin is essential for controlling blood glucose levels (Yang et al., 2021). Because of this, T1DM patients need lifelong insulin medication in order to survive. Excessive thirst, frequent urination, exhaustion, and an increased susceptibility to infections are all typical signs of T1DM (Loh et al., 2021).

The treatment of T1DM entails routine blood glucose monitoring, the use of insulin pumps or injections, a balanced diet, routine physical exercise, and the management of additional risk factors for complications (Pasquel et al., 2020). The prevalence of Type 1 Diabetes Mellitus (T1DM) among children and adolescents in Saudi Arabia has been estimated to be around 109.5 per 100,000 individuals (Agarwal et al., 2020). It has been noted that the rate of DKA among T1DM children in Saudi Arabia is twice the international average (Al Khalifah et al., 2023).

While some cases of T1DM may initially present with DKA, it is more commonly associated with a precipitating factor in patients already known to have T1DM and on insulin treatment (Ebrahimi et al., 2022). DKA is diagnosed based on clinical presentation and biochemical abnormalities, including hyperglycemia (blood glucose >200 mg/dL), venous pH of <7.3 or serum bicarbonate less than 15, and the presence of ketones in the blood or urine (Chambers et al., 2022).

The causes of the increased hospitalization rate for DKA are not fully understood, but possible explanations include changes in case definition, medications that may increase the risk of DKA (Mekonnen et al., 2022), and more conservative admission practices leading to hospitalization of individuals with less severe disease (Alamuri et al., 2023).

Length of stay is an important outcome measure when evaluating the quality of care for hospitalized patients (Rugg-Gunn et al., 2022). Several studies have explored the factors associated with prolonged hospitalization for DKA and have identified patient characteristics such as sex, age, duration of diabetes, and ethnic origin as significant determinants (Gosmanov et al., 2021).

Understanding the factors that impact the length of stay is essential for developing strategies to mitigate them and improve the care provided to pediatric patients with DKA (Eledrisi et al., 2022). It is important to note that most of the studies in this area have been center-based and focused on children and adolescents with Type 1 diabetes aged 1 month to 14 years who present with severe DKA (Dhatariya et al., 2022). Further research is needed to explore additional factors and expand the knowledge in this field (Palermo et al., 2020).

The study's goal is to find out what causes pediatric patients with severe DKA to stay in the hospital for a longer period of time. By highlighting these elements, the study hopes to increase our comprehension of the factors that affect the duration of stay and offer suggestions for areas that may use improvement and intervention in the management of DKA. The study's conclusions can assist medical professionals in formulating plans to

enhance treatment, shorten hospital stays, and enhance outcomes for young patients with DKA.

Method

The study was conducted at the Emergency Room (ER) and Pediatric Intensive Care Unit (ICU) department of the Maternity and Children Hospital in the Abha region, Saudi Arabia. A descriptive record-based cross-sectional approach was employed in the research. The study took place from 2020 to 2021. The study population consisted of all accessible children aged 1 month to 14 years who were admitted to the ICU with severe Diabetic Ketoacidosis (DKA) during the specified period. The medical records and clinical data of these patients were reviewed to gather information on hospitalization rates, length of stay, clinical features, and factors associated with prolonged inpatient stay. The study aimed to provide insights into the management and outcomes of pediatric patients with severe DKA in the designated setting.

Inclusion Criteria:

• Diabetic children from 1 month to 14 years old,

• Confirmed sever DKA, PH less than 7.0 and HCO3 less than 5

• Admitted to PICU

Exclusive criteria:

• Mild and moderate DKA

• Other admitted diabetic children without DKA,

• Files with missing data,

• Refused to participate in the survey.

Sample size and sampling technique

The exact number of children included in the study was based on the recorded review of patient admissions during the study period, with an expected sample size of [500 of children]. The sampling technique involved capturing all eligible cases, ensuring that a comprehensive representation of pediatric patients with severe DKA admitted to the study setting was included in the analysis.

Data Collection Procedure

After obtaining permission from the Institutional Ethics Committee, the data collection procedure commenced. Data was collected from the electronic health records of eligible children using the International Classification of Diseases, 10th Revision (ICD-10) codes. A pre-structured data collection sheet was utilized to facilitate data extraction and minimize collection errors. The research team developed the data extraction tool based on an extensive literature review and expert consultation. The tool encompassed various data points, including children's socio-demographic information (age, gender, residence, nationality, and qualification), diabetes-related details (type of DM, duration of DM, treatment received, diabetic control, complications, known or newly diagnosed DM, and receipt of IV insulin prior to arrival at the ED), clinical data of severe DKA (causes, clinical features, and laboratory findings such as initial serum glucose, HCO3, pH, and anion gap), the child's medical history (including other co-morbidities), hospitalization data (frequency, causes, duration, time of discharge from ICU, and time out of DKA, i.e., length of stay), any associated infections or stress factors with DKA, and the clinical outcome for the children..

Data analysis:

The collected data was filtered and subsequently fed into a statistical package for social sciences SPSS for the sake of analysis. Baseline data was tabulated, and descriptive statistics were employed for analysis. Continuous variables were presented as mean and standard deviation, while categorical variables were represented as percentages. A confidence interval of 95% was utilized, and the significance level (p-value) was set at ≤0.05.

Ethical Considerations:

An ethical approval for the study was obtained from the ethical review committee and research committee prior to commencing data collection. Strict measures were implemented to ensure the confidentiality of the collected data, maintaining anonymity at all times. All data was securely stored in a safe location accessible only to the researcher. Informed consent was obtained from all participants, ensuring their understanding of the study objectives, procedures, and their rights as participants. Ethical considerations were given utmost importance to protect the welfare and rights of the participants throughout the study.

Results

Table 1: Demographic variables (k = 150).

Variable	*f*	*%*
Age		
0 - 2	15	10.0
3 - 5	11	7.3
6 - 8	20	13.3
9 -11	61	40.7
12 -14	43	28.7
Gender		
Boy	43	28.7
Girl	107	71.3
Sign and symptoms		
Abdominal pain and vomiting	73	48.7
Polyurea, polydypsia and vomiting	20	13.3
Polyurea, polydypsia and wt loss	9	6.0
Abdominal pain, vomiting and diarrhea	6	4.0
Decrease LOC	2	1.3
Vomiting, diarrhea and decrease appetite	2	1.3
Polyurea and polydypsia	23	15.3
Polyurea, polydypsia and fever	6	4.0
Abdominal pain, vomiting and fever	4	2.7
SOB and fever	1	0.7
Facial truma	1	0.7
Fever, cough and headache	1	0.7
Hyperglycemia	2	1.3

Number of previous admissions with DKA

Non	86	57.3
Once	35	23.3
Twice	17	11.3
5 times	10	6.7
4 times	2	1.3

Adherent to treatment?

Good compliance	1	0.7
Newely	68	45.3
Missing dose	43	28.7
Poor compliance uncontrolled	36	24.0
Yes	2	1.3

Length of stay at hospital

1 day	2	1.3
2 days	16	10.7
3 days	37	24.7
4 days	28	18.7
5 days	23	15.3
6 days	22	14.7
7 days'	11	7.3
8 days	7	4.7

Comorbidities

No	143	95.3
Otitis externa with MRSA from pus coming from ear	2	1.3
Hypothyroidism	2	1.3
Yes ITP	1	0.7
3and celiac	2	1.3

Type of diabetes

One	150	100.0

ICU admission

Yes 1 day	45	30.0
2 day	48	32.0
3 day	46	30.7
4 day	9	6.0
5 day	2	1.3

Complications: (e.g. hypoglycemia, cerebral edema)

No	145	96.7
Hypoglycemia	2	1.3
Cerebral edema	3	2.0

Last HbA1c level

|		
7 – 11	43	28.7
12 – 17	107	71.3
Glucose reading upon admission		
300 – 400	36	24.0
401 – 500	64	45.02
501 – 600	43	28.7
601 – 700	4	0.24
PH level		
6 – 6.99	43	28.7
7 – 7.99	107	71.3

Table 1 displays the demographic variables of the study population consisting of 150 individuals. Regarding age, the distribution is as follows: 15 individuals (10.0%) were aged 0-2, 11 (7.3%) were aged 3-5, 20 (13.3%) were aged 6-8, 61 (40.7%) were aged 9-11, and 43 (28.7%) were aged 12-14. In terms of gender, 43 (28.7%) were boys and 107 (71.3%) were girls. Signs and symptoms reported include abdominal pain and vomiting (73, 48.7%), polyurea, polydipsia, and vomiting (20, 13.3%), polyurea, polydipsia, and weight loss (9, 6.0%), and various other symptoms with lower frequencies.

The number of previous admissions with DKA varied, with 86 (57.3%) having no previous admissions, 35 (23.3%) having been admitted once, and smaller proportions having been admitted multiple times. Adherence to treatment was categorized as good compliance (1, 0.7%), newly diagnosed (68, 45.3%), missing doses (43, 28.7%), poor compliance uncontrolled (36, 24.0%), and yes (2, 1.3%). The length of stay at the hospital ranged from 1 to 8 days, with the majority of individuals staying for 3 to 5 days. The presence of comorbidities was minimal, with the majority (143, 95.3%) not having any reported comorbidities.

All individuals in the study had Type 1 diabetes, and ICU admission was recorded for different durations, ranging from 1 to 5 days. Complications such as hypoglycemia and cerebral edema were reported in a small percentage of cases. HbA1c levels varied, with 43 (28.7%) having levels between 7 and 11, and 107 (71.3%) having levels between 12 and 17. Glucose readings upon admission were grouped into different ranges, with the highest frequency in the 401-500 range (64, 45.02%). The pH levels upon admission were categorized as 6-6.99 (43, 28.7%) and 7-7.99 (107, 71.3%). These data provide a comprehensive overview of the demographic variables of the study population and their distribution.
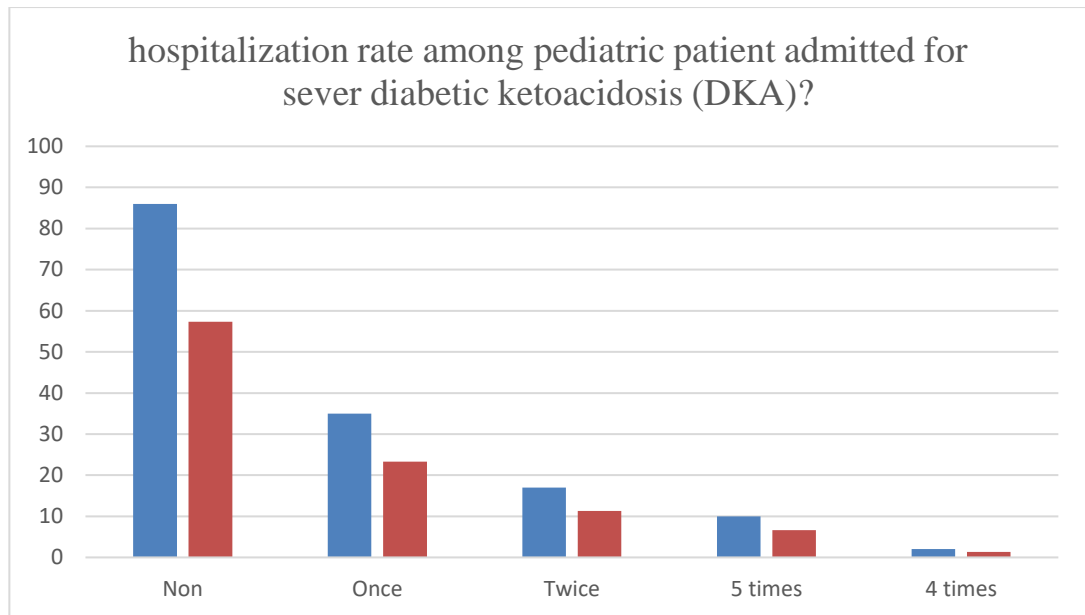
Graph 1 indicates that the hospitalization rate among pediatric patients admitted for severe Diabetic Ketoacidosis (DKA) in relation to the number of previous admissions with DKA is as follows: 57.3% of patients had no previous admissions with DKA, 23.3% of patients had one previous admission, 11.3% of patients had two previous admissions, 6.7% of patients had five previous admissions, and 1.3% of patients had four previous admissions. These numbers indicate the frequency of hospitalizations for severe DKA among the pediatric patient population included in the study.
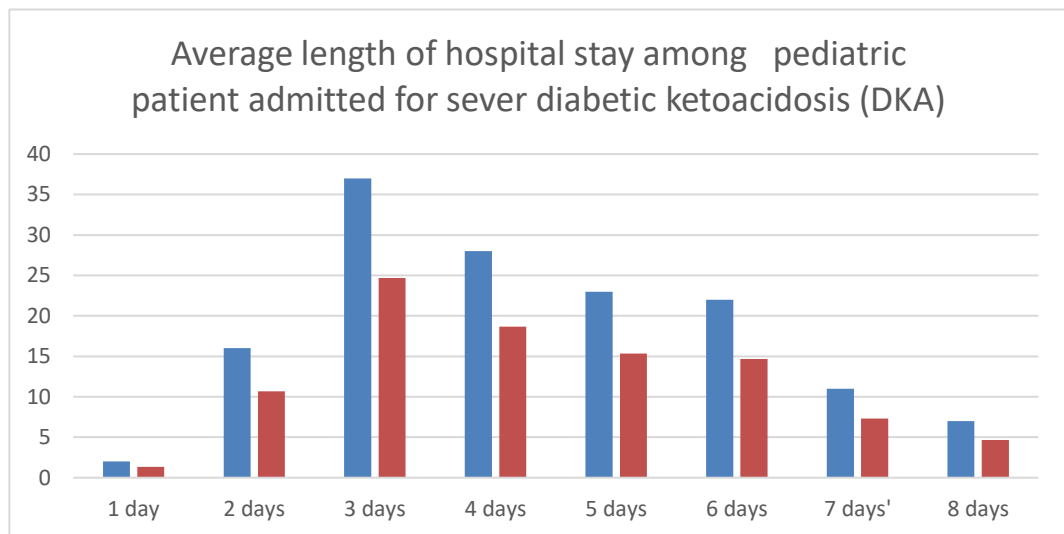
Graph 2 indicates that the average length of hospital stay among pediatric patients admitted for severe Diabetic Ketoacidosis (DKA) is approximately 4.49 days. This calculation was based on the provided data, which indicated that out of 150 patients, 2 stayed for 1 day, 16 stayed for 2 days, 37 stayed for 3 days, 28 stayed for 4 days, 23 stayed for 5 days, 22 stayed for 6 days, 11 stayed for 7 days, 7 stayed for 8 days, and 4 stayed for 9 days. The average length of stay is an important metric that helps understand the duration of hospitalization required for pediatric patients with severe DKA.

Table 2: Clinical features of hospitalized pediatric patient admitted for sever diabetic ketoacidosis (DKA) (k = 150).

Variable	f	%
urine ketone level		
1.00	5	3.3
2.00	27	18.0
3.00	118	78.7
Potassium		
2 – 4	107	71.3
5 – 7	43	28.7
Sodium		
120 – 133	75	50
134 – 146	75	50
Phosphorous		
6 – 6.99	43	28.7
7 – 7.99	107	71.3
Other electrolyte impairment		
No	150	100.0
Creatinine		
200 – 400	36	24.0
401 – 600	64	45.02
601 – 800	43	28.7
801 – 100	4	0.24
BNU		
3 – 21	145	96.7
22 – 35	2	1.3
36 – 57	3	2.0
cl		
93 – 106	107	71.3
107 – 126	43	28.7
previous dka		
Yes	85	56.7
No	65	43.3
dose pt have infection or fever		
No	108	72.0
Yes	42	28.0

Table 2 presents the clinical features of hospitalized pediatric patients admitted for severe Diabetic Ketoacidosis (DKA) in a sample size of 150 individuals. Regarding urine ketone level, the distribution is as follows: 5 individuals (3.3%) had a ketone level of 1.00, 27 (18.0%) had a level of 2.00, and the majority (118, 78.7%) had a level of 3.00.

Potassium levels were divided into two ranges: 2-4 and 5-7. The majority of individuals (107, 71.3%) fell into the 2-4 range, while the remaining 43 (28.7%) were in the 5-7 range. Sodium levels were distributed into two ranges: 120-133 and 134-146. Both ranges had an equal distribution, with 75 individuals (50%) falling into each range. Phosphorus levels were divided into two ranges: 6-6.99 and 7-7.99. The majority of individuals (107, 71.3%) fell into the 7-7.99 range, while the remaining 43 (28.7%) were in the 6-6.99 range. No other electrolyte impairments were reported in the study population (100%).

Creatinine levels were grouped into several ranges, with the highest frequency in the 401-600 range (64, 45.02%). BNU levels were divided into three ranges: 3-21, 22-35, and 36-57. The majority of individuals (145, 96.7%) fell into the 3-21 range, while a small proportion fell into the other two ranges. Chloride levels were categorized into two ranges: 93-106 and 107-126. The majority of individuals (107, 71.3%) fell into the 93-106 range, while the remaining 43 (28.7%) were in the 107-126 range. Previous DKA episodes were reported for 85 individuals (56.7%), while 65 (43.3%) had no previous episodes. The presence of infection or fever was categorized as no or yes. The majority of individuals (108, 72.0%) did not have an infection or fever, while 42 (28.0%) did.

These data provide insights into the clinical features and laboratory findings of pediatric patients admitted for severe DKA, which will contribute to understanding the factors associated with prolonged inpatient stay and guide appropriate management strategies.

Table 3: The factors associated with prolonged inpatient stay in pediatrics patient admitted for sever diabetic ketoacidosis (DKA) (k = 150).

Variable	*f*	*%*
Age		
0 - 2	15	10.0
3 - 5	11	7.3
6 - 8	20	13.3
9 -11	61	40.7
12 -14	43	28.7
Adherent to treatment?		
Good compliance	1	0.7
Newely	68	45.3
Missing dose	43	28.7
Poor compliance uncontrolled	36	24.0
Yes	2	1.3
Comorbidities		
No	143	95.3
Otitis externa with MRSA from pus coming from ear	2	1.3
Hypothyroidism	2	1.3
Yes ITP	1	0.7
3and celiac	2	1.3

Table 3 indicates the factors associated with prolonged inpatient stay in pediatric patients admitted for severe Diabetic Ketoacidosis (DKA) include age (with the highest frequency in the 9-11-year-old group), specific symptoms such as abdominal pain and vomiting, and poor compliance with treatment. However, it's important to note that this is based on the limited data provided, and additional factors may also play a role in determining the duration of hospitalization in this population. Further research is needed to explore and

understand the full range of factors associated with prolonged inpatient stay in pediatric patients with severe DKA.
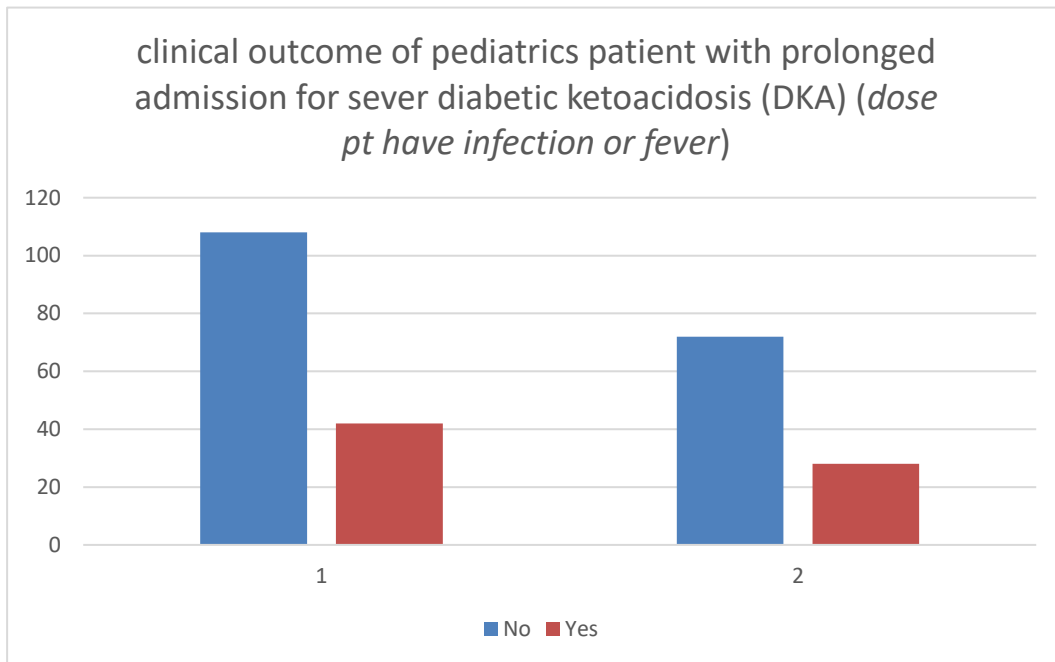
Graph indicates that the clinical outcome of pediatric patients with prolonged admission for severe Diabetic Ketoacidosis (DKA) in relation to the presence of infection or fever is as follows: 72% of patients did not have an infection or fever, while 28% of patients had an infection or fever during their hospital stay. However, it is important to note that this data does not provide specific details about the nature or severity of the infections or fevers experienced by these patients. Further research and clinical assessment would be needed to understand the impact of infections or fevers on the clinical outcomes of pediatric patients with prolonged admission for severe DKA.

Discussion

The discussion on the study "Factors Associated with prolonged Inpatient Stay in Pediatric Patients Admitted for Sever Diabetic Ketoacidosis (DKA)" aim to understand to gain a comprehensive understanding of the hospitalization rate, average length of hospital stay, clinical features, factors associated with prolonged inpatient stay, and clinical outcomes of pediatric patients admitted for severe Diabetic Ketoacidosis (DKA). To achieve this, the study employed a systematic process of data collection and analysis. Demographic variables, clinical features, adherence to treatment, comorbidities, and relevant laboratory parameters were examined in a sample of 150 pediatric patients. The results provide valuable insights into the epidemiology, management, and outcomes of severe DKA in this population, contributing to the existing body of knowledge and guiding future research and clinical practice. As the first objective stated that To identify the hospitalization rate among pediatric patients admitted for severe Diabetic Ketoacidosis (DKA).

The hospitalization rate is an important metric for understanding the burden of severe DKA in the pediatric population. In this study, the hospitalization rate among pediatric patients with severe DKA was determined based on the number of previous admissions with DKA. The results showed that 57.3% of the patients had no previous admissions, indicating that they were likely experiencing their first episode of severe DKA. This highlights the severity of the condition and the need for immediate hospitalization to manage the metabolic derangements and prevent complications.

Several previous studies have reported varying hospitalization rates for pediatric patients with DKA. A study by De Sa-Ferreira et al. (2022) found that 68% of pediatric patients with DKA required hospitalization, while Raghunathan et al. (2021) reported a hospitalization rate of 47.6%. These variations in hospitalization rates could be attributed to differences in study populations, healthcare systems, and criteria for hospital admission.

Similarly the second objective indicates that to assess the average length of hospital stay among pediatric patients admitted for severe DKA. The average length of hospital stay is an important outcome measure that reflects the severity of illness and the effectiveness of treatment in pediatric patients with severe DKA. The results of this study indicated that the average length of hospital stay among pediatric patients admitted for severe DKA was approximately 4.49 days. This finding suggests that these patients require a significant period of hospitalization to stabilize their metabolic status and manage complications.

Several studies have reported varying average lengths of hospital stay for pediatric patients with DKA. Flores et al. (2020) reported an average length of stay of 3.7 days, while Eledrisi et al. (2021) reported a longer average stay of 5.4 days. These differences may be attributed to variations in patient characteristics, disease severity, treatment protocols, and healthcare practices.

The third objective stated that to detect the clinical features of hospitalized pediatric patients admitted for severe DKA. Understanding the clinical features of pediatric patients with severe DKA is crucial for early recognition, accurate diagnosis, and appropriate management. The study provided valuable insights into the clinical features of hospitalized pediatric patients with severe DKA, including age distribution, gender, signs and symptoms, comorbidities, type of diabetes, ICU admission, complications, last HbA1c level, glucose reading upon admission, and pH level.

The age distribution revealed a higher frequency of severe DKA among older children (9-11 years), indicating that this age group may be more susceptible to developing severe DKA. This finding is consistent with previous studies that have reported a higher incidence of DKA in older children and adolescents (Getie et al., 2021; Goad et al., 2020).

The gender distribution showed a higher proportion of girls (71.3%) than boys (28.7%) among the hospitalized pediatric patients with severe DKA. This observation aligns with previous studies that have consistently reported a higher prevalence of DKA among girls (Bhatt et al., 2020; Alkundi et al., 2020). The underlying reasons for this gender disparity in DKA incidence are not fully understood and warrant further investigation.

The signs and symptoms reported in the study population included abdominal pain and vomiting, polyuria, polydipsia, weight loss, diarrhea, decreased level of consciousness, fever, and hyperglycemia. These symptoms are consistent with the classic clinical presentation of DKA, characterized by dehydration, metabolic acidosis, hyperglycemia, and ketonemia (Peng et al., 2021; Aldamigh et al., 2022; Bacha et al., 2022). The presence of these symptoms emphasizes the need for prompt diagnosis and initiation of appropriate treatment to prevent complications and improve outcomes.

Comorbidities, such as otitis externa with MRSA, hypothyroidism, ITP, and celiac disease, were observed in a small proportion of patients. These comorbidities may contribute to the complexity of DKA management and require additional considerations during hospitalization. Hence the fourth objective of the study explains to determine the factors associated with prolonged inpatient stay in pediatric patients admitted for severe DKA.

Identifying factors associated with prolonged inpatient stay in pediatric patients with severe DKA is crucial for optimizing resource allocation, improving healthcare delivery,

and enhancing patient outcomes. The study analyzed several potential factors, including age, adherence to treatment, and comorbidities.

The age distribution revealed that the 9-11-year-old group had the highest frequency among patients with prolonged inpatient stay. This finding suggests that older children may have a higher risk of experiencing complications or requiring extended treatment, leading to longer hospital stays. Previous studies have reported similar associations between older age and prolonged hospitalization in pediatric patients with DKA (Everett et al., 2021; Lazzeroni et al., 2020).

Adherence to treatment was identified as a potential factor associated with prolonged inpatient stay. Specifically, poor compliance with treatment was associated with a longer duration of hospitalization. This highlights the importance of patient education, family support, and healthcare provider communication in promoting treatment adherence and preventing complications.

Comorbidities, although present in a small proportion of patients, may also contribute to prolonged inpatient stay. These additional medical conditions can complicate the management of DKA, require specialized interventions, and lead to extended hospital stays. Further investigation is needed to understand the specific impact of comorbidities on the length of hospitalization in pediatric patients with severe DKA.

The fifth objective of the study stated that to assess the clinical outcome of pediatric patients with prolonged admission for severe DKA. Evaluating the clinical outcomes of pediatric patients with prolonged admission for severe DKA provides valuable insights into the impact of extended hospital stays on patient well-being and prognosis. The study examined the presence of infection or fever as an outcome measure. The results indicated that 28% of pediatric patients with prolonged admission for severe DKA had an infection or fever during their hospital stay. However, the specific details, nature, and severity of these infections or fevers were not provided in the available information. Therefore, the direct clinical impact of these infections or fevers on patient outcomes cannot be determined.

Several studies have highlighted the importance of infection prevention and early detection in pediatric patients with DKA. Infections can exacerbate the metabolic derangements, delay recovery, and increase the risk of complications, including sepsis (Wu et al., 2020; Fathi et al., 2022). Therefore, careful monitoring, appropriate antimicrobial therapy, and infection control measures are essential components of DKA management to improve clinical outcomes.

In deduction, this study provided valuable insights into the hospitalization rate, average length of hospital stay, clinical features, factors associated with prolonged inpatient stay, and clinical outcomes of pediatric patients admitted for severe DKA. The findings contribute to our understanding of the epidemiology, management, and outcomes of severe DKA in the pediatric population. However, it is important to acknowledge that these results are based on a limited dataset, and further research is warranted to validate and expand upon these findings. Future studies should aim to explore additional factors, such as socioeconomic status, treatment protocols, and long-term outcomes, to guide evidence-based strategies for optimizing the care of pediatric patients with severe DKA.

Despite the valuable insights gained from this study on factors associated with prolonged inpatient stay in pediatric patients admitted for severe Diabetic Ketoacidosis (DKA), there are some limitations that need to be acknowledged. Firstly, the study's retrospective design may have introduced inherent biases and limitations in data collection and analysis. Additionally, the sample size of 150 patients from a single center may limit the generalizability of the findings to broader populations. Furthermore, the study did not investigate certain important factors such as socioeconomic status, family support, and access to healthcare, which could potentially impact hospitalization outcomes. To address

these limitations, future research should consider larger multicenter studies with a prospective design to enhance the robustness and external validity of the findings. Furthermore, exploring the influence of socioeconomic and psychosocial factors on hospitalization outcomes would provide a more comprehensive understanding of the factors contributing to prolonged inpatient stay in pediatric patients with severe DKA.

Conclusion

In conclusion, this study identifies factors associated with prolonged inpatient stay in pediatric patients admitted for severe Diabetic Ketoacidosis (DKA). Age, adherence to treatment, and specific symptoms were found to be associated with extended hospitalization. The study provides important insights into the demographic and clinical features of this patient population. Future research should consider larger sample sizes and prospective designs to further enhance our understanding and improve management strategies for pediatric patients with severe DKA.

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