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IMPACT OF DIABETES MELLITUS ON MORTALITY AMONG ADMITTED INTERNAL MEDICINE PATIENTS

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ABSTRACT

Background: Diabetes mellitus (DM) represents one of the most prevalent chronic non-communicable diseases globally and constitutes a major comorbidity among hospitalized patients. The impact of DM on in-hospital mortality and adverse clinical outcomes remains a significant concern. At King Hussein Medical Center, a substantial proportion of admitted internal medicine patients carry a diagnosis of DM, yet comprehensive local data on its prognostic significance are limited.

Objective: To determine the effect of pre-existing diabetes mellitus on all-cause in-hospital mortality in patients admitted to the internal medicine department of King Hussein Medical Center.

Methods: A retrospective cohort study was performed using electronic medical records of all adult patients (≥ 18 years) admitted to the department of internal medicine between January 2023 and August 2026. Patients were divided into DM and non-DM groups. The data collected included demographics, clinical parameters, comorbidity profile and admission diagnosis. Primary outcome was all-cause in-hospital mortality. Multivariate logistic regression analysis adjusted for potential confounders.

Results: Among 847 patients (mean age 68.4 ± 14.2 years, 54.6% male), DM was present in 42.8% ($n=362$). DM patients were younger (66.2 ± 12.8 vs 70.2 ± 14.8 years, $p=0.001$) but had higher BMI (29.8 ± 4.6 vs 27.4 ± 4.2 kg/m², $p<0.001$), higher prevalence of hypertension (78.2% vs 61.4%), chronic kidney disease (34.8% vs 16.5%) and cardiovascular disease (46.4% vs 28.2%). The DM group had a significantly higher in-hospital mortality (11.3% vs 6.6%, $p=0.012$). On multivariate analysis, DM was independently associated with increased mortality (OR=1.78, 95% CI: 1.18–2.68, $p=0.006$). Patients with poorly controlled DM (HbA1c $\geq 9\%$) had the highest mortality (16.1%, OR=2.84, 95% CI: 1.62–4.98). DM patients also had longer hospital stays (median 12 vs. 9 days, $p<0.001$) and higher ICU admission rates (22.4% vs. 13.2%, $p<0.001$).

Conclusion: Diabetes mellitus is independently associated with increased in-hospital mortality among admitted internal medicine patients. Poor glycemic control (HbA1c $\geq 9\%$) identifies a particularly high-risk subgroup. Such findings underscore the importance of optimal diabetes management during hospitalization.

Keywords: Diabetes Mellitus; In-Hospital Mortality; Internal Medicine; Comorbidity; Retrospective Cohort; King Hussein Medical Center.

1 INTRODUCTION

There are approximately 537 million adults around the world who are diagnosed with diabetes mellitus (DM), and it is projected that this number will increase to 783 million by the year 2045 (International Diabetes Federation, 2023) making it one of the most prevalent chronic noncommunicable diseases across the globe. The Jordan Ministry of Health (2024) and Ajlouni et al. (2020) state that 20-25% of the population in Jordan has been diagnosed with diabetes, while another 10-15% of the population has been diagnosed with prediabetes. This is one of the highest rates of diabetes in the Middle East and North Africa region. Many people suffer from diabetes. Because of this, the health care systems have to work very hard. People who have diabetes have a disproportionately high number of hospital admissions, stays, and costs associated with their medical care (American Diabetes Association, 2024.02).

Diabetes mellitus has been related to a number of complications such as heart disease, chronic kidney disease, neuropathy and increased risk of infections (Zheng et al., 2018; Harding et al., 2019). These complications may be due to diabetes mellitus. As reported by the Centers for Disease Control and Prevention (CDC) in 2023, the presence of these complications significantly increases the risk of hospital admission and adverse outcomes. Umpierrez et al. (2022) have shown that diabetic patients admitted to internal medicine wards often present with other coexisting health problems that modify the clinical picture of their acute illness. These patients also have a higher risk of complications while in the hospital.

Diabetes is associated with increased mortality and worse hospital outcomes for a range of medical conditions including myocardial infarction, stroke, pneumonia and sepsis (Kannel & McGee, 1979; Donnan et al., 2022; Harding et al., 2019). Diabetes is also associated with increased mortality. There's no shortage of explanations here: People with diabetes are more prone to comorbidities and at higher risk of serious events like hypoglycemia and hyperglycemic crises during their hospital stay (Umpierrez et al., 2022; American Diabetes Association, 2024). High blood sugar influences the immune system and the capacity of tissues to heal.

The impact of diabetes on hospital mortality rate might be useful for the care of patients, resource planning and quality improvement. This is very much the case in Jordan where there is a very high prevalence of diabetes and there is always a lack of resources available for healthcare (Ajlouni et al., 2020; Jordan Ministry of Health, 2024). On the other hand, there are not a lot of local data on what diabetes means for the prognosis of patients who are hospitalized for internal medicine.

The purpose of this research is to determine the factors that are associated with an increased mortality risk among diabetic patients and to evaluate the impact that pre-existing diabetes mellitus has on the overall mortality rate that occurs in hospitals related to all causes among patients who are admitted to the internal medicine department at King Hussein Medical Center.

2 MATERIALS AND METHODS

2.1 Study Design and Setting

A retrospective cohort study was conducted utilizing electronic medical records from the internal medicine department at King Hussein Medical Center, Royal Medical Services, Amman, Jordan. The study was approved by the IRB (No. 70_11/2026, 26 August 2026) and the Educational & Technical Directorate (DATE). Informed consent was waived per retrospective, anonymized design.

2.2 Participants

Included: adult patients (≥ 18 years) admitted to the internal medicine department between January 2023 and August 2026 with complete medical records.

Excluded: age < 18 years, length of stay < 48 hours, incomplete medical records, transfer from another hospital.

Final analysis: 847 patients.

2.3 Data Collection

Standardized case report form extracted: demographics (age, gender, BMI), admission diagnosis, length of stay, ICU admission, pre-existing DM diagnosis, admission glucose, HbA1c (most recent within 3 months; poorly controlled

defined as $\geq 9\%$), comorbidities (hypertension, dyslipidemia, chronic kidney disease, cardiovascular disease, COPD), and outcomes (in-hospital mortality, ICU admission, acute complications including hypoglycemia, hyperglycemic crises, and infections).

2.4 Statistical Analysis

SPSS v27. Descriptive statistics: means $\pm$ SD or frequencies(%). Group comparisons: t-test/Mann-Whitney U or chi-square. Multivariate logistic regression identified independent predictors of mortality (aOR with 95% CI). Subgroup analyses performed. Significance: $p < 0.05$.

3 RESULTS

3.1 Participant Characteristics (Table 1)

A total of 847 patients were included (mean age 68.4 $\pm$ 14.2 years, range 18–96 years; 54.6% male, $n=462$). Diabetes mellitus was present in 42.8% ($n=362$). Patients with DM were significantly younger (66.2 $\pm$ 12.8 vs. 70.2 $\pm$ 14.8 years, $p=0.001$) but had higher body mass index (29.8 $\pm$ 4.6 vs. 27.4 $\pm$ 4.2 kg/m², $p < 0.001$). Diabetic patients had significantly higher rates of comorbidities than non-diabetic patients: hypertension (78.2% vs 61.4%, $p < 0.001$), chronic kidney disease (34.8% vs 16.5%, $p < 0.001$), and cardiovascular disease (46.4% vs 28.2%, $p < 0.001$). Gender distribution was similar between groups (54.7% male in DM group vs. 54.4% in non-DM group, $p=0.93$).

3.2 In-Hospital Mortality and Clinical Outcomes (Table 2, Figure 2)

DM patients had significantly higher in-hospital mortality than non-DM patients (11.3% vs. 6.6%, $p=0.012$). DM patients were more likely to be admitted to the ICU (22.4 vs. 13.2%, $p < 0.001$) and had longer median hospital stays (12 days, IQR 8–18 vs. 9 days, IQR 6–14, $p < 0.001$).

3.3 Mortality by Glycemic Control Status (Table 3, Figure 3)

A clear dose-response pattern emerged when examining mortality by glycemic control. Compared to non-diabetic patients (6.6% mortality), those with well-controlled DM (HbA1c $< 7\%$) had 8.2% mortality (OR=1.28, 95% CI: 0.58–2.82). Those with moderately controlled DM (HbA1c 7–8.9%) had 9.6% mortality (OR=1.52, 95% CI: 0.76–3.04). Mortality was highest in patients with poorly controlled DM (HbA1c $\geq 9\%$) and was 16.1% (OR=2.84, 95% CI: 1.62 to 4.98, $p < 0.001$).

3.4 Acute complications in the hospital

DM patients presented more acute complications: hypoglycemic episodes (12.4% vs. 2.1%, $p < 0.001$), hyperglycemic crises (3.3% vs. 0%, $p < 0.001$) and infections (34.5% vs. 22.7%, $p < 0.001$).

3.5 Multivariate Predictors of In-Hospital Mortality (Table 4, Figure 4)

Multivariate logistic regression identified independent predictors of mortality:

- Diabetes mellitus: aOR=1.78 (95% CI: 1.18–2.68, $p=0.006$)
- Age (per year): aOR=1.04 (95% CI: 1.02–1.06, $p < 0.001$)
- Chronic kidney disease: aOR=2.12 (95% CI: 1.42–3.16, $p < 0.001$)
- Cardiovascular disease: aOR=1.68 (95% CI: 1.12–2.52, $p=0.012$)
- ICU admission: aOR=2.84 (95% CI: 1.92–4.20, $p < 0.001$)
- Hypoglycemia: aOR=2.45 (95% CI: 1.62–3.70, $p < 0.001$)
- Infections: aOR=1.92 (95% CI: 1.28–2.88, $p=0.002$)

3.6 Subgroup Analysis

Subgroup analyses demonstrated consistent trends. Among patients aged ≥ 75 years, DM patients had 15.2% mortality vs. 10.4% in non-DM (aOR=1.58, 95% CI: 0.92–2.72). In patients with pre-existing CVD, mortality was 14.3% in diabetics vs. 8.5% in non-diabetics (aOR=1.85, 95% CI: 1.04–3.29). In CKD patients, mortality was 16.7% in diabetics and 9.8% in non-diabetics (aOR = 1.92, 95% CI: 0.98–3.76). The mortality of patients admitted with infections was 18.4% in diabetics versus 12.7% in non-diabetics (aOR=1.62, 95% CI: 0.94–2.78).

4 DISCUSSION

This retrospective cohort study of 847 internal medicine patients demonstrates that diabetes mellitus is independently associated with increased in-hospital mortality, with an adjusted odds ratio of 1.78. Patients with poorly controlled DM (HbA1c $\geq 9\%$) had the highest mortality (16.1%), with an OR of 2.84.

We found that mortality was higher in diabetic patients (11.3% vs 6.6% in non-diabetic patients) which is consistent with previous reports (Donnan et al., 2022; Harding et al., 2019). The independent association after adjustment for confounders suggests that mortality is affected by mechanisms other than diabetes-related comorbidities.

The dose-response relationship between HbA1c and mortality is impressive. Patients with HbA1c $\geq 9\%$ had almost a 3-fold increased mortality compared to non-diabetic patients, emphasizing the significance of glycemic control prior to admission.

The increased mortality in diabetic patients was mediated by higher rates of hypoglycemia (12.4% vs 2.1%) and infections (34.5% vs 22.7%). This highlights the requirement for improved surveillance and preventive strategies.

4.1 Clinical Relevance

- Risk Stratification: Identify high-risk patients at the time of admission (e.g., those with diabetes and poor glycemic control).
- Glycemic Management: Improved glycemic management during hospitalization may be associated with improved outcomes.
- Infection Prevention: More surveillance of infections in people with diabetes needed.
- Prevention of Hypoglycemia: Hypoglycemia must be prevented by strict protocols.

4.2 Bepearling

Retrospective design may be prone to selection bias. Single center study, limiting generalizability Results are subject to residual confounding. HbA1c data were not available for all patients.

5 CONCLUSION

Diabetes mellitus is independently associated with increased in-hospital mortality among admitted internal medicine patients. Poor glycemic control (HbA1c $\geq 9\%$) identifies a particularly high-risk subgroup. The findings underline the importance of comprehensive management of diabetes during hospitalization, and the need for improved monitoring and risk stratification of diabetic patients hospitalized in internal medicine wards.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding the publication of this manuscript. No financial support or compensation was received from any organization that may gain or lose financially from the results of this study. The authors have no relevant financial or non-financial interests to disclose.

Statement of ethical approval

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Institutional Review Board (IRB) of the Royal Medical Services, Jordan, on 16 August 2026 under registration number 70_11/2026. Final institutional approval was obtained from the Educational and Technical Directorate on 7 October 2026.

Statement of informed consent

The IRB waived the requirement for written informed consent because the data analysis was retrospective and anonymized. All patient data were de-identified prior to analysis to ensure confidentiality and privacy.

REFERENCES

- [1] Ajlouni K, Batieha A, Jaddou H, et al. Diabetes prevalence in Jordan: a systematic review and meta-analysis. *J Diabetes Metab Disord*. 2020;19(2):1319-1327. doi:10.1007/s40200-020-00643-5
- [2] American Diabetes Association. Standards of medical care in diabetes—2024. *Diabetes Care*. 2024;47(Suppl 1):S1-S300. doi:10.2337/dc24-SINT
- [3] Centers for Disease Control and Prevention. National Diabetes Statistics Report 2023. Atlanta: CDC; 2023.
- [4] Donnan P, et al. Diabetes and in-hospital mortality: a systematic review and meta-analysis. *Diabetologia*. 2022;65(6):945-958. doi:10.1007/s00125-022-05680-2
- [5] Harding JL, Pavkov ME, Magliano DJ, Shaw JE, Gregg EW. Global trends in diabetes complications: a review of current evidence. *Lancet Diabetes Endocrinol*. 2019;7(7):537-547. doi:10.1016/S2213-8587(19)30085-7
- [6] International Diabetes Federation. IDF Diabetes Atlas. 10th ed. Brussels: International Diabetes Federation; 2023.
- [7] Jordan Ministry of Health. Annual Statistical Report 2023. Amman: Ministry of Health; 2024.
- [8] Kannel WB, McGee DL. Diabetes and cardiovascular disease: the Framingham study. *JAMA*. 1979;241(19):2035-2038. doi:10.1001/jama.1979.03290450033020
- [9] Umpierrez GE, Pasquel FJ, Lansang MC. Management of diabetes in hospitalized patients. *J Clin Endocrinol Metab*. 2022;107(11):3065-3076. doi:10.1210/clinem/dgac455
- [10] Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. *Nat Rev Endocrinol*. 2018;14(2):88-98. doi:10.1038/nrendo.2017.151