Headache Medicine

ID: 199

Temporal and seasonal patterns of public expenditures on headache-related hospitalizations: a population-based analysis

Maria Luiza Fragoso Pereira Neta[1], Matheus Fausto Barbosa Gonçalves[1], Ana Clara Sobreira Moura[1], Maria Thereza Corrêa Gondim Bezerra Rodrigues[1], Victor Matheus soares da Silva[2], Norma Rafaella Uchôa Espíndola[2], Emilly Maria Soares da Silva[3], Arthur Gabriel Alves Soares[4], Marina Arruda Cirilo e Lima[1], Andrei Malafronte de Pontes[1], Giovanna de Siqueira Vasconcelos[5]

[1]Afya School of Medical Sciences of Jaboatão dos Guararapes, Jaboatão dos Guararapes, Pernambuco, Brazil
[2]Maurício de Nassau University Center, Recife, Pernambuco, Brazil
[3]Olinda School of Medicine, Olinda, Olinda, Pernambuco, Brazil
[4]University of Pernambuco, Recife, Pernambuco, Brazil
[5]Tiradentes University, Goiana, Pernambuco, Brazil

Maria Luiza Fragoso Pereira Neta
mluizafgs@gmail.com

Introduction
Financial management within the Brazilian Unified Health System (SUS) requires predictability. Unlike infectious diseases, which present well-defined seasonal peaks, headache disorders are often perceived as a constant and linear healthcare demand. However, this assumption of stability may conceal relevant financial fluctuations driven by periods of increased pressure on emergency care networks, such as holiday seasons, seasonal transitions, or economic downturns that may compromise access to medications. Understanding whether a seasonal pattern exists in the costs of headache-related hospitalizations (ICD-10: G43–G44) is essential for state and municipal health managers to establish more dynamic and efficient budget planning throughout the fiscal year.

Objective
To investigate the presence of significant seasonality in hospital expenditures and hospitalization volume related to headache disorders within the SUS from 2019 to 2023, comparing monthly costs and variations in average hospital length of stay throughout the twelve months of the year.

Methods
This retrospective observational study was based on microdata from SIH/DATASUS. The sample (n=51,306) was stratified by monthly reporting periods, totaling 60 temporal observation points. Time-series decomposition methods (trend and seasonality component analysis) were performed using RStudio software. The analyzed variables included total billed cost, absolute number of hospitalizations, and average length of stay. Autocorrelation function (ACF) tests were applied to determine whether public expenditures followed a repetitive annual cycle.

Results
The time-series analysis demonstrated remarkable stability, with no statistically significant seasonality identified in expenditures ($p>0.05$). Mean monthly costs ranged from BRL 380,000.00 to BRL 410,000.00, without peaks consistently associated with specific months. The findings suggest that financial costs were primarily determined by hospitalization volume — directly influenced by the COVID-19 pandemic in 2020 — rather than by climatic or seasonal factors. A slight increase in costs was observed in hospitalizations billed during December and January (approximately 8% above the annual average), potentially related to reduced elective bed availability and increased emergency department burden during the end-of-year holiday period.

Conclusion
The absence of expenditure seasonality suggests that hospital demand for headache disorders within the SUS represents a persistent epidemiological phenomenon, largely unaffected by predictable annual cycles. This pattern may facilitate budget planning by enabling healthcare managers to adopt stable expenditure targets. However, financial costs remain elevated due to the sustained rate of hospitalizations, reinforcing the importance of strengthening outpatient management and primary healthcare strategies to reduce avoidable hospital admissions.

Keywords:
Hospitalization
Headache disorders
Health expenditures

© Copyright 2025