

Research Article



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ASSOCIATION BETWEEN DIABETES MELLITUS AND OUTCOMES IN CRITICALLY ILL PATIENTS

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ABSTRACT

Background: A condition of adaptive metabolic response to extreme stress in critically sick patients is hyperglycemia.

Aim: The current study sought to determine if diabetes mellitus and outcomes were related in critically sick Indian patients who were admitted to the intensive care unit.

Methods: During the specified study period, medical records of patients with diabetes mellitus admitted to the Institute's intensive care unit were evaluated for this investigation. ICU mortality, duration of ICU stay, and blood glucose level upon ICU admission were taken from the records of all the participants who were included.

Results: According to study results based on data gathered from 480 individuals, 34.14% (n=160) of the participants had diabetes. There was a favorable association between the amount of time spent in the critical care unit and the capillary blood glucose level at admission. patients with diabetes spent considerably more time in the intensive care unit (ICU) than patients without diabetes (p-value = 0.02). In terms of ICU cure rates or death, there was again no statistically significant difference between the two groups.

Conclusion: This study indicates that the duration of stay in the intensive care unit is influenced by the presence of diabetes and that the length of stay at the intensive care unit is positively correlated with the capillary blood glucose level at the time of ICU admission. Diabetes does not, however, affect the ICU cure rate or fatality rate.

Keywords: Diabetes Mellitus, ICU, ICU mortality, outcomes, ICU stay length

INTRODUCTION

A condition of adaptive metabolic response to extreme stress in critically sick patients is hyperglycemia. Extensive insulin treatment has been shown to reduce death rates in critically sick people, according to existing literature data. It has been proposed, in accordance with the international consensus standards, that focused blood glucose management is essential, regardless of a history of diabetes mellitus. There have also been reports of increased mortality in severely unwell people with HbA1c. The higher the hemoglobin A1c, the better the glycemic management was in the past. It's also debatable if the subject's prior metabolic condition has anything to do with the ideal goal of glycemic control in the critical care unit.

Understanding how diabetes affects clinical outcomes and death in critically sick people is therefore crucial. There are, however, conflicting findings on the impact of diabetes mellitus on clinical outcomes and death rates in critically sick people.

According to the statistics, the association between hyperglycemia and cardiovascular diseases and mortality, regardless of diabetes mellitus, has been positively correlated for people admitted to intensive care units. Nevertheless, there have also been reports that it has no bearing on any unfavorable outcomes from an ICU stay for people who are hospitalized there. Additionally, the chances ratio for death among individuals with diabetes at all stages of hyperglycemia has been found to be lower than that of individuals without the disease.

Regardless of whether a patient has diabetes mellitus or not, glycemic fluctuation has been shown in prior research to have a negative impact on their outcomes and mortality rate. The purpose of the current study was to compare the frequency of acute kidney damage (AKI), the requirement for inotropic or vasopressor support, the need for mechanical ventilation (MV), the prognosis, and the clinical profile of critically sick diabetics to those who do not have the disease.

MATERIALS AND METHODS

Examining the relationship between diabetes mellitus and outcomes in critically sick Indian patients admitted to the intensive care unit was the goal of the current retrospective observational research. The research participants were drawn from the Institute's Department of Medicine. Before beginning the study, all participants and school officials gave their verbal and written informed permission.

Data from the participants admitted to the Institute's critical care unit throughout the designated research period were evaluated retrospectively. Every piece of information was collected in an anonymous manner. Participants who did not have a record of their blood glucose levels while in the hospital met the study's exclusion criteria.

Date of death was one of the variables collected from the participants' records. age, gender, date of discharge, lipid profiles, capillary blood glucose level at admission, history of diabetes mellitus at admission, duration of ICU stay, occupation of the individuals, and all blood glucose readings performed while in the intensive care unit.

Following data recording, the participants were split into two groups based on whether they had diabetes mellitus or not, as determined by glycemic readings collected while they were in the intensive care unit. The study considered case definition of Diabetes Mellitus by American Diabetic Association.

The data gathered were statistically analyzed using the chi-square test, Fisher's exact test, Mann Whitney U test, and SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk, NY, USA) using ANOVA, chi-square test, and student's t-test. The significance level was considered at a p-value of <0.05.

Results

Examining the relationship between diabetes mellitus and outcomes in critically sick Indian patients admitted to the intensive care unit was the goal of the current retrospective observational research. The current study evaluated hospital records of individuals with diabetes mellitus who were hospitalized to the Institute's intensive care unit throughout the specified study period. With $p=0.314$, the mean age of study participants with and without diabetes was similar. The research participants' gender differences were likewise comparable, with men and females having corresponding p-values of 0.05 and 0.08. According to Table 1, the lipid profile showed similar values of LDL-C, HDL-C, triglycerides, and total cholesterol in diabetics and non-diabetics ($p=0.345$, 0.244, 0.125, and 0.083, respectively).

It was found that there was no discernible difference between the study participants with diabetes and those without the disease in terms of age, gender, lipid profile, or employment. However, a p-value of less than 0.05 indicated a statistically significant difference in the baseline morbidity distribution between patients with diabetes and those without the disease.

According to the research's findings, the death rate for study participants with diabetes was 28.52%, which was substantially lower than the mortality rate for those without the disease, which was 22.21%. Although diabetes participants had a higher death rate, there was no statistically significant difference between the two groups' mortality rates. But when comparing the two groups, the mean length of stay in the intensive care unit showed that diabetics had a noticeably longer stay than non-diabetics. Additionally, it was shown that the ICU cure rate was determined by the existence or absence of sequelae at the time of release. It showed healing when there were no sequelae. There was no statistically significant difference between diabetics and non-diabetics based on the ICU cure rate. It showed healing when there were no sequelae. There was no statistically significant difference between diabetics and non-diabetics based on the ICU cure rate. Additionally, a favorable relationship between the capillary blood glucose level at the time of ICU admission and the duration of ICU hospitalization was observed.

DISCUSSION

The hospital records of the participants with diabetes mellitus who were hospitalized to the Institute's intensive care unit during the research period were evaluated in this study. According to the study's findings, out of the 480 participants whose data was collected, 34.14% ($n=160$) had diabetes. With $p=0.314$, the mean age of study participants with and without diabetes was similar. The research participants' gender differences were likewise comparable, with men and females having corresponding p-values of 0.05 and 0.08. Triglycerides, total cholesterol, LDL-C, and HDL-C levels were similar in diabetics and non-diabetics ($p=0.345$, 0.244, 0.125, and 0.083, respectively) in terms of the lipid profile. These findings were similar to those of earlier research by Chakroborty B et al. (5 in 2022) and Chakroborty B et al. (6 in 2020), in which the authors evaluated participants using demographic information similar to that of the current study.

According to the research's findings, there was no discernible difference between the study participants with and without diabetes in terms of their age, gender, lipid profile, or employment. However, a p-value of less than 0.05 indicated a statistically significant difference in the baseline morbidity distribution between patients with diabetes and those without the disease. The findings of the current study were in line with those of Leonidou L et al. (2007) and Zelihic E et al. (2015), who reported a statistically significant difference between the distribution of baseline morbidities in subjects with diabetes and those without the disease.

It was observed that the death rate among study participants with diabetes was 28.52%, which was substantially lower than the mortality rate among those without diabetes, which was 22.21%. Although diabetes participants had a higher death rate, there was no statistically significant difference between the two groups' mortality rates. But when comparing the two groups, the mean length of stay in the intensive care unit showed that diabetics had a noticeably longer stay than non-diabetics.

These results were consistent with those of Mahmoodpoor A et al.⁹ and Siegelar SE et al.¹⁰, who found no statistically significant difference in mortality between critically ill diabetic and non-diabetic subjects and that diabetics had a noticeably longer stay duration than those in the current study.

The study's findings also demonstrated that the ICU cure rate was determined by whether or not there were any sequelae at the time of release. It showed healing when there were no sequelae. There was no statistically significant difference between diabetics and non-diabetics based on the ICU cure rate. Additionally, a favorable relationship between the capillary blood glucose level at the time of ICU admission and the duration of ICU hospitalization was observed. These findings were consistent with those of Michalia M et al. (2011) and Slynkova K et al. (2006), who similarly found a positive association between the length of hospitalization in the intensive care unit and the capillary blood glucose level at the time of admission.

CONCLUSION

Taking into account its limitations, the current study comes to the conclusion that having diabetes has an impact on the duration of stay in the intensive care unit (ICU) and that the length of stay in the ICU is positively correlated with the capillary blood glucose level at the time of ICU admission. Diabetes, however, has little bearing on the ICU cure rate or fatality rate. To draw a different conclusion, further longitudinal research with a bigger sample size and longer monitoring is required.

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S. No	Characteristics	Diabetics	Non-diabetics	Total	p-value
1.	Mean age (years)	51.26±1.56	55.06±2.39	53.95±1.33	0.314
2.	Gender (%)				
a)	Males	54.6	46.8	49.5	0.05
b)	Females	45.2	53	51.3	0.08
3.	Lipid profile				
a)	LDL-C	89.06±2.00	87.06±2.20	87.95±2.75	0.345
b)	HDL-C	43.01±3.08	45.02±2.31	44.78±2.06	0.244
c)	Triglyceride	133.05±3.18	128.222±2.19	130.95±2.86	0.125
d)	Total cholesterol	194.20±2.24	188.32±4.24	190.09±3.09	0.083

Table 1: Demographic data of diabetic and non-diabetic study subjects