Health Leadership and Quality of Life. 2025; 4:920
doi: 10.56294/hl2025920

ORIGINAL

Trend Analysis and Prediction of Outpatient and Inpatient Visits for Diabetes Mellitus at RSI Siti Hajar Sidoarjo: A Linear Trend Approach for 2024-2026

Análisis y Predicción de la Tendencia de Consultas Ambulatorias y Hospitalizaciones por Diabetes Mellitus en el RSI Siti Hajar Sidoarjo: Un Enfoque de Tendencia Lineal para 2024-2026

Andiani Andiani[1], Sulistiawati Sulistiawati[2], Lilik Djuari[2], Hanik Badriyah Hidayati[3], Kuntaman Kuntaman[4], Tri Yunita Fitria Damayanti[1,5]

[1]Doctoral Program of Medical Science, Faculty of Medicine, Universitas Airlangga, Surabaya. Indonesia.
[2]Departement of Public Health Science-Preventive Medicine, Faculty of Medicine, Universitas Airlangga. Surabaya. Indonesia.
[3]Departement of Neurology, Faculty of Medicine, Universitas Airlangga, Surabaya. Indonesia.
[4]Departement of Clinical Microbiology, Faculty of Medicine, Universitas Wijaya Kusuma Surabaya. Indonesia.
[5]Department of Midwifery, Faculty of Nursing and Midwifery, Institut Ilmu Kesehatan Nahdlatul Ulama Tuban. Indonesia.

Cite as: Andiani A, Sulistiawati S, Djuari L, Badriyah Hidayati H, Kuntaman K, Fitria Damayanti TY. Trend Analysis and Prediction of Outpatient and Inpatient Visits for Diabetes Mellitus at RSI Siti Hajar Sidoarjo: A Linear Trend Approach for 2024-2026. Health Leadership and Quality of Life. 2025; 4:920. https://doi.org/10.56294/hl2025920

Submitted: 12-06-2025 **Revised:** 29-08-2025 **Accepted:** 07-11-2025 **Published:** 08-11-2025

Editor: PhD. Neela Satheesh

Corresponding author: Andiani Andiani

ABSTRACT

Introduction: diabetes Mellitus (DM) is a chronic condition characterized by elevated blood glucose levels, and its prevalence is rising, posing significant challenges for healthcare systems. This study aimed to analyze the trend of outpatient and inpatient visits for DM at RSI Siti Hajar Sidoarjo from 2021 to 2023 and predict future trends for 2024-2026.
Method: a descriptive research design was employed, using secondary data from patient visits between 2021 and 2023. Linear regression models were applied to forecast the number of outpatient and inpatient visits for the years 2024-2026 based on historical trends. Data analysis involved identifying trends in patient visits and generating predictions for the coming years.
Results: the results indicated a consistent upward trend in outpatient visits, rising from 8,800 in 2021 to 10,818 in 2023, representing a 17,8 % increase in the final year. The regression model Y=9601,3+1009X predicted continued growth, with outpatient visits expected to reach 16,637 by 2026, a projected increase of approximately 31,7 %. Similarly, inpatient visits showed a significant surge, from 325 in 2021 to 716 in 2023, marking an 84,1 % rise. The inpatient regression model Y=476,6+195,5X forecasted an increase to 1,259 visits by 2026. Model validation demonstrated a high degree of accuracy, as the predicted 2023 values for both outpatient and inpatient visits matched the actual data precisely. facilities.
Conclusion: this study provides valuable insights into the future demand for diabetes-related healthcare services at RSI Siti Hajar Sidoarjo. It underscores the importance of expanding both outpatient and inpatient services to accommodate the increasing number of diabetes patients. The study also highlights the need for early diagnosis, integrated care, and health promotion to manage the rising demand effectively. These findings offer a foundation for healthcare administrators to make informed decisions regarding resource allocation and service improvement, ensuring better care for diabetes patients in the coming years.

Keywords: Diabetes Mellitus; Outpatient Visits Inpatient Visits; Trend Analysis; Healthcare Prediction.

RESUMEN

Introducción: la Diabetes Mellitus (DM) es una enfermedad crónica caracterizada por niveles elevados de glucosa en la sangre, cuya prevalencia está en aumento y plantea importantes desafíos para los sistemas de salud. Este estudio tuvo como objetivo analizar la tendencia de las visitas ambulatorias y hospitalarias de pacientes con DM en el RSI Siti Hajar Sidoarjo entre los años 2021 y 2023, así como predecir las tendencias futuras para el período 2024-2026.
Método: se empleó un diseño de investigación descriptivo, utilizando datos secundarios de las visitas de pacientes entre 2021 y 2023. Se aplicaron modelos de regresión lineal para pronosticar el número de visitas ambulatorias y hospitalarias durante los años 2024-2026, basándose en las tendencias históricas. El análisis de los datos incluyó la identificación de patrones en las visitas de los pacientes y la generación de predicciones para los años siguientes.
Resultados: los resultados mostraron una tendencia ascendente constante en las visitas ambulatorias, que aumentaron de 8,800 en 2021 a 10,818 en 2023, lo que representa un incremento del 17,8 % en el último año. El modelo de regresión Y=9601,3+1009X predijo un crecimiento continuo, con un número estimado de 16,637 visitas ambulatorias para 2026, equivalente a un incremento proyectado de aproximadamente el 31,7 %. De manera similar, las visitas hospitalarias presentaron un aumento considerable, pasando de 325 en 2021 a 716 en 2023, lo que representa un incremento del 84,1 %. El modelo de regresión para hospitalizaciones Y=476,6+195,5X estimó un aumento hasta 1,259 visitas en 2026. La validación de los modelos demostró un alto grado de precisión, ya que los valores predichos para 2023 coincidieron exactamente con los datos reales tanto para las visitas ambulatorias como hospitalarias.
Conclusión: este estudio proporciona información valiosa sobre la futura demanda de servicios de salud relacionados con la diabetes en el RSI Siti Hajar Sidoarjo. Resalta la importancia de ampliar tanto los servicios ambulatorios como los hospitalarios para atender al número creciente de pacientes diabéticos. Asimismo, enfatiza la necesidad de un diagnóstico temprano, una atención integral y la promoción de la salud para gestionar eficazmente el aumento de la demanda. Estos hallazgos ofrecen una base sólida para que los administradores de salud tomen decisiones informadas sobre la asignación de recursos y la mejora de los servicios, garantizando una mejor atención para los pacientes con diabetes en los próximos años.

Palabras clave: Diabetes Mellitus; Consultas Ambulatorias; Hospitalizaciones; Análisis de Tendencias; Predicción Sanitaria.

INTRODUCTION

Diabetes Mellitus (DM) has emerged as a significant global public health challenge, marked by chronic high blood glucose levels, which continue to rise. The World Health Organization (WHO) reported that an estimated 422 million people worldwide suffer from diabetes, with the majority residing in low- and middle-income countries. As the prevalence of diabetes grows, it brings with it increased morbidity and mortality, placing a heavy burden on healthcare systems.[1,2,3] This chronic condition is known to cause complications such as cardiovascular diseases, neuropathy, nephropathy, and diabetic retinopathy, necessitating continuous healthcare interventions. In response to this growing public health issue, healthcare providers must not limited to manage the existing patient load but also anticipate future demands to ensure adequate preparation and resource allocation.

In Indonesia, the number of people living with diabetes has steadily increased, with the province of East Java alone estimating 863,686 diabetes cases among individuals aged 15 and older in 2022.[4] This study builds on previous research that demonstrates the significance of prediction models in healthcare planning. According to Teh et al.[5], prediction models have proven to be effective in predicting patient volumes, thereby aiding healthcare providers in optimizing their resources and improving service delivery. The data from RSI Siti Hajar Sidoarjo show a clear upward trend in both outpatient and inpatient visits, with a 4,3 % increase in outpatient visits from 2021 to 2022, followed by a 17,8 % increase from 2022 to 2023. Similarly, inpatient visits saw a 19,7 % increase in 2022 and a dramatic 84,1 % rise in 2023. These statistics suggest that the hospital must be prepared for continued growth in patient numbers, which further underscores the importance of effective prediction.[6]

Given the continued rise in diabetes cases and the subsequent strain on healthcare resources, prediction models have become essential tools for hospital administrators. Linear trend analysis has proven effective in predicting future healthcare demands based on historical data.[5] By analyzing the trend of outpatient and inpatient visits for diabetes, this study seeks to forecast the number of visits at RSI Siti Hajar Sidoarjo from 2024 to 2026, providing crucial insights for hospital management to optimize resource allocation and plan for future

demands. Prediction models will also help in ensuring that the hospital remains equipped to handle increased patient volumes, particularly during peak periods when the need for diabetes care is at its highest.

A study by Ghaemi et al.[7] emphasized that understanding patient satisfaction and treatment adherence is crucial for improving diabetes management. High patient satisfaction is linked to better treatment outcomes and increased follow-up care, which impacts the frequency of visits to healthcare facilities. At RSI Siti Hajar Sidoarjo, the increased number of diabetes visits may also be attributed to improved patient education, early diagnosis, and better management strategies. These factors contribute to more frequent outpatient visits, thus preventing complications that often lead to hospitalization. This trend is consistent with findings by Huang et al.[8] which suggested that early intervention and integrated care models, such as continuous monitoring and tailored diabetes education, reduce the need for inpatient care and improve long-term patient outcomes.

Furthermore, research by Bouly et al.[9] has highlighted that regular follow-up care can reduce the recurrence of complications such as diabetic foot ulcers, which are common among patients with poorly controlled diabetes. This highlights the importance of healthcare providers focusing not only on treatment but also on preventive care and early interventions. The increasing trend in diabetes-related visits observed at RSI Siti Hajar Sidoarjo suggests that the hospital is adopting strategies that emphasize prevention and early diagnosis, helping to manage the growing number of cases effectively.

The need for effective prediction in the context of diabetes care is also emphasized by the work of Monju et al.[1], who found that medication adherence, regular check-ups, and proper treatment plans are pivotal in managing diabetes and preventing complications. In addition, studies such as those by Rheeder et al.[10] have suggested that telemedicine and nurse-led programs can improve access to care, particularly in areas with limited healthcare infrastructure. These approaches can help manage patient flow by offering continuous care, reducing the need for emergency care or inpatient services, and thus influencing the trend of increasing visits.

At RSI Siti Hajar Sidoarjo, as the number of diabetes patients grows, the hospital faces increasing pressure to meet the needs of its patients while maintaining high-quality care. Therefore, understanding the trends in outpatient and inpatient visits is essential for planning future healthcare strategies. Linear trend analysis, as employed in this study, can provide valuable predictions for hospital administrators to prepare for the expected rise in diabetes-related visits, guiding decisions on staffing, resource allocation, and facility expansion. In particular, this study aims to forecast the number of outpatient and inpatient visits at RSI Siti Hajar Sidoarjo for 2024 to 2026, taking into account the significant increases observed in the past three years.[11,12]

METHOD

Study Design

The study employed a forecasting study. This study aims to analyze and forecast the trend of outpatient and inpatient visits for Diabetes Mellitus (DM) at RSI Siti Hajar Sidoarjo for the years 2024-2026. The methodology incorporates data collection, the use of trend analysis, and prediction techniques based on secondary data from the hospital's patient visits. Furthermore, the study employs a linear regression model for the analysis of the data, ensuring that the predictions are accurate and actionable for the hospital management. The following sections provide a detailed description of the data collection process, data analysis techniques, and the prediction model applied.

This study utilizes a descriptive research design aimed at analyzing the trends in outpatient and inpatient visits related to Diabetes Mellitus at RSI Siti Hajar Sidoarjo. Descriptive research is particularly suitable for identifying patterns and trends within existing data, providing a clear overview of the situation.[5] The study relies on secondary data, which includes outpatient and inpatient visit records for patients diagnosed with DM from 2021 to 2023. The descriptive approach allows for an in-depth analysis of past trends, which forms the basis for the predictions made for the subsequent years.

Data Collection

Data for this study was collected from the medical records unit at RSI Siti Hajar Sidoarjo. The dataset includes records of outpatient and inpatient visits for patients diagnosed with Diabetes Mellitus over a three-year period from 2021 to 2023. The data used are secondary data from hospital records, ensuring that they represent the actual number of visits by DM patients to the hospital. The dataset was obtained through documentation techniques, which are considered reliable for gathering historical data on patient visits.[13]

The collected data includes:

- The total number of outpatient visits for DM patients each year (2021–2023).
- The total number of inpatient visits for DM patients each year (2021–2023).
- The data is categorized by year, with the intention to observe trends in visit frequency over time.

The data collected from the medical records were carefully reviewed to ensure accuracy, and any discrepancies were cross-checked with the hospital's records. This ensures the reliability of the data for subsequent analysis.

Data Analysis

The analysis of the data was carried out using a linear trend analysis approach, which is a common and effective method for prediction healthcare data. Linear regression models are often used in healthcare settings to predict future patient volumes based on historical data trends.[5] This approach is useful when examining variables that are expected to change at a constant rate over time.

The data analysis follows these steps:

1. *Data Preparation*: data from the years 2021 to 2023 was organized into intervals for both outpatient and inpatient visits.
2. *Trend Calculation:* a linear trend line was created for both outpatient and inpatient visits using the least squares method, a standard approach for linear regression analysis. This method minimizes the sum of the squared differences between observed and predicted values, making it a robust approach for prediction.[1]
3. *Prediction:* after determining the linear trend for each category (outpatient and inpatient visits), the data for the years 2024 to 2026 was predicted using the regression formula. This allows the hospital to anticipate the expected number of visits in the coming years based on past trends.

The linear regression model used the following formula for both outpatient and inpatient visits:
Y=a+bXY = a + bX

Where:

- Y is the predicted number of visits.
- a is the intercept of the line, representing the base number of visits in the first year.
- b is the slope of the line, indicating the rate of change in visits per year.
- X is the year number (2021, 2022, or 2023).

Model Validation and Accuracy

To ensure the accuracy of the predictions, the linear trend model was validated by comparing the predicted values for 2023 with the actual recorded values. The method used was the Mean Absolute Percentage Error (MAPE), which calculates the average of the absolute percentage errors between predicted and observed values. This provides an assessment of how well the linear trend model performs in predicting the actual data. [13] A low MAPE indicates a reliable model for prediction future visits.

Prediction Method

The prediction technique used in this study is based on linear regression, as described earlier. This method is widely adopted in healthcare studies due to its simplicity and effectiveness in predicting outcomes based on historical data. Linear regression assumes that the relationship between the independent variable (time) and the dependent variable (number of visits) remains consistent over the period under study. By using data from 2021 to 2023, the model predicts the number of outpatient and inpatient visits for the years 2024 to 2026.

For outpatient visits, the formula used for prediction is as follows:
Y=9601,3+1009(Year)Y = 9601,3 + 1009(Year)

For inpatient visits, the formula used for prediction is:
Y=476,6+195,5(Year)Y = 476,6 + 195,5(Year)

These equations were derived from the historical data, with the year factor applied to project the number of visits for the following years.

Table 1. Predicted Outpatient Visits for 2024-2026

Year	Predicted Outpatient Visits
2024	11 619,3
2025	12 628,3
2026	16 637,3

Table 2. Predicted Inpatient Visits for 2024-2026

Year	Predicted Outpatient Visits
2024	867
2025	1 063,1
2026	1 258,6

The predictions indicate a significant increase in both outpatient and inpatient visits, reflecting the growing prevalence of diabetes in the region and the rising demand for diabetes-related healthcare services.

Ethical Considerations

This study used secondary data collected from medical records, ensuring that patient confidentiality and data privacy were maintained. No direct patient interactions occurred during the data collection process. The hospital's medical records department provided the data, which was anonymized before analysis to protect patient identities. Ethical approval for the study was obtained from the hospital's ethics review board.

RESULTS

Outpatient Visits for Diabetes Mellitus at RSI Siti Hajar Sidoarjo

The data on outpatient visits for DM patients at RSI Siti Hajar Sidoarjo between 2021 and 2023 revealed a clear upward trend in the number of visits each year. Table 3 presents the actual outpatient visit data from 2021 to 2023.

Table 3. Outpatient Visit Data for Diabetes Mellitus Patients (2021-2023)

Year	Total Outpatient Visits	Percentage Increase
2021	8 800	-
2022	9 186	4,3 %
2023	10 818	17,8 %

The total number of outpatient visits for DM patients increased from 8 800 in 2021 to 9 186 in 2022, reflecting a 4,3 % increase. The subsequent year (2023) saw a much higher than previous year, increase of 17,8 %, with visits rising to 10,818. This pattern suggests a consistent rise in the number of DM patients seeking outpatient care at the hospital, which is in line with global trends where the prevalence of diabetes continues to rise.

Trend Analysis of Outpatient Visits

To further investigate the trend, a linear regression model was applied to the data from 2021 to 2023. The formula for the linear trend line is as follows:

Y=9601,3+1009×(X)Y = 9601,3 + 1009 /times (X)

Where:

- YY is the predicted number of outpatient visits,
- XX is the year index (2021 = -1, 2022 = 0, 2023 = 1),
- The slope (b=1009b = 1009) indicates the annual increase in visits.

The equation suggests that the number of outpatient visits will continue to rise steadily over the next few years. The predicted values for the years 2024 to 2026 are presented in table 4.

The results indicate a continued upward trend in outpatient visits for the coming years, with a projected increase of approximately 31,7 % by 2026. This forecast suggests that RSI Siti Hajar Sidoarjo will face significant growth in demand for outpatient services, requiring hospital management to plan for additional resources, staffing, and facilities to accommodate the rising number of visits.

Table 4. Predicted Outpatient Visits for 2024-2026

No	Year	Linear Trend Equation	Result
1.	2024	Y = 9601,3+1009(2)	11 619,3
2.	2025	Y = 9601,3+1009(3)	12 628,3
3.	2026	Y = 9601,3+1009(4)	16 637,3

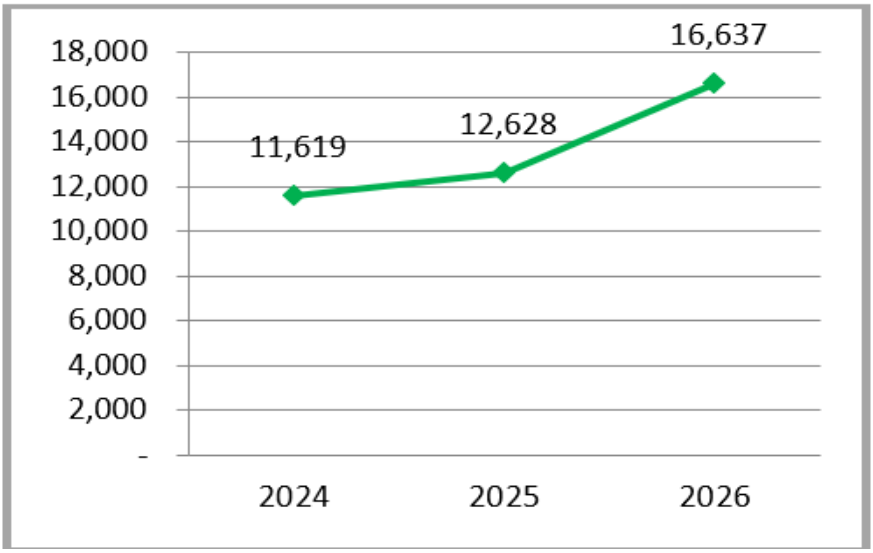

Figure 1. Outpatient visit trend diagram

Validation of Outpatient Visit Predictions

To validate the accuracy of the predictions, the predicted number of outpatient visits for 2023 was compared to the actual recorded visits. The predicted value for 2023 was 10,818, which exactly matches the observed data. This suggests that the linear regression model used in this study accurately reflects the trend in outpatient visits for DM patients at RSI Siti Hajar Sidoarjo, confirming the reliability of the prediction approach.

Inpatient Visits for Diabetes Mellitus at RSI Siti Hajar Sidoarjo

Inpatient visits for DM patients also followed a noticeable upward trend from 2021 to 2023. Table 5 presents the actual inpatient visit data for DM patients during this period.

Table 5. Inpatient Visit Data for Diabetes Mellitus Patients (2021-2023)

Year	Total Outpatient Visits	Percentage Increase
2021	325	-
2022	389	19,7 %
2023	716	84,1 %

The number of inpatient visits increased significantly by 19,7 % from 2021 to 2022, from 325 visits to 389. However, the most striking increase occurred between 2022 and 2023, with a remarkable 84,1 % rise, resulting in 716 inpatient visits in 2023. This substantial growth highlights the increasing severity of diabetes-related complications, which require hospitalization. According to literature, poorly controlled diabetes is a leading cause of hospitalization due to complications such as diabetic ketoacidosis, infections, and cardiovascular event.[14,15]

Trend Analysis of Inpatient Visits

A similar linear regression model was applied to predict inpatient visits for the years 2024 to 2026. The equation for the inpatient visit trend is as follows:

Y=476,6+195,5×***(X)Y*** = 476,6 + 195,5 \times (X)

Where:

- Y represents the predicted number of inpatient visits,
- X is the year index (2021 = -1, 2022 = 0, 2023 = 1),
- The slope (b=195,5b = 195,5) represents the annual increase in inpatient visits.

This model predicts a steady increase in inpatient visits in the coming years. The predicted inpatient visits for 2024 to 2026 are displayed in table 6.

Table 6. Predicted Inpatient Visits for 2024-2026

No	Year	Linear Trend Equation	Result
1.	2024	Y = 476,6+195,5(2)	867
2.	2025	Y = 476,6+195,5(3)	1 063,1
3.	2026	Y = 476,6+195,5(4)	1 258,6

The predicted results indicate a 31,7 % increase in inpatient visits by 2026. The hospital is expected to experience significant growth in the number of patients requiring inpatient care, which further emphasizes the importance of strategic planning to accommodate this demand. Hospital management must consider expanding inpatient facilities, increasing staffing levels, and ensuring that appropriate medical supplies are available to meet the growing need for care.[13,14,15,16]

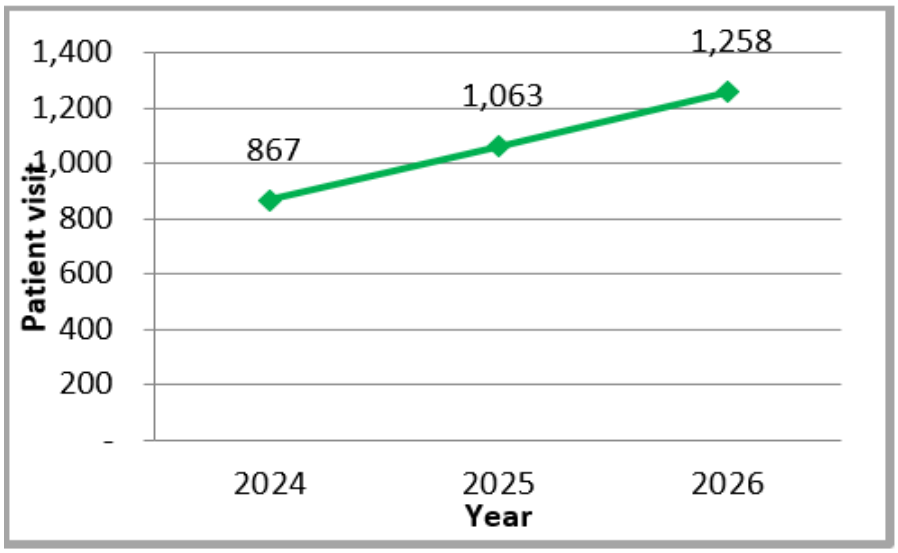

Figure 2. Inpatient visit trend diagram

Validation of Inpatient Visit Predictions

To validate the inpatient visit predictions, the actual number of visits in 2023 was compared with the predicted value. The linear regression model predicted 716 inpatient visits for 2023, which matched the actual recorded data precisely. This confirms the accuracy of the model in predicting inpatient visits at RSI Siti Hajar Sidoarjo, ensuring that the forecast for future years is based on reliable data.

DISCUSSION

The results from the trend analysis and prediction indicated a significant rise in both outpatient and inpatient visits over the past three years, with projected continued increases in the coming years. These findings underscore the growing burden of diabetes and its complications in the region and highlight the need for proactive planning in healthcare delivery. This section discusses the findings in detail, compares them with existing literature, explores the implications for healthcare management, and addresses the limitations of the study.

The data clearly indicates that the number of outpatient visits for diabetes-related care has been growing over the past few years. These findings are consistent with global trends indicating an increased demand for outpatient care as the prevalence of diabetes rises. According to [7], effective management of diabetes often requires frequent outpatient visits for monitoring blood glucose levels, medication adjustments, and prevention of complications.

The linear regression model predicted an increase of approximately 31,7 % by 2026 (table 4). This projected rise reflects the continued growth in the number of diabetes patients and the growing demand for outpatient care. The forecast suggests that RSI Siti Hajar Sidoarjo will experience an increasing number of outpatient visits, and the hospital will need to prepare for this demand by scaling up resources, including healthcare personnel, medical equipment, and facilities.

These findings align with literature that highlights the need for healthcare systems to plan for the increasing demand for diabetes care. Teh et al.[5] found that outpatient visits for chronic conditions like diabetes are increasing due to the rising burden of the disease. Furthermore, Huang et al.[8] requiring exogenous insulin to

sustain life. Achieving near normal blood glucose levels with insulin, a primary goal of diabetes management, carries a significant risk of hypoglycaemia. There is compelling evidence that an abnormal gut microbiota or dysbiosis can increase intestinal permeability (IPargue that early diagnosis and continuous monitoring of diabetes can significantly reduce complications and the need for inpatient care. The increasing outpatient visits at RSI Siti Hajar Sidoarjo can be seen as a result of improved access to care and better disease management, both of which contribute to the hospital's ability to manage a larger patient load.

This significant rise in inpatient visits highlights the growing severity of complications associated with diabetes, as patients often require hospitalization for conditions such as diabetic ketoacidosis, cardiovascular disease, and diabetic nephropathy.[15,17] The findings suggest that while outpatient services may be sufficient for managing stable diabetes cases, the increasing number of complications is pushing more patients into inpatient care.

The results from the linear regression model indicate that inpatient visits will continue to grow, further emphasizing the need for enhanced hospital capacity to accommodate the rising number of hospitalizations. The hospital's management must plan for increased bed capacity, additional healthcare staff, and more specialized care units to handle the growing demand for inpatient diabetes care.

These findings are consistent with existing literature that highlights the association between poor diabetes control and increased hospitalization rates. According to Zhang et al.[5], poorly managed diabetes is a leading cause of hospitalization due to complications such as cardiovascular diseases and infections. Furthermore, a study by Kutluay et al.[17] noted that an increase in diabetes-related complications often correlates with the need for inpatient care, particularly when outpatient treatment fails to manage the disease effectively. The substantial rise in inpatient visits observed at RSI Siti Hajar Sidoarjo underscores the importance of enhancing diabetes management strategies to reduce hospitalizations.

The significant increases in both outpatient and inpatient visits for DM patients at RSI Siti Hajar Sidoarjo have important implications for healthcare management. The steady rise in outpatient visits requires the hospital to ensure that its outpatient services are adequately equipped to handle the increased demand. This includes expanding the availability of diabetes-related services such as regular check-ups, glucose monitoring, and educational programs aimed at improving diabetes self-management. Effective management of diabetes in outpatient settings can potentially reduce the need for more intensive inpatient care, which is more spending cost and resource-intensive.[9,19,20]

For inpatient care, the rising number of hospitalizations underscores the need for enhanced healthcare infrastructure and specialized care. RSI Siti Hajar Sidoarjo must invest in expanding its inpatient facilities, increasing staffing levels, and improving the quality of care provided to patients with diabetes-related complications. The hospital may also consider implementing more comprehensive preventive care strategies, such as early detection and intervention programs, to reduce the need for hospitalization and improve long-term patient outcomes.[21] In addition, the increasing burden of diabetes highlights the need for effective health promotion and patient education programs. A study by El-Deyarbi et al.[22] emphasized the importance of regular follow-up care in reducing the recurrence of complications such as diabetic foot ulcers. By integrating health promotion and prevention strategies into the hospital's services, RSI Siti Hajar Sidoarjo can help patients manage their condition more effectively, reducing the need for inpatient care and improving overall health outcomes.[21,23]

The findings of this study align with existing literature on diabetes care, which emphasizes the growing demand for both outpatient and inpatient services due to the increasing prevalence of diabetes and its complications. A study by Monju et al.particularly diabetes mellitus. The prevalence of medication adherence among people with diabetes in rural communities is largely unknown. This study aimed to identify the prevalence and associated factors of medication adherence across sub-district healthcare facilities in Bangladesh. Research design and methods: This cross-sectional study included 389 diabetic patients from non-communicable disease corners (NCDsC found that medication adherence and regular healthcare visits are key factors in managing diabetes and preventing complications.[1]particularly diabetes mellitus. The prevalence of medication adherence among people with diabetes in rural communities is largely unknown. This study aimed to identify the prevalence and associated factors of medication adherence across sub-district healthcare facilities in Bangladesh. Research design and methods: This cross-sectional study included 389 diabetic patients from non-communicable disease corners (NCDsC Similarly, Teh et al. highlighted the importance of prediction models in predicting patient visits and optimizing resource allocation in healthcare settings.[5] This study builds on this literature by applying a linear trend prediction model to predict the future demand for diabetes-related services at RSI Siti Hajar Sidoarjo.

Moreover, the rising trend in inpatient visits observed in this study is consistent with research by Zhu et al.[24], who found that poorly controlled diabetes is closely linked to an increased risk of hospitalization. The substantial increase in inpatient visits at RSI Siti Hajar Sidoarjo suggests that more patients are experiencing severe complications that require hospitalization, which further emphasizes the need for improved diabetes

management strategies to prevent hospital admissions.

While this study provides valuable insights into the trends and predictions for diabetes-related visits at RSI Siti Hajar Sidoarjo, it is important to acknowledge some limitations. The primary limitation of this study is the reliance on secondary data, which may contain inaccuracies or inconsistencies due to variations in record-keeping practices or missing data. Although the data used were carefully reviewed for accuracy, potential errors in the data collection process cannot be entirely ruled out.

The linear regression model assumes that the relationship between the year and the number of visits remains constant over time. However, various factors such as changes in healthcare policies, economic conditions, or advances in diabetes treatment could influence patient visits in ways that are not captured by the model. For instance, improvements in diabetes care, such as the introduction of new medications or treatments, could reduce the need for inpatient visits in the future. Future studies could consider incorporating more complex models that account for such factors to improve the accuracy of predictions.

Given the limitations of this study, future research could explore the impact of external factors on the trends in diabetes-related visits. For example, the introduction of new healthcare policies, changes in diabetes treatment guidelines, or advancements in telemedicine could significantly alter the demand for diabetes care. Longitudinal studies that track changes in diabetes management over time would provide a more comprehensive understanding of how these factors influence patient visits.

Moreover, future research could examine the effectiveness of various interventions in reducing the need for hospitalization, such as early screening programs, lifestyle modification initiatives, and telehealth services. Understanding the impact of these interventions on patient outcomes would provide valuable insights for healthcare systems aiming to improve diabetes care while managing the increasing burden of the disease.

CONCLUSION

This study aimed to analyze the trends in outpatient and inpatient visits for Diabetes Mellitus (DM) at RSI Siti Hajar Sidoarjo from 2021 to 2023 and forecast future trends for the years 2024 to 2026 using linear regression analysis. The results revealed a significant increase in both outpatient and inpatient visits, highlighting the growing burden of diabetes and its complications at the hospital. Specifically, outpatient visits increased by 4,3 % in 2022 and 17,8 % in 2023, while inpatient visits saw a substantial rise of 19,7 % in 2022 and 84,1 % in 2023. Projections for the years 2024 to 2026 indicate that these trends will continue, with outpatient visits predicted to increase by approximately 31,7 % and inpatient visits expected to rise by a similar percentage.

The findings of this study underscore the need for proactive healthcare management to address the increasing demand for diabetes-related services. The hospital must scale up its outpatient and inpatient services, including expanding facilities, increasing staffing levels, and ensuring sufficient medical resources to meet the projected rise in patient visits. Additionally, improving diabetes management strategies, such as early diagnosis, integrated care, and health promotion programs, will be essential in managing the growing patient load and improving patient outcomes.

This research contributes to the existing body of knowledge by providing insights into the trends of diabetes-related visits at a major hospital in East Java, Indonesia, and offers a practical prediction model that can be applied in similar healthcare settings. By using a simple yet effective linear regression model, this study provides valuable projections that can help healthcare administrators plan for future resource needs. It also highlights the importance of early intervention and continuous care in managing diabetes, which aligns with findings from previous studies that emphasize the need for comprehensive diabetes management.

However, while the study provides useful insights, there are some limitations that should be addressed in future research. One limitation is the assumption that the trend will continue at a constant rate, ignoring potential factors such as changes in healthcare policies, technological advancements, or improvements in diabetes care that may alter the trajectory of patient visits. Further research could explore the impact of such factors on diabetes care and hospital visits. Longitudinal studies that incorporate variables like treatment advancements, lifestyle interventions, and patient education could provide a more nuanced understanding of how these elements affect the demand for healthcare services.

Furthermore, future research could expand the analysis by incorporating data from other hospitals in different regions or healthcare settings, providing a more comprehensive view of diabetes trends across Indonesia. Investigating the effectiveness of interventions aimed at reducing the need for hospitalization, such as telemedicine, home monitoring, and lifestyle modification programs, would also be valuable in shaping future healthcare strategies for diabetes management.

In conclusion, this study highlights the growing demand for diabetes-related healthcare services at RSI Siti Hajar Sidoarjo and the need for proactive planning to manage this increase effectively. The findings provide a basis for hospital administrators to make informed decisions regarding resource allocation and healthcare service improvements. By addressing the increasing prevalence of diabetes and its complications through improved diabetes care, early interventions, and strategic resource management, healthcare systems can

better meet the needs of patients and improve overall public health outcomes.

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FINANCING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Data curation: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Formal analysis: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Research: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Methodology: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Project management: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Resources: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

SoftwareAndiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Supervision: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Validation: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Display: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Drafting - original draft: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.

Writing - proofreading and editing: Andiani Andiani, Sulistiawati Sulistiawati, Lilik Djuari, Hanik Badriyah Hidayati, Kuntaman Kuntaman, Tri Yunita Fitria.