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Clinical profile and treatment outcome of patients with Diabetic ketoacidosis admitted at Dr.Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni Bk.

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ABSTRACT

Background of study: Diabetic Ketoacidosis (DKA) is a severe and potentially life-threatening complication predominantly associated with diabetes mellitus, particularly type 1 diabetes, although it can occur in type 2 diabetes as well. DKA is characterized by a combination of hyperglycemia, ketosis, and metabolic acidosis. DKA is a major cause of morbidity and mortality among individuals with diabetes. The incidence rates of DKA vary widely across different regions, with higher rates observed in low and middle-income countries due to limited access to healthcare resources and inadequate diabetes education.

Objectives: 1.To assess the clinical profile and outcomes of patient with diabetic ketoacidosis. 2. To compare the outcome of diabetic ketoacidosis patient with their selected demographic variables.

Material and methods: : A descriptive, cross-sectional study design was used to study clinical profile and treatment outcome of patients with Diabetic ketoacidosis admitted at Dr. VVPPRH, Loni Bk. The sample consisted of 30 patients diagnosed with DKA willing to participate in the study. Sampling techniques used for the present study was non-probability, purposive sampling technique. A proforma was prepared to collect the data. Descriptive and inferential statistics were used to analyse the data according to objectives

Results: The study findings revealed that, 13.33% of the study participants had blurred vision, 70% of the study participants had smell of acetone in breaths, 76.66% of the study participants Kussmaul breathing, 10% of the study participants had arrhythmias, 3.33% of the study participants had murmur present, 86.66% of the study participants had nausea present, 73.33% of the study participants experienced vomiting, 90% of the study participants experienced abdominal pain, 100% of the study participants had polyuria, 96.66% of the study participants had glycosuria, 100% the study participants had polydipsia, 63.33% of the study participants had polyphagia present. The present study findings regarding treatment outcome of the patients diagnosed with diabetic ketoacidosis reveals that, 83.33% of the study participants had good recovery, followed by 6.66% of the study participants were DAMA discharged and 6.66% of the study participants were expired, followed by 3.33% of the study participants referred to the higher Centre and no study participants were given DOPR discharge.

Conclusion: - The present study conducted to study the clinical characteristics and treatment outcome of the patient diagnosed with diabetic ketoacidosis. The study findings highlighted important clinical characteristics of the diabetic ketoacidosis and good recovery of the patients was observed as an outcome of the treatment.

Key words: Diabetic ketoacidosis, Clinical profile, Treatment outcome

I Introduction

Diabetic Ketoacidosis (DKA) is a severe and potentially life-threatening Complication predominantly associated with diabetes mellitus, particularly type 1 diabetes, although it can occur in type 2 diabetes as well. DKA is characterized by a combination of hyperglycemia, ketosis, and metabolic acidosis. The pathophysiology involves a significant deficiency of insulin along with an increase in counter-regulatory hormones such as glucagon, catecholamines, cortisol, and growth hormone. This hormonal imbalance leads to increased hepatic glucose production and decreased peripheral glucose utilization, culminating in hyperglycemia. [1]

Globally, DKA is a major cause of morbidity and mortality among individuals with diabetes. The incidence rates of DKA vary widely across different regions, with higher ratesobserved in low and middle-income countries due to limited access to healthcare resources and inadequate diabetes education. [2]

Even in developed nations with advanced healthcare systems, DKA continues to be a common and costly complication, underscoring the ongoing need for research and improvement in management strategies. [3]

DKA typically presents with a range of symptoms including excessive thirst (polydipsia), frequent urination (polyuria), significant weight loss, nausea, vomiting, abdominal pain, and altered mental status, which can range from mild confusion to coma. These symptoms result from severe dehydration, electrolyte imbalances, and the accumulation of ketone bodies in the blood. [4]

The diagnostic criteria for DKA include blood glucose levels exceeding 250 mg/dL, arterial pH less than 7.3, serum bicarbonate levels below 18 mEq/L, and the presence of ketonemia or ketonuria[5]

Several risk factors contribute to the development of DKA, including insulin omission, infections, acute illnesses, inadequate insulin therapy, and poor adherence to diabetes management plans. In children and adolescents, DKA is often the initial presentation of type 1 diabetes. Understanding these risk factors is essential for earlydetection and prevention of DKA episodes. Several risk factors contribute to the development of DKA, including insulin omission, infections, acute illnesses, inadequate insulin therapy, and poor adherence to diabetes management plans. In children and adolescents, DKA is often the initial presentation of type 1 diabetes. Understanding these risk factors is essential for earlydetection and prevention of DKA episodes. [6]

I.1Statement of problem

Clinical profile and treatment outcome of patients with Diabetic ketoacidosis admitted at Dr. Vitthalrao Vikhe

Patil Pravara Rural Hospital, Loni Bk.

Objectives

1. To assess the clinical profile and outcomes of patient with diabetic ketoacidosis.
2. To compare the outcome of diabetic ketoacidosis patient with their selected demographic variables.

III Methodology

II.1 Research design and approach

Research design for the current study descriptive cross sectional. And the research approach use for the study was quantitative approach.

II.2 Setting of the study

The study was conducted in Dr.Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni Bk. i.e., Medicine in-patient department. Loni which is a 1275 bedded multispecialty trust hospital at Loni village.

II.3 Sample

For the present study sample comprised of patients diagnosed with diabetic ketoacidosis who fulfilled the inclusion criteria.

II.4 Sample size

The sample size selected for this study is 30.

II.5 Sampling technique

For the present study non-probability, purposive sampling technique was used

II.6 Sampling Procedure

Samples were screened for eligibility of inclusion and exclusion criteria. Patients eligible and willing to participate were included in the study.

II.7 Inclusion and Exclusion criteria

Inclusion criteria: The patients, who are;

Diagnosed with diabetic ketoacidosis

Available during data collection.

Willing to participate.

Exclusion criteria:

The patients, who are;

Unconscious or terminally ill patients.

Unable to respond tool.

Not willing to participate for study.

Tools and techniques

Interview method was used to collect the data from the participants, which consists of following sections;

Section A: Demographic variables of the study participants incudes 9 items namely, Age, Gender, Marital Status, Educational Status, Occupation, Type of DM, Duration of DM, Co-morbid illness, History of addiction.

Section B: Clinical profile includes vital parameters, systemic examinations, Investigations of the study participants.

Section C; - Treatment outcome of the study participants.

Treatment outcome includes 5 items namely, good recovery, Refer to higher Centre, DOPR discharge, DAMA discharge, Death.

Data collection procedure Ethical aspects

a) Ethical clearance: Proposal was presented before Institutional Ethics Committee of PIMS (DU), Loni and ethical clearance was obtained.

b) Permission from concerned authority: Written permission was obtained from Medical Superintendent of the DRVVPPRH, Loni Bk.

c) Informed written consent: The study participants were contacted on one-on-one basis and explanation regarding study objectives, confidentiality of their data, their willingness to participate and right to withdraw from the study were provided to them. Informed written consent was obtained from participants of the study.

Data collection: After self-introduction and informed written consent the data was collected from the participants using interview method.

II.8 Data Analysis

Data was coded in the Microsoft excel sheet. Descriptive and inferential statistics were used to analyse the data according to objectives. The demographic variables were analyzed by using descriptive statistics (frequency and percentage). •Data from the clinical profiles to be analyzed using frequency, percentage in the form of tables and graphs. Data from the treatment outcome to be analyzed using frequency, percentage in the form of tables and graphs.

III Results

III.1 Assessment of socio-demographic characteristics of the study participants

The demographic findings concludes that in, Majority 30% of the study participants were in the category of 34-43 years of age, Majority 60% of the study participants were male, Majority 80% of the study participants were married, Majority 33.33% of the study participants were in the category of primary education, . Majority 33.33% of the study participants were in the category of agriculture, Majority 86.66% of the study participants were having type I DM, Majority 67% of the study participants were having DM for past 5-10 years, Majority 43.33% of the study participants were having no any co-morbid illness, Majority 40% of the study participants had addiction of tobacco chewing.

III.2 Description of clinical profile of the study participants.

Table: 2.1 - Description of vital parameters of the study participants.

Sr. No	Vital Parameters		F	%
1	Temperature	97.6^0 F-99^o F	28	93.33%
		$>99^0$ F	2	6.66%
2	Pulse (Beats/min)	60-100	23	76.66%
		>100	6	20%
3	Respiration (Breaths/min)	16-22	26	86.66%
		>22	4	13.33%
4	Blood pressure	Up to 120/80	25	83.33%
		>120/80	3	10%

Table No I shows that 93.33% of the study participants having normal body temperature whereas 6.66% of the study participants had elevated body temperature. 76.66% of the study participants had normal pulse whereas 20% of the study participants had tachycardia. 86.66% of the study participants had normal respiration rate whereas 13.33% of the study participants had tachypnea. 83.33% of the study participants had normal blood pressure whereas 10% of the study participants had elevated blood pressure.

Table: 2.2 - Description of systemic examinations of the study participants.

Sr. No.	Systemic Examinations		F	%
1	Blurred vision	Present	4	13.33%
		Absent	26	86.66%
2	Smell of acetone in breaths	Present	21	70%
		Absent	9	30%
3	Kussmaul breathing	Present	23	76.66%
		Absent	7	23.33%
4	Arrhythmia	Present	3	10%
		Absent	27	90%
5	Murmur	Present	1	3.33%
		Absent	29	96.66%
6	Nausea	Present	26	86.66%

		Absent	4	13.33%
7	Vomiting	Present	22	73.33%
		Absent	8	26.66%
8	Abdominal pain	Present	27	90%
		Absent	3	10%
9	Polyuria	Present	30	100%
		Absent	0	0%
10	Glycosuria	Present	29	96.66%
		Absent	1	3.33%
11	Polydipsia	Present	30	100%
		Absent	0	0%
12	Polyphagia	Present	19	63.33%
		Absent	11	36.66%

Table No II shows that 13.33% of the study participants had blurred vision, 70% of the study participants had smell of acetone in breaths, 76.66% of the study participants Kussmaul breathing, 10% of the study participants had arrhythmias, 3.33% of the study participants had murmur present, 86.66% of the study participants had nausea present, 73.33% of the study participants experienced vomiting, 90% of the study participants experienced abdominal pain, 100% of the study participants had polyuria, 96.66% of the study participants had glycosuria, 100% of the study participants had polydipsia, 63.33% of the study participants had polyphagia present.

Table: 2.3- Table Description of level of consciousness of the study participants.

Sr. No.	Level of consciousness	F	%
1	Conscious and oriented	18	60%
2	Confusion	7	23.33%
3	Lethargy	3	10%
4	Stupor	0	0%
5	Coma	2	6.66%

Table No III shows that 60% of the study participants was conscious and oriented, followed by 23.33% of the study participants were in state of confusion, followed by 10% of the study participants were in lethargy state, followed by 6.66% of the study participants were in coma stage and 0% of the study participants were in stupor state.

Table: 2.4- Description of blood glucose level of the study participants.

Sr. No.	Blood Glucose Level		F	%
1	Random	Normal	0	0%
		Increased	30	100%
		Decreased	0	0%
2	Fasting	Normal	0	0%
		Increased	30	100%
		Decreased	0	0%
3	Post prandial	Normal	0	0%
		Increased	30	100%
		Decreased	0	0%

Table No IV shows that 100% of the study participants had elevated random blood sugar levels, 100% of the study participants had elevated fasting blood sugar levels and 100% of the study participants had elevated post prandial blood sugar levels.

Table: 2.5- Description of HbA1c status of the study participants.

Sr. No.	HbA1c Status	F	%
1	Normal	0	0%
2	Pre-diabetic	2	6.66%
3	Diabetic	28	93.33%

Table No V shows that 93.33% of the study participants had diabetic HbA1c status, followed by 6.66% of the study participants had pre-diabetic HbA1c status and 0% of the study participants had normal HbA1c status.

Table: 2.6- Description of blood cell count of the study participants.

Sr. No.	Blood Cell Count		F	%
1	Haemoglobin	Normal	27	90%
		Decreased	3	10%
2	Total Leucocyte count	Normal	19	63.33%
		Elevated	11	36.66%
3	Platelets count	Normal	28	93.33%
		Decreased	2	6.66%

Table No VI shows that 10% of the study participants had decreased level of hemoglobin, 36.66% of the study participants had elevated total leucocyte count and 6.66% of the study participants had decreased platelet count.

Table: 2.7- Description of Arterial blood gas analysis of the study participants.

Sr. No.	Arterial Blood Gas		F	%
1	pH	Normal	0	0%
		Acidic	30	100%
		Alkaline	0	0%
2	PaCO2	Normal	26	86.66%
		Increased	4	13.33%
3	PaO2	Normal	27	90%
		Decreased	3	10%
4	NaHCO3	Normal	0	0%
		Decreased	30	100%

Table No VII shows that 100% of the study participants had acidic pH in ABG analysis, 13.33% of the study participants had increased PaCO2 levels, 10% of the study participants had decreased PaO2 levels and 100% of the study participants had decreased NaHCO3 levels in ABG analysis.

Table: 2.8- Description of urine examination of the study participants.

Sr. No.	Urine Examination		F	%
1	Ketone	Present	30	100%
		Absent	0	0%
2	Glucose	Present	28	93.33%
		Absent	2	6.66%
3	Albumin	Present	29	96.66%
		Absent	1	3.33%

Table No VIII shows that 100% of the study participants had ketone present in urine examination, 93.33% of the study participants had glucose present in the urine examination and 96.66% of the study participants had albumin present in the urine examination.

Table: 2.9- Description of oxygenation status of the study participants.

Sr. No.	Oxygenation status	F	%
1	Room Air	14	46.66%
2	Nasal prongs	3	10%
3	Oxygen mask	5	16.66%
4	Venturi mask	3	10%
5	Oxygen tent	0	0%
6	T piece	1	3.33%
7	Ventilatory support	4	13.33%

Table No IX shows that 46.66% of the study participants were on room air, followed by 16.66% of the study participants were on oxygen mask, followed by 13.33% of the study participants were on ventilatory support, followed by 10% of the study participants were on nasal prongs and 10% of the study participants were on venturi mask, followed by 3.33% of the study participants were on T piece and 0% of the study participants were on oxygen tent.

Table: 2.10- Description of hydration status of the study participants.

Sr. No.	Type of Fluid	Fluid	F	%
1	Isotonic	NS 0.9%	19	63.33%
		DNS	4	13.33%
2	Hypotonic	NS 0.45%	7	23.33%

Table No X shows that 63.33% of the study participants had NS 0.9% fluid prescribed, followed by 13.33% of the study participants had NS 0.45% fluid prescribed and 13.33% of the study participants had DNS fluid prescribed by the physician.

Table: 2.11- Description of type of nutrition of the study participants.

Sr. No.	Nutrition	F	%
1	Oral	24	80%
2	RT Feeding	6	20%
3	TPN	0	0%

Table No XI shows that 80% of the study participants were consuming oral diet, followed by 20% of the study participants were on Ryle's tube feeding and no study participants were on total parenteral nutrition.

Table: 2.12- Description of medications of the study participants.

Sr. No.	Medicine	F	%
1	Antibiotics	24	80%
2	Alkalizing	4	13.33%
3	Electrolyte supplement	13	43.33%
4	Oral hypoglycemic	0	0%

Table No XII shows that 80% of the study participants had Antibiotics prescribed, followed by 43.33% of the study participants had electrolyte supplement prescribed, followed by 13.33% of the study participants had alkalizing agent prescribed by the physician and no study participants were on oral hypoglycemic.

Sr. No.	Type of Insulin	F	%
1	Rapid acting	25	83.33%
2	Intermediate acting	3	10%
3	Long acting	2	6.66%

Table: 2.13- Description of type of insulin of the study participants.

Table No XIII shows that 83.33% of the study participants were on rapid acting insulin, followed by 10% of the study participants were on intermediate acting insulin and 6.66% of the study participants were on the long-acting type of insulin**.**

IVDiscussion

IV.1Findings related to demographic characteristics.

The demographic findings concludes that in, Majority 30% of the study participants were in the category of 34-43 years of age, Majority 60% of the study participants were male, Majority 80% of the study participants were married, Majority 33.33% of the study participants were in the category of primary education, . Majority 33.33% of the study participants were in the category of agriculture, Majority 86.66% of the study participants were having type I DM, Majority 67% of the study participants were having DM for past 5-10 years, Majority 43.33% of the study participants were having no any co-morbid illness, Majority 40% of the study participants had addiction of tobacco chewing.

IV. 2 Clinical profile of the study participants.

The present study assesses the clinical profile of the study participants diagnosed with diabe5tic ketoacidosis. Findings

Regarding clinical profile reveals that, 93.33% of the study participants having normal body temperature. 100% of the

Study participants had polydipsia & 100% of the study participants had polyuria. 60% of the study participants was conscious

And oriented. 100% of the study participants had elevated random blood sugar levels, 100% of the study participants had

Elevated fasting blood sugar levels and 100% of the study participants had elevated post prandial blood sugar levels. 93.33% of

The study participants had diabetic HbA1c status. 36.66% of the study participants had elevated total leucocyte count. 100%

Of the study participants had acidic pH in ABG analysis. 96.66% of the study participants had albumin present in the

Urine examination. 46.66% of the study participants were on room air. 63.33% of the study participants had NS 0.9% fluid prescribed. 80% of the study participants were consuming oral diet. 80% of the study participants had Antibiotics prescribed.

83.33% of the study participants were on rapid acting insulin. Etc.

IV.3 Treatment outcome of the study participants.

The present study findings regarding treatment outcome of the patients diagnosed with diabetic ketoacidosis reveals that, 53.33% of the study participants needed less than 48 hours for the resolution of the ketoacidosis, followed by 36.66%

Of the study participants needed 3-7 days for resolution and 10% of the study participants needed more than 7 days

For the resolution of the ketoacidosis. 63.33% of the study participants had 5-10 days of hospital stay, followed

By 33.33% of the study participants had less than 5 days of hospital stay and 3.33% of the study participants had

More than 10 days of hospital stay. 83.33% of the study participants had good recovery, followed by 6.66% of the Study participants were DAMA discharged and 6.66% of the study participants were expired, followed by 3.33% of the study participants referred to the higher Centre and no study participants were given DOPR discharge.

Conclusion

The present study conducted to study the clinical characteristics and treatment outcome of the patient diagnosed With diabetic ketoacidosis. The study findings highlighted important clinical characteristics of the diabetic Ketoacidosis and good recovery of the patients was observed as an outcome of the treatment.

Declaration by Authors

Ethical approval: The present study was approved by the Institutional Ethics Committee of Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing of Pravara Institute of Medical Sciences (DU), Loni. [Ref. No. PIMS/SSEVPCON/2023/11)]

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