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Monitoring Insulin and Glucose Levels in Hospital Najaf: A Critical Analysis of Diabetes Management

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Abstract

Diabetes mellitus, characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both, is a global health concern with increasing prevalence. In the city of Najaf, Iraq, Hospital Najaf plays a pivotal role in managing diabetes cases for a substantial population. Effective diabetes management is critical, as uncontrolled diabetes can lead to a range of complications. Monitoring insulin and glucose levels is pivotal in this context. This study employs a mixed-methods approach to comprehensively assess diabetes management at Hospital Najaf, encompassing both qualitative and quantitative data sources. Qualitative data was gathered through interviews with healthcare professionals and patients, while quantitative data included the analysis of medical records and surveys. Statistical analysis was performed using SPSS. Results reveal significant differences in sugar and insulin levels between healthcare professionals and patients with diabetes, underlining the importance of monitoring and intervention. Patient interviews highlight the need for education and culturally sensitive care. This study's insights aim to contribute to enhanced diabetes management and the well-being of individuals with diabetes in Najaf and beyond.

Keywords:

Introduction:

Diabetes mellitus, characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both, is a global health concern. It is a multifaceted condition that poses substantial challenges to healthcare systems worldwide (Akram et al., 2022; Fox et al., 2018). In Iraq, the city of Najaf is no exception, grappling with a rising prevalence of diabetes (Mansour et al., 2014). Hospital Najaf, as a pivotal healthcare institution in the region, plays a crucial role in managing diabetes cases and providing essential services to a substantial population. The efficient and effective management of diabetes within Hospital Najaf is of paramount importance for patient well-being and overall healthcare system performance. The importance of diabetes management cannot be overstated (Akhtari-Zavare et al., 2010; Alexopoulos et al., 2019). Diabetes, when left uncontrolled, can lead to a plethora of complications, including cardiovascular diseases, neuropathy, nephropathy, and retinopathy, which impose a significant burden on patients and the healthcare system(Nellaiappan et al., 2022). Given the growing prevalence of diabetes in Iraq, understanding the nuances of its management becomes imperative. Understanding diabetes is essential in the context of monitoring insulin and glucose levels (Al-Saadi et al., 2011). Diabetes exists in various forms, with the most prevalent types being Type 1, characterized by an autoimmune attack on insulin-producing cells, and Type 2, associated with insulin resistance (Flannick et al., 2016). In both cases, insulin, a hormone produced by the pancreas, plays a crucial role in regulating blood sugar levels(Gao et al., 2022; Iuorno and Nestler, 2001). Its primary function is to facilitate the entry of glucose into cells for energy production, thereby maintaining glucose homeostasis. When this balance is disrupted, as in hyperglycemia (high blood sugar) or hypoglycemia (low blood sugar), it can lead to severe health complications, making precise monitoring of insulin and glucose levels pivotal in diabetes management (He et al., 2022; Mayer et al., 2007). Blood glucose monitoring encompasses a spectrum of techniques. Traditional blood glucose testing, involving

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fingerstick tests and glucose meters, remains a common method. Continuous Glucose Monitoring (CGM) has gained prominence, provided real-time data and reduced the need for frequent fingerstick (Lu et al., 2023). Flash glucose monitoring offers a hassle-free, wearable sensor that stores glucose data. Interstitial fluid glucose monitoring is an emerging approach that promises less invasiveness and more comfort. Future trends in blood glucose monitoring involve miniaturization, improved accuracy, and enhanced data integration. Insulin monitoring is equally vital, with traditional methods including self-administered insulin injections. Advanced insulin monitoring tools like insulin pumps allow precise dosage control. Developing technologies, such as smart insulin pens and closed-loop systems, aim to automate insulin administration, further enhancing diabetes care (Evans et al., 2022; Leelarathna and Wilmot, 2018).

Aim:

The aim is to comprehensively assess the existing protocols, practices, and challenges related to monitoring insulin and glucose levels within the context of diabetes management at Hospital Najaf. This study seeks to shed light on the strengths and weaknesses of diabetes care in this healthcare facility, ultimately aiming to contribute to the improvement of diabetes management in the region.

Objectives:

1. To evaluate the current protocols and practices concerning the monitoring of insulin and glucose levels at Hospital Najaf.
2. To identify and analyze the challenges and successes of diabetes management within the hospital's setting.
3. To propose practical improvements and best practices that can enhance the effectiveness of diabetes care at Hospital Najaf, with a focus on insulin and glucose monitoring.
4. To explore case studies, both internationally and locally, to draw insights and recommendations relevant to the specific context of Hospital Najaf.
5. To contribute valuable insights to the ongoing efforts to optimize diabetes management, ultimately benefiting the health and well-being of individuals with diabetes in Najaf and the surrounding regions.

Materials and Methods

Data Collection:

This study aimed to comprehensively assess diabetes management at Hospital Najaf, focusing on the monitoring of insulin and glucose levels. A mixed-methods approach was employed to gather both qualitative and quantitative data for a comprehensive analysis (Tzivian et al., 2022).

Qualitative Data Collection:

1- **Interviews with Healthcare Professionals:** In-depth interviews were conducted with a diverse group of healthcare professionals, including physicians, nurses, diabetes educators, and other staff members directly involved in diabetes care at Hospital Najaf. The interviews aimed to gain insights into their perspectives on the existing diabetes management practices within the hospital. Questions were designed to explore the challenges they encountered, their observations, and their suggestions for improvements (Newington et al., 2022).

2- **Patient Interviews**: Interviews were also conducted with individuals receiving diabetes care at Hospital Najaf. These interviews were essential for understanding the patient experience, their knowledge of monitoring techniques, and their preferences in diabetes management. Patient interviews covered topics related to their experiences, their understanding of monitoring, and any specific needs or concerns they had regarding their diabetes care(Dunkel-Schetter, 1984).

Quantitative Data Collection:

1- **Analysis of Medical Records**: Patient medical records were systematically analyzed to gather quantitative data. This included information on the prevalence of diabetes among the patients, the various treatment regimens administered, and patient outcomes. The analysis provided insights into the impact of the existing diabetes management protocols.

2- **Surveys for Healthcare Professionals**: A structured survey was administered to healthcare professionals at Hospital Najaf. The survey focused on their knowledge, training, and competence in diabetes management, with a specific emphasis on insulin and glucose monitoring. The survey

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questions aimed to assess their familiarity with monitoring technologies, their confidence in using them, and their perceived effectiveness in managing patients' diabetes.

By employing this mixed-methods approach, the study gathered a diverse set of data, allowing for a comprehensive evaluation of diabetes management at Hospital Najaf, with a particular emphasis on monitoring insulin and glucose levels. The combination of qualitative insights from healthcare professionals and patients with quantitative data from medical records and surveys provides a well-rounded perspective on the existing practices and highlights areas for potential improvement in diabetes care (Alibraheemi et al., 2021; Burt et al., 2013).

Statistical Analysis

The data collected from various sources, including interviews, patient records, and surveys, were subjected to a rigorous analysis using SPSS (Statistical Package for the Social Sciences). Descriptive statistics were computed to summarize the main characteristics of the data, such as means, standard deviations, and frequencies, allowing for a comprehensive understanding of the dataset. Inferential statistical methods, including t-tests and regression analyses, were employed to examine relationships and associations within the data. The statistical analysis was critical in drawing meaningful conclusions about diabetes management at Hospital Najaf, particularly concerning insulin and glucose monitoring. It provided valuable insights into potential areas for enhancement in diabetes care practices. The statistical findings from the SPSS analysis were fundamental in shaping the study's recommendations and conclusions.

The Result and Desiccation

In this study, two distinct groups were examined: Healthcare Professionals and Patients with diabetes. The mean sugar level (mg/dL) for Healthcare Professionals was found to be 72 ± 2, while the mean insulin level (µU/mL) was 5.56 ± 0.5. In contrast, the Patients with diabetes exhibited notably higher sugar levels with a mean of 145 ± 12 mg/dL, and their insulin levels were also significantly higher, averaging 11.2 ± 1 µU/mL.

Groups	Sugar Level (mg/dL)	Insulin Level (µU/mL)
Healthcare Professionals	72 ± 2	5.56 ± 0.5
Patients diabetes	145 ± 12	11.2 ± 1

The results of this study demonstrate a substantial difference in sugar and insulin levels between the two groups, Healthcare Professionals and Patients with diabetes. Healthcare Professionals exhibited significantly lower mean sugar levels and insulin levels compared to Patients with diabetes. This difference can be attributed to the absence of diabetes in the Healthcare Professionals group, whereas the Patients with diabetes group naturally displayed elevated sugar and insulin levels due to their medical condition (Al-amery et al., 2022; Nakamura and Sadoshima, 2020).

When comparing these findings with previous studies, the results align with established knowledge regarding sugar and insulin levels in diabetic and non-diabetic populations. Previous studies have consistently shown that individuals with diabetes typically have elevated sugar levels and higher insulin levels due to the body's reduced ability to regulate blood sugar. The lower sugar and insulin levels among Healthcare Professionals provide a benchmark for what can be considered within the normal range for non-diabetic individuals (Ebrahim et al., 2014; Mansour and Wanoose, 2007).

These results reaffirm the importance of monitoring and managing sugar and insulin levels in patients with diabetes, as elevated levels can be indicative of uncontrolled diabetes and potential health risks. Moreover, the findings emphasize the necessity for healthcare professionals to be well-versed in diabetes management, as their own health parameters, as seen in this study, can serve as a reference point for healthy blood sugar and insulin levels. It is essential for healthcare professionals to stay updated on diabetes care and management guidelines to provide optimal care for their patients (Al-garawi et al., 2022; Farmer et al., 2007).

The data	Evaluation
Age of Patients with Diabetes	53.8 (±3.4) years
Time of Urination (Patients with Diabetes)	6.4 (±0.9) times per day

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Acceptability of the health care	8.7 (Scale: 1-10)
Knowledge of Diabetes Management	7.2 ($\pm$0.4) (Scale: 1-10)

The interviews with healthcare professionals yielded valuable insights into their perspectives on existing diabetes management practices at Hospital Najaf. Several recurring themes and observations emerged during these interviews. Healthcare professionals expressed concerns regarding the accessibility and availability of advanced monitoring technology, particularly continuous glucose monitors (CGMs) and insulin pumps. Many professionals highlighted challenges in resource allocation, including funding limitations and equipment availability, which hindered their ability to adopt state-of-the-art monitoring tools. Some professionals also emphasized the critical role of continuous training and professional development in ensuring competence in using the available resources (González Hernández et al., 2019; Sinha et al., 1996).

Interviews with Healthcare Professionals:

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Patient Interviews:

Conducting interviews with individuals receiving diabetes care at Hospital Najaf provided essential feedback from the patient perspective. Patients with diabetes shared their experiences and challenges related to diabetes management. Many patients highlighted the need for more comprehensive education and awareness campaigns about diabetes prevention and management, underlining the importance of patient-centered care. Patients emphasized the role of cultural and socioeconomic factors in influencing their adherence to treatment and lifestyle changes. Their insights underscored the need for personalized and culturally sensitive approaches in diabetes care .

Surveys for Healthcare Professionals:

The surveys administered to healthcare professionals aimed to quantitatively assess their knowledge, training, and competence in diabetes management, particularly in the context of insulin and glucose monitoring. The survey data provided a numerical overview of healthcare professionals' familiarity with monitoring technologies, their confidence in using them, and their perceived effectiveness in managing patients' diabetes. Analysis of the survey responses revealed varying levels of competence and highlighted areas where additional training and support may be required.

These results, obtained through interviews with healthcare professionals, patient interviews, and surveys for healthcare professionals, collectively contribute to a comprehensive understanding of the current state of diabetes management at Hospital Najaf and will inform the proposed improvements and recommendations outlined in the study.

Conclusion

In conclusion, this comprehensive analysis of diabetes management at Hospital Najaf underscores the critical importance of precise monitoring of insulin and glucose levels, particularly in the context of a region grappling with a rising prevalence of diabetes. The significant disparity in sugar and insulin levels between healthcare professionals and patients with diabetes highlights the imperative for timely intervention, personalized care, and continuous monitoring to maintain the delicate balance of blood sugar. These findings align with established knowledge in the field, emphasizing the need for well-informed healthcare professionals and the importance of patient education and culturally sensitive approaches. The study's insights offer a roadmap for enhancing diabetes care at Hospital Najaf, contributing to the broader global effort to address the multifaceted challenges posed by diabetes and ultimately improving the well-being of individuals with diabetes in the region.

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