Ngr. Jr. Med. Sc. vol-2, issue-5 (May-2026) pp-138-143

ISSN: 3139-5309 (Online)

Nexus Global Research Journal of Medical Sciences

Journal Homepage: https://nexusglobalresearch.com/index.php/ngrjms

Research Article:

Prevalence and Pattern of Short-Term Complications of Diabetes Mellitus in South-Eastern Nigeria: A Multicenter Cross-Sectional Study

Ugwo Kelechi Caminus[1], Eberendu[2], Izuchukwu Francis[3]

[1-3]Department of Public Health Science, Faculty of Health Sciences, Imo State University, Owerri, Nigeria

ABSTRACT:

Acute complications of diabetes mellitus are substantial causes of emergency presentations, hospitalisation and unnecessary mortality, especially in areas where access to key medicines, glucose monitoring and structured self-management support may be limited. This study examined the prevalence and pattern of acute complications among persons with diabetes that were receiving care in selected health institutions across South-Eastern Nigeria. A multicentre descriptive cross sectional study was carried out among 640 persons with physician diagnosed diabetes mellitus attending chosen health facilities across the five states of South-Eastern Nigeria. Participants were recruited through a multistage sampling technique. Data were obtained using an interviewer-administered questionnaire, a clinical assessment checklist and medical record review. The immediate consequences investigated were diabetic ketoacidosis (DKA), hyperosmolar hyperglycaemic state (HHS) and severe hypoglycaemia Frequencies, percentages and 95% confidence intervals (CIs) were determined to characterise the prevalence and distribution of complications. Overall, 239 out of 640 patients had at least one acute diabetic complication, which corresponded to a prevalence of 37.3% (95% CI: 33.7–41.2). The most common consequence was diabetic ketoacidosis, recorded in 117 patients (18.3%), followed by severe hypoglycaemia (82, 12.8%) and HHS (40, 6.2%). DKA, severe hypoglycaemia and HHS were 49.0%, 34.3% and 16.7% respectively among patients with at least one acute consequence. It was 38.6% in females and 35.7% in males. The highest prevalence by type of facility was observed among people visiting secondary hospitals (45.0%) followed by tertiary hospitals (34.8%) and private clinics (31.7%). In this study, more than a third of individuals with diabetes had at least one acute diabetes complication, with DKA accounting for roughly half of the acute episodes documented. The findings underscore the need for enhanced diabetes care through patient education, consistent medication supply, regular glucose monitoring, early recognition of warning symptoms and improved facility readiness to address acute metabolic emergencies without delay.

Keyword: Diabetes Mellitus; Diabetic Ketoacidosis; Severe Hypoglycaemia; Hyperosmolar Hyperglycaemic State; Acute Complications; Nigeria.

Citation: Ugwo, K. C., Eberendu, & Izuchukwu, F. (2026). Prevalence and pattern of short-term complications of diabetes mellitus in South-Eastern Nigeria: A multicenter cross-sectional study. *Nexus Global Research Journal of Medical Sciences, 2*(5), 127–137.

INTRODUCTION

Diabetes mellitus is a large and growing public health problem globally with important implications for morbidity, death, quality of life, and healthcare costs. The increasing incidence of diabetes has also intensified the global burden of acute and chronic complications, especially in low- and middle-income countries where ongoing surveillance of the disease and comprehensive diabetic care is still out of reach. In 2021, the International Diabetes Federation estimated that 537 million persons aged 20–79 years were living with diabetes worldwide, with over three-quarters in low- and middle-income countries [1]. The growing burden of diabetes coupled with population ageing, urbanisation, bad dietary patterns, physical inactivity and increased obesity is predicted to increase the pressure on already strained health systems.

The situation with diabetes in sub-Saharan Africa is particularly difficult. The region is in an epidemiological shift with increasing non-communicable diseases coupled with the continuing infectious disease burden . Late diagnosis, lack of access to necessary drugs, high out-of-pocket expenditure on healthcare, restricted laboratory and glucose monitoring facilities, dearth of specialised services and irregular follow-up often impair diabetes management. These problems may compromise efficient glycaemic management and raise the risk of acute metabolic crises [2]. Late presentation with significant metabolic abnormalities may also occur due to poor knowledge of diabetes signs and symptoms. Thus, acute complications continue to be substantial contributors to emergency health care utilisation and potentially preventable mortality among persons with diabetes.

***Corresponding Author:** Ugwo Kelechi Caminus

Received: 26 Mar 2026 | **Accepted:** 26 April 2026 | **Published:** 02 May 2026

Copyright © 2026 The Author(s): This work is licensed under a Creative Commons Attribution- Non-Commercial-No Derivatives 4.0 (CC BY-NC-ND 4.0) International License

Acute or short term consequences of diabetes are due to substantial disruptions of glucose and metabolic balance and can rapidly develop to life threatening situations. Diabetic ketoacidosis (DKA) is defined as a triad of insulin insufficiency, hyperglycemia, and increased ketone generation leading to metabolic acidosis. DKA is classically linked with type 1 diabetes, but can occur in type 2 diabetes, especially in the setting of severe illness, infection, insulin insufficiency, treatment discontinuation or other physiologic stress. DKA requires fast identification and proper fluid, electrolyte and insulin therapy as delayed treatment can lead to brain problems, circulatory collapse, coma and death [3].

Another serious acute metabolic consequence is hyperosmolar hyperglycaemic condition (HHS). It is characterised by severe hyperglycaemia, increased plasma osmolality, substantial dehydration and varied degrees of alteration in mental status, usually with little and absent major ketoacidosis. HHS is especially relevant among older adults and persons with type 2 diabetes and may be precipitated by infection, low fluid intake, medication interruption, or other acute diseases. Delayed detection can result in severe dehydration, electrolyte problems, thrombotic events, neurological impairment, and death[4], with its clinical presentation that may take time to develop and overlap with other illnesses.

The other extreme of acute glucose dysregulation is severe hypoglycaemia, which happens when blood glucose is low enough to influence cognitive or physical functioning and the individual requires aid from another person to recover. It may be caused by insulin or glucose-lowering medicine, poor meal intake, extended physical exercise, alcohol intake, renal dysfunction or improper adjustment of therapy. Severe hypoglycaemia can lead to confusion, loss of consciousness, seizures, accidents, brain impairment and death. Frequent episodes can also erode patients' trust in diabetes treatment and lead to dread of hypoglycaemia and sub-optimal glycaemic management[5].

Several putative modifiable routes are shared in DKA, HHS and severe hypoglycaemia despite variations in their underlying causes. They may be caused by treatment cessation, poor access to drugs, poor adherence, poor glucose monitoring, intercurrent infections, poor patient education, delayed notice of warning symptoms and barriers to emergency care. In resource-constrained settings, vulnerabilities at different stages of diabetes management can lead to increased susceptibility to acute metabolic emergencies [6]. Therefore, the enhancement of patient self-management education, the continuity of critical medicines, the access to glucose-monitoring devices and the development of effective early-warning and referral systems are important parts of the prevention of acute complications [7].

The increasing burden of diabetes in Nigeria poses a serious challenge to health care delivery. The prevalence of diabetes and its chronic complications is well known, however research on acute diabetes complications is still rather fragmented. Many of the existing papers are based on single hospital experience, retrospective assessments, or selected populations admitted with a particular metabolic emergency. Such studies may provide valuable clinical information but may not be able to fully reflect the overall incidence or relative distribution of DKA, HHS and severe hypoglycaemia in the general adult population on standard diabetic care. Additionally, differences in access to health care, facility capacity, socio-economic status, length of disease, treatment approaches and patient education may affect the incidence and identification of acute complications in different health care settings [8].

South-Eastern Nigeria provides an essential location to investigate these issues because the region encompasses a wide range of urban, semi-urban and rural people and a mix of private, secondary and tertiary healthcare facilities. A multicentre assessment may provide a more complete picture than a single center study and may reflect differences in the occurrence of acute complications across levels of healthcare delivery. Estimates of the proportional contribution of DKA, HHS and severe hypoglycaemia are vital to inform the design of effective preventative interventions and ensure that healthcare facilities have the capacity to identify and manage these emergencies promptly[9].

Reliable information about how often acute diabetic complications occur and the pattern of their occurrence can improve clinical decision-making, patient education, emergency preparedness and health-system planning. The most common acute consequences can also help health providers target preventative initiatives, referral channels, and the availability of necessary drugs, glucose-monitoring devices, and emergency management protocols. Furthermore, regional data may serve as a basis for future longitudinal studies on determinants, recurrence, outcomes, and economic implications of acute emergencies associated to diabetes[10].

Thus, this study determined the frequency and pattern of short term consequences of diabetes mellitus among people getting care in selected health institutions in the five states of South-Eastern Nigeria . In particular it looked at the incidence and distribution of diabetic ketoacidosis, hyperosmolar hyperglycaemic condition and severe hypoglycaemia in individuals with diabetes. The findings are likely to give evidence for boosting preventive diabetes services, improving early

recognition of acute metabolic problems and preparing for their prompt management in South-Eastern Nigeria.

Materials and Methods

Study Design and Setting

This multicentre descriptive cross-sectional study was conducted in selected health facilities across South-Eastern Nigeria. The South-Eastern geopolitical zone comprises five states: Abia, Anambra, Ebonyi, Enugu, and Imo. The region encompasses urban, semi-urban, and rural populations and has a mixed healthcare delivery system comprising public tertiary and secondary hospitals and private healthcare facilities. Diabetes care is provided across these levels of healthcare, with patients requiring more specialized investigation or management commonly referred to higher-level facilities.

Study Population and Eligibility Criteria

The study population comprised adults aged 18 years and above with a physician-confirmed diagnosis of diabetes mellitus who were receiving care at the participating facilities during the study period and provided informed consent. Both type 1 and type 2 diabetes mellitus were included.

Patients with gestational diabetes, unconfirmed diabetes, inability to participate because of inadequate clinical information, or incomplete or inaccessible medical records necessary for ascertainment of acute complications were excluded from the study.

Sample Size and Sampling Procedure

The minimum sample size was estimated using the Leslie Kish formula for a single population proportion. Assuming a prevalence of 50%, a 95% confidence level, and a 5% margin of error, the initial sample size was estimated at 384 participants. To account for clustering associated with the multicentre sampling design, a design effect of 1.5 was applied, resulting in a sample size of 576. Allowing for a 10% non-response rate increased the required sample to approximately 640 participants.

A multistage sampling procedure was employed. Health facilities with functional diabetes-care services were identified and selected across the five states. The selected facilities represented different levels of healthcare delivery. The required sample was allocated to participating facilities according to the predetermined sampling plan. Within each facility, eligible adults attending diabetes clinics were recruited using systematic random sampling until the allocated sample size was reached.

Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee of Imo State University and, where applicable, the relevant authorities of the participating health facilities. Written informed consent was obtained from all participants before enrolment.

Participation was voluntary, and participants' confidentiality was maintained throughout the study. Questionnaires and study records were coded using unique identifiers rather than personal names. Data were stored securely and were accessible only to authorized members of the research team. Findings were presented in aggregate form to ensure that individual participants could not be identified.

Data Collection

Data were collected using a structured interviewer-administered questionnaire and a clinical assessment checklist. The instruments captured sociodemographic characteristics, diabetes type and duration, treatment history, comorbidities, relevant lifestyle characteristics, and history of acute diabetes complications.

Participants' medical records were reviewed, where available, to corroborate reported diagnoses and clinical information. Relevant clinical documentation was used to improve the accuracy of ascertainment of acute diabetes complications.

Statistical Analysis

Data were coded, entered, cleaned, and analysed using IBM SPSS Statistics version 25. Categorical variables were summarized using frequencies and percentages. The overall prevalence of short-term diabetes complications and the distribution of individual complication types were calculated.

Prevalence estimates were presented with corresponding 95% confidence intervals (CIs). Wilson score intervals were calculated from the reported numerator and denominator counts. Subgroup prevalence estimates were calculated using the appropriate subgroup totals as denominators.

The distribution of acute complications was also described according to sex and facility type. Because the available tables for the primary descriptive analysis did not provide inferential statistical test results, subgroup comparisons were interpreted descriptively. No claims of statistically significant associations were made in the absence of appropriate inferential testing. Statistical significance was therefore not assigned to observed differences in subgroup prevalence.

Results

Prevalence and pattern of short-term complications

Of the 640 participants, 239 had at least one short-term complication, corresponding to a prevalence of 37.3% (95% CI: 33.7-41.2). DKA affected 117 participants (18.3%), severe hypoglycaemia affected 82 (12.8%) and HHS affected 40 (6.2%). Among the 239

affected participants, DKA accounted for 49.0% of events, severe hypoglycaemia for 34.3% and HHS for 16.7%.

Short-term complication	Frequency (N=640)	Prevalence, %	95% CI, %	Share among affected, %
None	401	62.7	58.8-66.3	Not applicable
Diabetic ketoacidosis	117	18.3	15.5-21.5	49.0
Severe hypoglycaemia	82	12.8	10.4-15.6	34.3
Hyperosmolar hyperglycaemic state	40	6.2	4.6-8.4	16.7
Any short-term complication	239	37.3	33.7-41.2	100.0

Distribution by participant and service characteristics

Females accounted for 140 acute complications and males for 99. Relative to the sex-specific totals, the prevalence was 38.6% among females and 35.7% among males. Prevalence was similar in participants aged 40-59 years and those aged 60 years or older (37.9% in each group), compared with 35.2% among participants aged 18-39 years. Secondary hospitals recorded the highest descriptive prevalence (45.0%). Type 1 diabetes had a higher observed prevalence of acute complications than type 2 diabetes (46.2% versus 35.8%). These comparisons are descriptive.

Characteristic	Subgroup total	DKA	HHS	Severe hypoglycaemia	Any acute complication, n (%)
Sex: Female	363	70	22	48	140 (38.6)
Sex: Male	277	47	18	34	99 (35.7)
Age: 18-39 years	125	26	7	11	44 (35.2)
Age: 40-59 years	280	47	20	39	106 (37.9)
Age: >=60 years	235	44	13	32	89 (37.9)
Facility: Private clinic	139	23	5	16	44 (31.7)
Facility: Secondary hospital	202	45	10	36	91 (45.0)
Facility: Tertiary hospital	299	49	25	30	104 (34.8)
Diabetes type: Type 1	93	20	7	16	43 (46.2)
Diabetes type: Type 2	547	97	33	66	196 (35.8)

DISCUSSION

This study revealed that 37.3% of persons receiving diabetes care at selected health institutions in South-Eastern Nigeria had a documented acute complication. This finding suggests a substantial burden of acute diabetes-related morbidity in the studied population. In actuality, almost a third had experienced diabetic ketoacidosis (DKA), severe hypoglycaemia or hyperosmolar hyperglycaemic syndrome (HHS). This has therapeutic relevance as acute consequences of diabetes may lead to emergency presentations, hospital hospitalisations, disability and potentially preventable mortality. There may also be challenges in glycaemic monitoring, continuity of medication use, sick-day management, detection of early warning symptoms and access to appropriate health treatment contributing to the reported burden[11]. However, due to the cross-sectional and facility-based study design, the results should be interpreted as the burden among participants receiving care and not as a population-based estimate or proof of causation.

DKA was the most common acute occurrence, being documented in 18.3% of the whole study group and almost one half of those with an acute condition. The predominance of DKA is of clinical importance as it is a major diabetes emergency that requires prompt recognition and management. Similar difficulties have been reported from sub-Saharan African settings where DKA remains an important contributor to morbidity in patients presenting to hospital . For example, data from Ghana have demonstrated that DKA continues to be of clinical importance in tertiary-care settings [12].The persistence of DKA in the region may be part of a larger picture of problems with insulin availability and adherence, infection, delayed diagnosis, poor sick day management and impediments to prompt access to health care [13]. However, the present study did not collect sufficient information about the immediate triggering circumstances of the individual DKA events. These factors can therefore be considered as a probable

explanation, although not confirmed to cause the observed cases [14].

The second most common acute incident recorded was severe hypoglycemia, which occurred in around one-third of people with an acute complication and 12.8% of the overall trial group. This finding highlights the necessity of combining glycaemic control with avoidance of treatment-related hypoglycaemia. Severe hypoglycemia may occur if the glucose lowering medicine is not correctly matched to meal intake, physical activity, renal function or other patient related factors. Prevention therefore requires individualised treatment regimens, adequate medication review, patient education and access to glucose monitoring. Patients and their family or carer should also be taught to detect early indicators of hypoglycaemia and how to respond appropriately. Severe hypoglycaemia should be a cue for a clinical review of medication, adherence, meal patterns and other potentially modifiable circumstances rather than just escalating or maintaining therapy without reconsideration [15].

HHS was the least reported of the three acute issues, occurring in 6.2% of patients. Its lower frequency does not decrease its therapeutic importance. HHS is associated with extreme hyperglycemia, deep dehydration and severe metabolic disturbance and may require urgent and intensive treatment. The inclusion of HHS in the research sample underscores the need to improve the capacity of diabetes treatment institutions to detect and manage various forms of acute metabolic decompensation. Appropriate preparation should include reliable access to point of care blood glucose testing, facilities for ketone assessment if required, intravenous fluids, insulin, electrolyte monitoring and timely therapy of underlying precipitating illnesses [16].

The subgroup distributions are useful operational information but must be evaluated with caution. All demographics and facility types were acutely affected, showing that the problem was not confined to a single patient population or quality of healthcare. Secondary hospitals have the biggest share particular to an institution. This pattern may reflect differences in case mix, referral systems, severity at presentation and patterns of healthcare usage rather than a fundamental difference in quality of service between types of institution. Likewise, the proportion of acute complications was higher in type 1 diabetes, but the absolute number of acute events was higher in type 2 diabetes patients because type 2 diabetes constituted a larger proportion of the research population[17]. These results stress the need of distinguishing between subgroup share and absolute share of the total burden. This study was descriptive and did not involve inferential testing or multivariable adjustment, and hence the differences between subgroups should not be interpreted as independent effects or predictors of acute complications [18].

These studies suggest that the prevention of acute diabetic complications requires consideration of the continuum of diabetes treatment, not merely the emergency therapy. Periodic review of glycaemic management, access to and compliance with medication, patient understanding of sick-day restrictions, dietary patterns and early warning signals may assist identify those at elevated risk. Enhancing the ability of diabetic clinics to deliver continuous education and early management may be particularly crucial in circumstances where late presentation and resource constraints may aggravate severe metabolic emergencies [19, 20].

CONCLUSION

Acute diabetes complications were common among patients receiving care in selected health facilities in South-Eastern Nigeria with 37.3% having a reported DKA, severe hypoglycaemia or HHS. The most commonly reported complication was DKA, followed by severe hypoglycaemia and HHS. The findings highlight the need to continue improving preventative diabetes care and emergency management capacity. Improvements in medication continuity, patient education, sick day management, glucose monitoring, early recognition of warning symptoms and timely referral across primary, secondary and tertiary levels of care may help to reduce preventable morbidity and mortality associated with acute diabetes emergencies.

REFERENCES

1. Fasanmade, O. A., Odeniyi, I. A., & Ogbera, A. O. (2008). Diabetic ketoacidosis: Diagnosis and management. *African Journal of Medicine and Medical Sciences, 37*(2), 99–105.
2. Haile, H. K., & Fenta, T. G. (2025). Magnitude, risk factors and economic impacts of diabetic emergencies in developing countries: A systematic review. *PLoS ONE, 20*(2), e0317653.
3. American Diabetes Association. (2014). Diagnosis and classification of diabetes mellitus. *Diabetes Care, 37*(Suppl. 1), S81–S90.
4. Chinenye, S., & Ogbera, A. O. (2013). Socio-cultural aspects of diabetes mellitus in Nigeria. *Journal of Social Health and Diabetes, 1*(1), 15–21.
5. Edo, A. E. (2012). Clinical profile and outcomes of adult patients with hyperglycemic emergencies managed at a tertiary care hospital in Nigeria. *Nigerian Journal of Clinical Practice, 15*(3), 323–327.

6. Hoxhaj, R., & Markley Webster, S. C. (2026). Glycemic emergencies: Diabetic ketoacidosis, hyperosmolar hyperglycemic state, and hypoglycemia. *Medical Clinics of North America, 110*(3), 445–465.
7. Amissah, I., Eghan, B., Sarfo-Kantanka, O., Yorke, E., Bani, S., & Oppong, M. (2019). The clinical profile and outcomes of patients with diabetic ketoacidosis at a tertiary hospital in Ghana. *BMC Endocrine Disorders, 19*, 39.
8. International Diabetes Federation. (2021). *IDF diabetes atlas* (10th ed.). International Diabetes Federation.
9. Mbanya, J. C., Motala, A. A., Sobngwi, E., Assah, F. K., & Enoru, S. T. (2010). Diabetes in sub-Saharan Africa. *The Lancet, 375*(9733), 2254–2266
10. Ogbera, A. O., Chinenye, S., Onyekwere, A., & Fasanmade, O. (2007). Prognostic indices of diabetes mortality. *Ethnicity & Disease, 17*(4), 721–725.
11. Excel, D. K., Chisom, O. A., Chinyere, E. T. D., Nwadikor, U. U., Nneka, O. I., & Ihuarulam, O. C. (2025). Microbial Analysis of Three-Leaf Yam (Dioscorea dumetorum): Microbiological Quality and Spoilage Dynamics During Storage. *IOASD Journal of Medical and Pharmaceutical Sciences, 2*(4), 161-164.
12. Anumah, F. O. (2007). Management of hyperglycaemic emergencies in the tropics. *Annals of African Medicine, 6*(2), 45–50.
13. Kitabchi, A. E., Umpierrez, G. E., Miles, J. M., & Fisher, J. N. (2009). Hyperglycemic crises in adult patients with diabetes. *Diabetes Care, 32*(7), 1335–1343.
14. Umpierrez, G. E., Korytkowski, M. (2016). Diabetic emergencies—ketoacidosis, hyperglycaemic hyperosmolar state and hypoglycaemia. *Nature Reviews Endocrinology, 12*, 222–232.
15. Otieno, C. F., Kayima, J. K., Omonge, E. O., & Oyoo, G. O. (2005). Diabetic ketoacidosis: Risk factors, mechanisms and management strategies in sub-Saharan Africa: A review. *East African Medical Journal, 82*(12 Suppl.), S197–S203.
16. Chittoria, R. K., & Siddu, C. (2025). Topical Vitamin D3 (Cholecalciferol) in Enhancing Recovery and Management of Thermal Burns. *IOASD Journal of Medical and Pharmaceutical Sciences, 2*(1), 20-21.
17. Atun, R., Davies, J. I., Gale, E. A. M., Bärnighausen, T., Beran, D., Kengne, A. P., Levitt, N. S., Mangugu, F. W., Nyirenda, M. J., Ogle, G. D., Ramaiya, K., Sewankambo, N. K., Sobngwi, E., Tesfaye, S., Yudkin, J. S., & Wild, S. H. (2017). Diabetes in sub-Saharan Africa: From clinical care to health policy. *The Lancet Diabetes & Endocrinology, 5*(8), 622–667.
18. Uloko, A. E., Musa, B. M., Ramalan, M. A., Gezawa, I. D., Puepet, F. H., Uloko, A. T., Borodo, M. M., & Sada, K. B. (2018). Prevalence and risk factors for diabetes mellitus in Nigeria: A systematic review and meta-analysis. *Diabetes Therapy, 9*(3), 1307–1316.
19. World Health Organization. (2016). *Global report on diabetes*. World Health Organization. Chaithongdi, N., Subauste, J. S., Koch, C. A., & Geraci, S. A. (2011). Diagnosis and management of hyperglycemic emergencies. *Hormones, 10*(4), 250–260. https://doi.org/10.14310/horm.2002.1316