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Research Article

**STUDY TO KNOW THE VARIOUS PRECIPITATING
FACTORS RESPONSIBLE FOR DIABETIC KETOACIDOSIS**¹Dr. Anam Riaz, ²Dr. Mansoor Latif, ³Dr. Saqib Ali¹ WMO, RHC Harappa² RHC Sankhatra Tehsil Zafarwal District Narowal³ RHC Sankhatra Tehsil Zafarwal District Narowal**Abstract:**

Objective: To determine the different precipitating factors of diabetic ketoacidosis.

Study Design: An observational study.

Place and Duration: In the Medicine Unit II of Services Hospital Lahore for Six months duration from March 2018 to August 2018.

Methods: According to appropriate sampling, patients and their families were selected for the interview. The data were collected in a specially designed format. Fifty patients were included in the study and proforma was completed from each patient. All patients were evaluated with various blood tests, urinalysis, ECG and chest radiographs. Data analysis was computer based done on SPSS 17.

Results: The mean age was 31.3 years. 60% of the patients were male. Diabetes mellitus was recently diagnosed in 22% of patients. Vomiting was present in 44% of patients and conscious awareness was observed in 42% of patients. The mean blood glucose level was 509 mg / dl (380-698 mg / dl). The mean value of the arterial pH was 7.05 (6.9-7.2). Infection (56%) and incompatibility with insulin (38%) were the most frequent triggers. There was also weak information about the disease, treatment and follow-up.

Conclusion: Although the non-compliance with infection and anti-diabetic therapy are the main factors of DK, information about the education of the disease and early detection of complications should be given.

Key words: Diabetic ketoacidosis, precipitating factors.

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INTRODUCTION:

Demographic data, especially in obese women with a family history have shown that the prevalence of diabetes is increasing in Pakistani population. Diabetic complications are an important cause of mortality and morbidity round the globe. Diabetic ketoacidosis is a serious and potentially lethal metabolic complication of diabetes mellitus. In developed countries, the average mortality rate is 5-10% and the numbers are higher in Pakistan. Therefore, the purpose of this study is to provide local statistical data to give an idea of the problem and to compare it with international data.

PATIENTS AND METHODS:

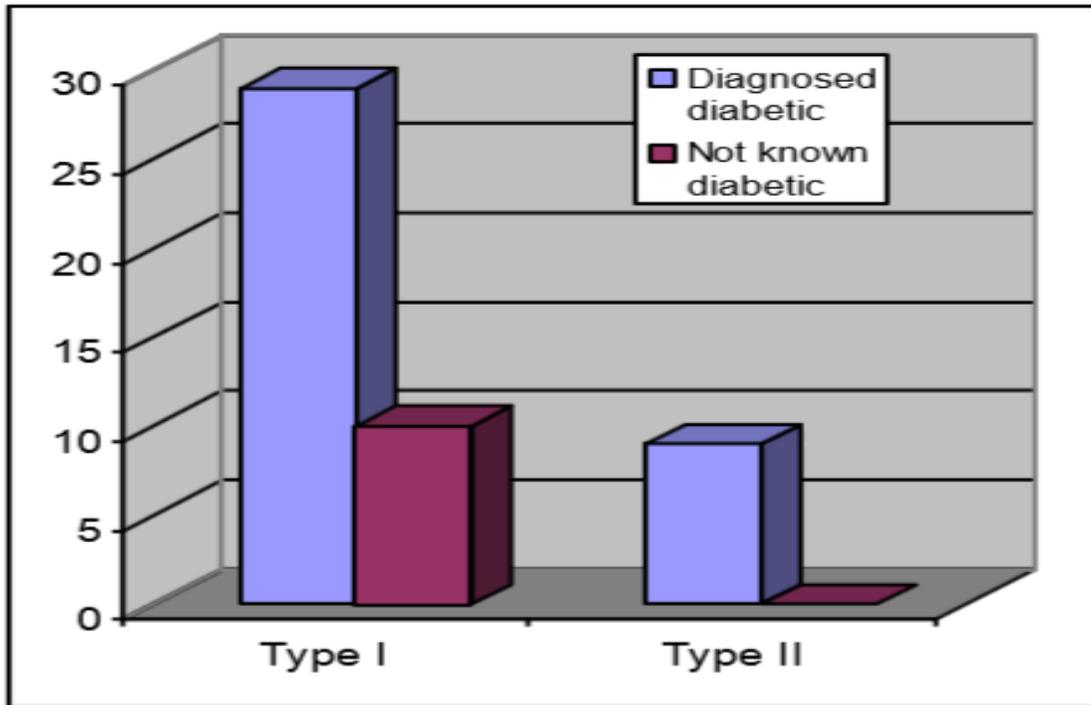
This observational study was conducted in the Medicine Unit II of Services Hospital Lahore for Six months duration from March 2018 to August 2018. The type of sampling was found appropriate. All patients or their relatives were interviewed and the data were entered in a specially designed form. Diabetic ketoacidosis was diagnosed in the first presentation or previously diagnosed as insulin-dependent diabetes mellitus and non-insulin dependent diabetes mellitus. Patients were excluded with chronic renal failure, lactic acidosis, drug intoxication, alcoholic ketosis, hyperosmolar non-

ketotic coma. The diagnostic criteria used for DKA are hyperglycemia (random) > 250 mg / dl, arterial pH <7.3 and positive urinary ketones or had a history of respiratory tract infection, cough, fever, leukocytosis > 10000 / cm cough and a history of radiological findings, if any urinary tract infection or lower abdominal pain with fever was noted, complete urine test with having > 5 pus cell and on CBC having leukocytosis > 10,000 / cm done and shows strong evidence of infection. Data were analyzed by the computer. SPSS 10 was used for this purpose.

RESULTS:

A total of 50 patients visited the Services Hospital Lahore. The mean age of these patients was 15.64 to 31.30(13-72). Of these, 30 (60%) were male and 20 (40%) were female. Abdominal pain was present in 24 (48%) patients. Vomiting was present in 22 (44%) patients. The level of consciousness was modified in 21 (42%) patients. The mean temperature of these patients was 101.45 (98-103 F). Infection was seen in 28 (56%) patients. The mean blood glucose level was 509.88 with difference of 65.61(380- 698). The average pH was 7.05 with range up to 6.9-7.2 and maximum 9.65. Of the patients, 39 (78%) were diagnosed with diabetes and 11 (22%) showed diabetic ketoacidosis for the first time (Fig. 1).

Graph 1: Frequency of first presentation with DKA in type 1 and type 2 diabetes



The level of knowledge about the disease and the level of health education were very poor in most patients. Type 1 diabetes mellitus in 40 (80%) patients and type 2 diabetes mellitus in 10 (20%) patients. The mean blood glucose level was 517 with range from 380-698. Urinary ketones were +++ in 18 (45%) patients +++++ and in 17 (42.5%) patients and ++ in 5 (12.5%) patients. The average pH was 7.04-9.79. The mean serum sodium was 135 ranges from 128-149. The mean serum potassium was 3.58 with difference of 0.4 (3-5). The mean hemoglobin was 11.38 with difference of 1.65 (8-14.2). The mean total leukocyte count was 9112 with difference of 2757 (5400-14000). The mean serum bilirubin was 0.7 ranges 0.5-1.1. The mean of SGPT was 29 (14-48). The mean blood urea was 36.75 (20-88). The mean serum creatinine was 0.84 ranges 0.5-2. Respiratory tract infection was detected in 11 (27%) patients. There was no significant abnormality in these patients. Urine sugar was + in 3 (7%) patients, ++ in 15 (37%) and +++ in 22 (55%) patients. 9 patients (22%) were diagnosed with urinary tract infection. Insulin was not recommended in 9 (22%) patients because of Quack's recommendation, (10%) of the subjects left insulin and 4 (10%) and 4 were incorrectly converted to tablets. 8 (20%) patients accidentally left insulin therapy. Poor storage was observed in 5 (12%) patients and 11 (27%) patients received inadequate doses.

Graph 2: Frequency of various parameters responsible for poor insulin compliance

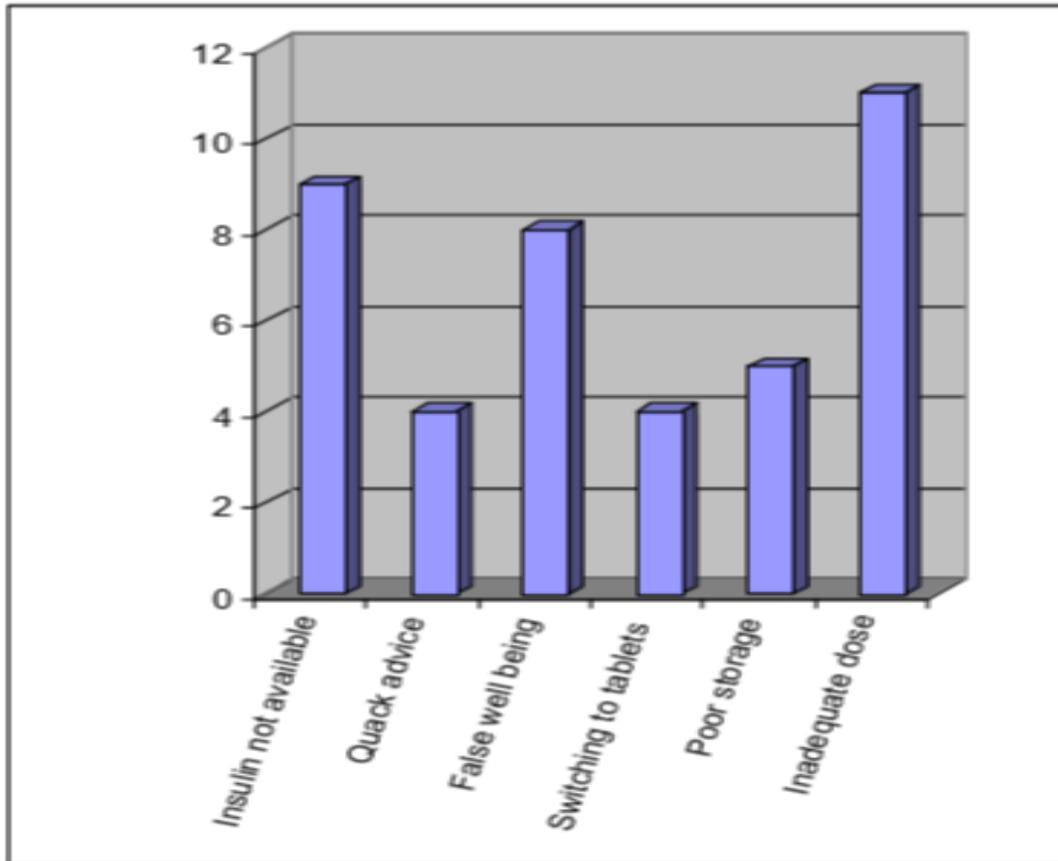
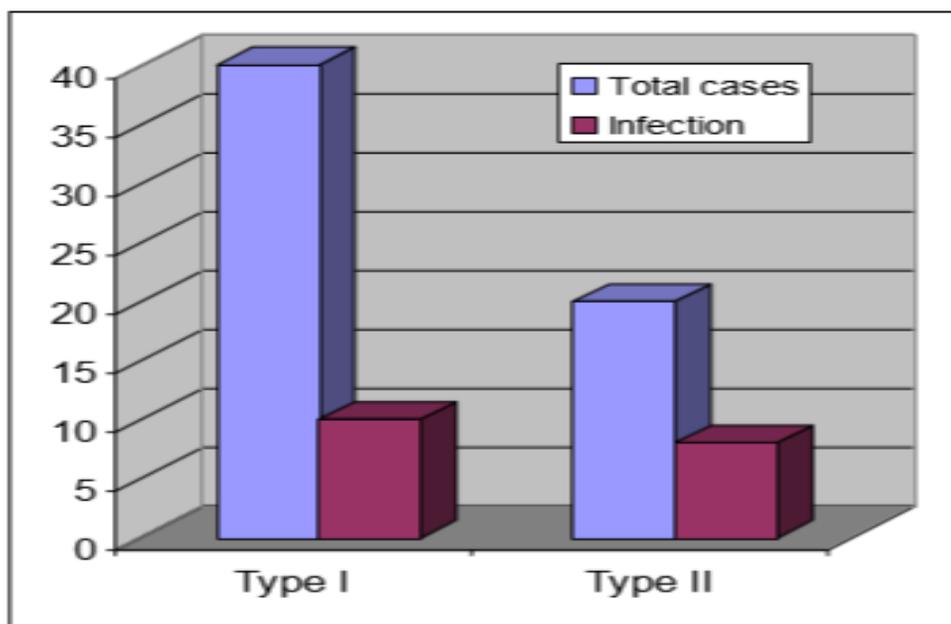


Figure 2 shows the various parameters of poor insulin compatibility. In subjects of poor compliance the Infection was present in 20 (50%) patients. Infection evidence was observed in 12 (30%) patients with low insulin compatibility. In 9 (22%) patients, multiple compatibility parameters were observed with weak insulin. In 5 (50%) of patients with type 2 diabetes, compliance with the drugs was not detected and the mean blood glucose level was 481.1 (415-535) in these patients. The mean serum sodium was 137.7 (129-149), mean serum potassium was 3.53 (3-5). The mean hemoglobin was 11.38.75 (8-13). The mean total leukocyte count was 10890 2486.1 (5800-14000). The mean serum bilirubin was 0.84 (0.6-1.1). The mean of SGPT was 32.8 8.65 (22-54). The mean blood urea was 54 rages from 30-94. The mean serum creatinine was 1.38 ranges from 0.9-2.3. The average pH was 7.05 (6.9 - 7.2). Urinary ketones were present in 3 (30%) ++ , in (5) patients +++ (50%), and ++++ in 2 (20%) patients. Respiratory tract infection was diagnosed in 3 (30%) patients. ECG showed no significant abnormalities in any patient. Urinary tract infection was detected in 5 (50%) patients. 8 (80%) patients had infection (Graph 3).

Graph 3: Frequency of infection in type 1 and type 2 diabetes



In 4 (40%) patients, incompatibility of drugs with symptoms of infection was observed.

DISCUSSION:

Various studies have been carried out on this subject with variable results in different regions of the world. The methods used to evaluate precipitating factors were also different. The age of our group ranged from 13 to 72 (mean 31.3-15.64). An international study was conducted by Qari et al. (22.5 years). Thirty patients (60%) were male. A similar trend was observed in some other studies. Gómez et al. Reported that 52% of 7 males, Yu et al., 8 accounted for 56% of males, and Qari et al constituted 58% of male patients. In our study, 11 (22%) patients were diagnosed as newly diagnosed diabetes mellitus, and this was reported by Rajasoorya et al. (18%) and Smith et al. (27%). In our study, 22 (44%) patients had vomiting and 24 (48%) patients had abdominal pain. Rajasoorya et al. 52% reported vomiting and 18% reported abdominal pain. In our study, the level of consciousness was changed in 21 (42%) patients, a higher rate (61%), and Akhter et al. (12%) reported change rate. In our study, the mean blood glucose level was 509.88 (380-698). Akhter et al. Reported an average blood glucose level of 624. Rajasoorya et al. reported 633 (351-1200) an average blood glucose level. The average pH of our study was 7.05 (6.9-

7.2). Similarly, Akhter et al reported an average pH of 7.09. In our study, the most common factor responsible for diabetic ketoacidosis was 56% Urinary tract infection and diagnosed in 11 (27%) patients with type 1 diabetes, 3 (30%) patients with type 2 diabetes and 9 (22%) patients with type 1 diabetes. Fifty (50%) patients with type 2 diabetes mellitus were enrolled in the study. Other studies reported similar findings. Akhter et al. He reported that the most common precipitating factor was infection (45.2%). Rajasoorya et al. (9) reported that infection (52%), especially the urogenital system, was the main trigger of diabetic ketoacidosis. Yu et al. It was reported that infection was the most common (63%) in patients over 40 years of age. Gómez et al. 41% reported an infection. In their study, Qari et al reported that the infection was the second most common acceleration factor (28%). The possible explanation of this difference may be the inadequate living conditions of the population and health facilities in comparison to the living standards of the Pakistan and health facilities. Chaudry and colleagues stressed the need for health education and the establishment of diabetes clinics in Pakistan.

CONCLUSION:

Drugs in our diabetic population due to its poor compliance is the main triggering factors of diabetic ketoacidosis. The lack of information about the disease and the low education level for health is a major concern among diabetics. Therefore, more attention should be given to diabetic health education with pharmacological treatment.

REFERENCES:

- KARAJGIKAR, NEHA, AMY DONIHI, ROSE A. SALATA, RONALD CODARIO, RUNA ACHARYA, POOJA MANROA, and MARY T. KORYTKOWSKI. "Risk Factors for Hospital Readmission following Implementation of a Diabetic Ketoacidosis (DKA) Power Plan." (2018): 1279-P.
- Wolfsdorf, Joseph I., Nicole Glaser, Michael Agus, Maria Fritsch, Ragnar Hanas, Arleta Rewers, Mark A. Sperling, and Ethel Codner. "Diabetic Ketoacidosis and Hyperglycemic Hyperosmolar State: A Consensus Statement from the International Society for Pediatric and Adolescent Diabetes." *Pediatric diabetes* (2018).
- Akturk, Halis K., Daniel D. Taylor, Ulas M. Camsari, Amanda Rewers, Gregory L. Kinney, and Viral N. Shah. "Association Between Cannabis Use and Risk for Diabetic Ketoacidosis in Adults With Type 1 Diabetes." *JAMA internal medicine* (2018).
- Finn, Bryan P., Claire Power, Niamh McSweeney, Dorothy Breen, Gerald Wyse, and Susan M. O'Connell. "Subarachnoid and parenchymal haemorrhages as a complication of severe diabetic ketoacidosis in a preadolescent with new onset type 1 diabetes." *Pediatric diabetes* (2018).
- Hoshina, Sari, Gregers S. Andersen, Marit E. Jørgensen, Martin Ridderstråle, Dorte Vistisen, and Henrik U. Andersen. "Treatment Modality-Dependent Risk of Diabetic Ketoacidosis in Patients with Type 1 Diabetes: Danish Adult Diabetes Database Study." *Diabetes technology & therapeutics* 20, no. 3 (2018): 229-234.
- Krishnan, Rekha, Sheeja Sugunan, S. Bindusha, and P. G. Hariprasad. "Clinical profile of children with diabetic ketoacidosis and related cerebral edema in a tertiary care hospital from Southern Kerala." *Indian Journal of Child Health* 5, no. 2 (2018): 73-79.
- Lau, Aaron, Simon Bruce, Erica Wang, Ron Ree, Kevin Rondi, and Anthony Chau. "Perioperative implications of sodium-glucose cotransporter-2 inhibitors: a case series of euglycemic diabetic ketoacidosis in three patients after cardiac surgery." *Canadian Journal of Anesthesia/Journal canadien d'anesthésie* 65, no. 2 (2018): 188-193.
- Zhong, Victor W., Juhaeri Juhaeri, and Elizabeth J. Mayer-Davis. "Trends in Hospital Admission for Diabetic Ketoacidosis in Adults With Type 1 and Type 2 Diabetes in England, 1998–2013: A Retrospective Cohort Study." *Diabetes care* (2018): dc171583.
- Sharma, Purva V., Yash B. Jobanputra, Karen Lewin, Stuart Bagatell, and Daniel M. Lichtstein. "Diabetic ketoacidosis in patients with type 2 diabetes on sodium-glucose cotransporter-2 inhibitors-a case series." *Reviews on recent clinical trials* 13, no. 2 (2018): 156-160.
- Jaffe, Anat, Naomi Dafni, and Galith Haran. "Diabetic ketoacidosis among SGLT2i-treated patients: insight from a single medical center located in the region with the highest diabetes mellitus mortality rate in Israel." In *20th European Congress of Endocrinology*, vol. 56. BioScientifica, 2018.
- Lee, Melissa H., Genevieve L. Calder, John D. Santamaria, and Richard J. MacIsaac. "Diabetic ketoacidosis in adult patients: an audit of factors influencing time to normalisation of metabolic parameters." *Internal medicine journal* 48, no. 5 (2018): 529-534.
- Idrees S, Gupta S, Mantilla M, Goyal P, Hulinsky I. Unusual cause of severe diabetic ketoacidosis precipitated by *Streptococcus bovis/equinus* (SBSEC) bacteremia: Case report and review of literature. *IDCases*. 2018 Jan 1;11:53-5.
- Desai, Dimpi, Dhruv Mehta, Priyanka Mathias, Gopal Menon, and Ulrich K. Schubart. "Health Care Utilization and Burden of Diabetic Ketoacidosis in the US Over the Past Decade: A Nationwide Analysis." *Diabetes care* (2018): dc171379.
- Sood, Monica, Barbara Simon, Kathleen F.

- Ryan, and Marcus Zebrower. "Euglycemic diabetic ketoacidosis with SGLT2 inhibitor use in a patient on the Atkins diet: a unique presentation of a known side effect." *AACE Clinical Case Reports* 4, no. 2 (2018): e104-e107.
15. Patoulis, D., A. Manafis, C. Mitas, K. Avranas, G. Lales, I. Zografou, C. Sambanis, and A. Karagiannis. "Sodium-glucose cotransporter 2 inhibitors and the risk of diabetic ketoacidosis; from pathophysiology to clinical practice." *Cardiovascular & hematological disorders drug targets* (2018).