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Diabetic versus non-comorbid patients' metabolic and nutritional reactions to hospitalization

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Abstract

Background: Hospitalization may have an impact on nutritional and metabolic status, particularly in patients with long-term conditions like diabetes, which could lead to a longer recovery period and undesirable results. The study's goal was to compare the nutritional and metabolic reactions to hospitalization between non-comorbid patients following a standard hospital diet and Type 2 diabetic patients following a diabetic diet.

Techniques: 159 adult patients (85 with diabetes and 74 without) who spent more than three days in the hospital in 2024 were retrospectively reviewed in this retrospective cohort study conducted at Hazm Mebaireek General Hospital in Qatar. Weight, BMI, hemoglobin, albumin, and glucose were among the parameters that were noted. Paired and independent t-tests were used to compare changes within and between groups, and Spearman's rank coefficient was used to look at correlation with length of stay.

Results: The diabetic patients were older (51.1 ± 10.4 years) than the non-comorbid patients (44.5 ± 13.0 years) and had shorter lengths of stay (18.9 ± 30.7 vs. 33.4 ± 55.2 days). The weight and BMI of diabetic patients were maintained constant (73.5 ± 15.7 to 73.6 ± 15.3 kg and 25.8 ± 4.9 to 25.9 ± 4.8 kg/m^2), while the weight and BMI of non-comorbid patients reduced (70.6 ± 14.5 to 67.8 ± 18.2 kg and 28.0 ± 18.1 to 24.1 ± 6.3 kg/m^2). Hemoglobin and albumin decreased in both groups (diabetic: 12.4 ± 2.7 to 11.6 ± 2.1 g/dL, 30.9 ± 6.6 to 27.1 ± 5.5 g/L; non-comorbid: 13.4 ± 2.8 to 11.6 ± 2.3 g/dL, 32.8 ± 7.8 to 30.0 ± 8.1 g/L). Glucose decreased in both groups, significantly in the non-comorbid group (8.5 ± 4.1 to 6.6 ± 1.9 mmol/L). Length of stay was negatively correlated with hemoglobin (r = −0.43), albumin (r = −0.24), and glucose (r = −0.19).

Conclusion: All patients' nutritional and metabolic parameters are impacted by hospitalization. Possibly because of systematic diet management, diabetic patients maintained their weight and BMI better than non-comorbid patients. To maximize the benefits of recovery, focused nutritional monitoring is recommended.

Keywords: Hospitalization; Nutritional status; Type 2 diabetes; length of stay; Hospital Malnutrition

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1. Introduction

Patients' health and recovery may be impacted by severe changes in nutrition and metabolism brought on by hospitalization. A prevalent inpatient condition that is linked to longer hospital stays, higher rates of complications, and mortality is malnutrition [1]. Because their condition and nutritional status interact, patients with long-term conditions like diabetes are particularly vulnerable. Long-term inadequate blood glucose regulation is a hallmark of diabetes mellitus, a chronic metabolic disease that, if left untreated, can result in cardiovascular disease, renal disease, and impaired wound healing [2]. A clear focus on nutrition is necessary because hospitalization and illness can result in increased nutritional needs in addition to elevated metabolic needs. Since it simultaneously controls blood glucose levels and satisfies all nutrient requirements, nutrition management is essential to the management of diabetes. By monitoring carbohydrate intake and meeting overall nutrient requirements, the diabetic diet aims to control blood sugar levels. The impact of a diabetic diet on hospitalized patients' nutritional and metabolic outcomes is still unclear [3]. Research suggests that hospitalized diabetic patients may experience weight loss, protein-energy malnutrition, and low serum albumin concentrations, all of which may have a detrimental impact on their ability to recover [4]. Patients without diabetes are almost always given a standard hospital diet. They might also suffer from malnutrition because of their inability to eat, inflammation brought on by their illness, or metabolic abnormalities related to their illness [5]. Few studies directly and specifically compare the nutritional and metabolic responses of patients with diabetes to those of non-comorbid patients on different diets, even though malnutrition has been documented in hospitalized patients in earlier research. To close this gap, the study was carried out at Hamad Medical Corporation's Hazm Mebaireek General Hospital (HMGH). To better understand how diet and hospitalization affect the two groups differently, we will measure nutritional (weight, BMI, hemoglobin, and albumin) and metabolic (glucose) changes in both patient groups before and after hospitalization. The results should result in better nutritional treatments to help patients with and without diabetes recover and achieve better results.

2. Method

This retrospective cohort study, which examined patient data from January 1, 2024, to December 31, 2024, was carried out at Hazm Mebaireek General Hospital (HMGH), Qatar. Adult patients between the ages of 18 and 80 made up the study population. They were divided into two groups: Group 1 included Type 2 diabetic patients who were admitted to the hospital for longer than three days and who were given a diabetic diet, and Group 2 included patients without chronic comorbidities who were admitted to the hospital for longer than three days and were given a full hospital diet. Eligibility requirements included having a Type 2 diabetes diagnosis on file (Group 1) or not having any chronic comorbidities (Group 2). Malnourished or at risk of malnourishment, as demonstrated by low albumin, >significant weight loss, low BMI, or abnormal transferrin/lactoferrin levels, were prescribed the diet during the hospital stay. The study did not include patients undergoing hemodialysis, those with life-threatening comorbidities, or those with severe cognitive impairment. Data was gathered from the hospital's EMR over six months. Weight, BMI, hemoglobin, albumin, fasting glucose, transferrin/lactoferrin, and other metabolic and nutritional markers were the primary outcome. The secondary outcome was the variation in the markers between patients with diabetes and those without the condition.

2.1. Statistical Analysis

Mean ± standard deviation was used to report continuous measures (weight, BMI, glucose, hemoglobin, and albumin). To check for pre-post within-group changes, either Wilcoxon signed-rank tests or paired t-tests were used, depending on the data distribution. When necessary, independent t-tests or Mann-Whitney U tests were used to statistically control for between-group (diabetic vs. non-comorbid) differences. Using Spearman's rank correlation coefficient, the cumulative relationship between hospital stays durations and nutritional or metabolic factors was assessed. A significance threshold of $p < 0.05$ was applied to two-tailed tests.

2.2. Ethical Considerations

The study followed the principles of respect, justice, and confidentiality outlined in the 2013 Declaration of Helsinki. The protocol was submitted for approval to the Hamad Medical Corporation Medical Research Centre (MRC) and adheres to the laws and regulations of the Ministry of Public Health, Qatar.

3. Results

Table 1 provides an overview of certain aspects of the patients in each study group (having diabetes, n = 85, having no chronic co-morbidities, n = 74). Patients with diabetes had a mean length of stay (18.91 ± 30.72 days) that was substantially lower than patients with no chronic diseases (33.41 ± 55.15 days) from the study sample. There are

important age differences, meaning the patients in the diabetes group were older (51.11 ± 10.43 years), in comparison to those with no chronic co-morbidities (44.49 ± 12.98 years). Height was similar between groups (168.49 ± 7.32 cm vs. 168.03 ± 6.59 cm). Therefore, while patients in the diabetes group were older overall, they also had a shorter length of stay compared to patients with no chronic co-morbidities, as well as similar heights to the comparison group.

Table 1 Descriptive Statistics of Hospitalized Patients by Health Status (Mean ± SD).

Variable	Diabetes Group (85)	No Chronic Comorbidities Group (74)
Length of Stay (Days)	18.91 ± 30.72	33.41 ± 55.15
Age (Years)	51.11 ± 10.43	44.49 ± 12.98
Height (cm)	168.49 ± 7.32	168.03 ± 6.59

In Table 2, we present weight changes, BMI, and other significant blood values prior to hospitalization (Preop) and following hospitalization (Postop) in the two groups. In hospitalized diabetic patients, body weight and BMI experienced only a small but statistically significant increase (Preop 73.49 ± 15.68 to Postop 73.64 ± 15.30 (kg), and Preop 25.84 ± 4.91 to Postop 25.88 ± 4.82 (kg/m^2); p = 0.000). Blood glucose level decreased from Preop 12.37 ± 5.97 to Postop 8.16 ± 2.82 (mmol/L), and while this decrease is important clinically, it was not statistically significant (p = 0.331). Hemoglobin and albumin values decreased significantly post-hospitalization (Preop 12.37 ± 2.73 to Postop 11.59 ± 2.12 (g/dL), and Preop 30.87 ± 6.60 to Postop 27.13 ± 5.46 (g/L); p = 0.000). In the group without comorbidities, weight and BMI both decreased significantly (Preop 70.56 ± 14.53 to Postop 67.83 ± 18.21 (kg) and Preop 27.95 ± 18.06 to Postop 24.13 ± 6.32 (kg/m^2); p = 0.000 and p = 0.038, respectively). Blood glucose decreased significantly, from Preop 8.50 ± 4.14 to Postop 6.61 ± 1.93 (mmol/L) (p = 0.000). Hemoglobin and albumin decreased significantly in this group following hospitalization (Preop 13.35 ± 2.78 to Postop 11.55 ± 2.29 (g/dL) and Preop 32.75 ± 7.82 to Postop 30.00 ± 8.14 (g/L); p = 0.000). In summary, both groups had decreases of hemoglobin and albumin following hospitalization. While patients without comorbidity lost weight and had clinically meaningful weight loss and improvement in glucose, diabetic patients had relatively stable weight and BMI following hospitalization and only demonstrated a small clinically meaningful change in glucose.

Table 2 Comparison of Pre- and Post-Hospitalization Measurements in Diabetic and Non-Comorbid Patients (Mean ± SD).

Variable	DIABETES GROUP (85)			NO CHRONIC COMORBIDITIES GROUP (74)		
	Pre-Hospitalization	Post-Hospitalization	*p*-value	Pre-Hospitalization	Post-Hospitalization	*p*-value
Weight (kg)	73.49 ± 15.68	73.64 ± 15.30	0.000	70.56 ± 14.53	67.83 ± 18.21	0.000
BMI (kg/m^2)	25.84 ± 4.91	25.88 ± 4.82	0.000	27.95 ± 18.06	24.13 ± 6.32	0.038
Glucose (mmol/L)	12.37 ± 5.97	8.16 ± 2.82	0.331	8.50 ± 4.14	6.61 ± 1.93	0.000
Hemoglobin (g/dL)	12.37 ± 2.73	11.59 ± 2.12	0.000	13.35 ± 2.78	11.55 ± 2.29	0.000
Albumin (g/L)	30.87 ± 6.60	27.13 ± 5.46	0.000	32.75 ± 7.82	30.00 ± 8.14	0.000

Table 3 displays the relationship between the length of hospital stay and important blood parameters. There was a negative correlation of blood glucose, hemoglobin, and albumin with the length of stay. Patients who stayed longer in the hospital exhibited lower glucose ($r = -0.190$, $p < 0.05$), hemoglobin ($r = -0.430$, $p < 0.01$), and albumin ($r = -0.237$, $p < 0.01$) levels. In other words, longer hospitalization was also generally associated with lower levels of these markers in the blood, indicating that poorer nutritional and blood status was likely to contribute to longer hospitalization.

Table 3 Spearman's Rank Correlation Between Length of Stay and Metabolic–Nutritional Markers at Discharge (N = 159)

Variables	Glucose (mmol/L)	Hemoglobin (g/dL)	Albumin (g/L)
Length of Stay (Days)	−0.190*	−0.430**	−0.237**

Note: $p < 0.05$ (*); $p < 0.01$ (**), two-tailed test.

4. Discussion

The study highlights the main differences in dietary and metabolic patterns between individuals with diabetes and those without long-term conditions. As is typical, the diabetics in the study's sample of hospitalized patients were older than those without a chronic illness, which is in line with the fact that diabetes is more common in older people [6]. Surprisingly, compared to patients without chronic illness, older diabetic patients stayed shorter. In contrast to patients without chronic disease, who may have been admitted with more acute and complex illnesses that required more treatment and a longer recovery period, diabetic patients may have better disease stability and better-controlled therapeutic approaches that are more routine and may stabilize faster [7]. The hospitalization experience and admission for a non-diabetic illness may cause decompensatory changes in nutritional and metabolic status, as both groups did experience decreases and clinically significant changes in hemoglobin and albumin while in the hospital [8, 9]. These decreases could be explained by a biological reaction to the stress of non-diabetic illness, inflammation, or an unaltered dietary status. The decreases in albumin levels could be a sign of a biological reaction to an acute stressor, a chronic inflammatory state, or a worrying nutritional status [6].

There was a decrease in patients without chronic comorbidity, but there seemed to be an improvement in the diabetic patient group's weight and body mass index (BMI). Those without chronic disease may have consumed less energy because of acute illness, decreased appetite, or changes in fluid balance, whereas those with diabetes may have adopted more cautious eating practices and improved insulin control [7]. Both groups saw an improvement in glucose, but only those without chronic illness saw a statistically significant change. Variability in blood sugar control and varying reactions to insulin therapy may be the cause of the minor, non-significant change in diabetic patients [8]. Longer hospital stays are linked to lower nutritional and metabolic parameters, indicating that prolonged hospitalization can lead to a slower recovery and a lower nutritional status [9]. Length of stay also showed negative correlations with glucose, hemoglobin, and albumin levels. In conclusion, this study highlights the significance of meticulous hemoglobin, albumin, and blood glucose monitoring in the inpatient context. Individualized care and early inpatient nutritional support, especially for diabetic patients, may help prevent decline and improve overall results [6, 7].

5. Conclusion

Patients with diabetes and those without comorbid conditions experience significant changes in their nutritional and metabolic status while in the hospital. While non-comorbid patients experienced substantial weight loss, diabetic patients were older and had a relatively stable weight and BMI. Both groups' albumin and hemoglobin levels showed the same changes. The differences in nutritional and metabolic values were more noticeable the longer the patient was in the hospital. In order to prevent malnutrition and enhance patient outcomes, these findings highlight the necessity of continuous nutritional surveillance and person-centered dietary treatment during hospital stays. In high-risk populations, structured dietary programs, such as the diabetic diet, can help patients maintain their weight and metabolic status.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest to be disclosed.

Statement of ethical approval

The study design and operationalization adhered to the principles of respect, justice and confidentiality stipulated in the 2013 Declaration of Helsinki Good Clinical Practice. Also, in line with the laws and regulations of the Ministry of Public Health in Qatar, the study protocol was approved by HMC's Medical Research Center (MRC).

Statement of informed consent
The researchers will maintain anonymity of the participants by not including their personal details on the data collection
tool.

References

[1] Cederholm, T., Barazzoni, R., Austin, P., et al. (2015). ESPEN guidelines on definitions and terminology of clinical nutrition. Clinical Nutrition, 34(3), 335–340. https://doi.org/10.1016/j.clnu.2015.03.025.

[2] American Diabetes Association. (2023). Standards of medical care in diabetes—2023. Diabetes Care, 46(Suppl 1), S1–S291. https://doi.org/10.2337/dc23-S001.

[3] Tappy, L., & Lê, K. A. (2010). Metabolic effects of fructose and the worldwide increase in obesity. Physiological Reviews, 90(1), 23–46. https://doi.org/10.1152/physrev.00019.2009.

[4] Muñoz, N., Posthauer, M. E., Cereda, E., et al. (2018). The role of nutrition for pressure injury prevention and healing: The 2019 international clinical practice guideline recommendations. Advances in Skin & Wound Care, 31(11), 469–480. https://doi.org/10.1097/01.ASW.0000546500.36536.

[5] Keller, H. H., & du Chatenet, M. (2014). Nutritional risk, dietary intake, and physical function in hospitalized older adults. Journal of Nutrition, Health & Aging, 18(7), 657–662. https://doi.org/10.1007/s12603-014-0460-4.

[6] Jang, S. A., et al. (2024). Higher mortality and longer length of stay in hospitalized patients with newly diagnosed diabetes. ScienceDirect. https://www.sciencedirect.com/science/article/pii/S0168822724000858

[7] Kwizera, P., et al. (2024). Malnutrition risk among hospitalized patients with type 2 diabetes mellitus and its association with hospital length of stay. Wiley Online Library. https://onlinelibrary.wiley.com/doi/full/10.1002/puh2.70011.

[8] Sanz-Paris, A., et al. (2016). Health-care costs, glycemic control, and nutritional status in hospitalized patients with diabetes. PubMed Central. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4808881/.

[9] Valles, C. S., et al. (2020). Influence of nutritional status on hospital length of stay in patients with type 2 diabetes. PubMed. https://pubmed.ncbi.nlm.nih.gov/33054996/.

[10] Wunderlich, S. M., et al. (1992). Relationship between nutritional status indicators and length of hospital stay. Journal of the American Dietetic Association, 92(10), 1240–1244. https://doi.org/10.1016/0002-8223(92)90646-5.