Economic Impact of Poison Control Center Interventions on Hospitalization Costs in Algeria: A Retrospective Analysis

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Abstract

•**Introduction:** Poisonings are a significant public health concern in Algeria, as they are worldwide. Management strategies range from simple observation to intensive care hospitalization. In this context, Poison Control Centers (PCCs) play a key role in supporting diagnosis, therapeutic decision-making, and prioritizing cases based on severity. Evaluating the economic impact of such centers has become a necessity to inform health policy.
•**Objective:** This study aims to assess the economic impact of the Poison Control Center (PCC) on healthcare expenditures related to poisoning in Algeria.
•**Materials and Methods:** A retrospective study was conducted at the National Toxicology Center's PCC from January to May 2025. It analyzed patient records from January to July 2024, focusing on poisoning cases in Algeria. Among the 6,663 calls received, 6,431 were related to poison exposures. Data on patient management, type of poisoning, age, sex, and clinical outcome were analyzed. A comparative model simulated a scenario without the PCC, where all non-hospitalized cases would have been directed, out of caution, to hospitalization at university medical centers. The average cost of a day in an emergency unit was estimated at 4,297.91 DZD (approximately 33.06 USD).
•**Results:** Out of 6,020 managed cases, 2,312 patients were hospitalized. In the absence of the PCC, 5,535 hospitalizations would likely have occurred—meaning 3,223 hospitalizations were avoided thanks to the PCC's guidance. This represents a total cost saving of 13,851,454 DZD, equivalent to approximately 106,550 USD, or around 17.7 USD saved per patient. Additionally, patients managed at home showed a very favorable recovery rate (%97.7).
•**Conclusion:** The PCC contributes to significantly reducing healthcare costs by avoiding unnecessary hospitalizations. These findings support strengthening the system and recognizing its strategic role in public health.
Keywords: Poison Control Center, poisoning, hospitalization, cost-benefit analysis

Background & Objectives

Poisonings are a major global public health problem due to their frequency and potentially severe health consequences. According to WHO, they cause nearly 300,000 deaths annually worldwide and represent a substantial economic burden. Poison Control Centers (PCCs) have demonstrated their value in reducing health risks and optimizing healthcare costs; in the United States, every dollar invested in PCCs is estimated to save about USD 6.50 in healthcare expenses.

In Algeria, poisonings also represent a significant health challenge. The National Poison Control Center (PCC), operating since 2017 under the Ministry of Health, provides 7/24 nationwide telephone support for healthcare professionals and the general public. In addition to clinical guidance, it plays a role in training and prevention. Between January and July 2024, the center managed 6,663 calls, including urgent cases requiring specialized medical care.

Objective

This study aims to evaluate the economic impact of the Algerian Poison Control Center on healthcare expenditures related to poisoning cases.

Methods

Data were collected through two complementary approaches:

1 **Literature review** (Dec 2024 – Feb 2025) on PubMed and Google Scholar using keywords related to poison control centers, health economics, and hospitalization costs. The goal was to identify evidence on the economic impact of Poison Control Centers (PCCs), particularly in reducing avoidable hospitalizations.

2 **Internal data collection** at the Algerian National Poison Control Center (**PCC**) covering January–July 2024. A retrospective study was conducted (Jan–May 2025) using standardized forms to extract patient characteristics, type of poisoning, management, and outcomes from **PCC** records.

Economic model:

•Analysis conducted from the **public payer perspective**, considering only direct medical costs.
•Two scenarios were compared using a decision tree model (adapted from Descamps et al., Int J Public Health, 2019):
-**Scenario 1 (With PCC):** Patients managed according to **PCC** recommendations (home care, outpatient monitoring, or hospitalization).
-**Scenario 2 (Without PCC):** All non-hospitalized patients assumed to be admitted for precautionary hospitalization.
•Unit costs of hospitalization were extracted from national literature.
•Results expressed in Algerian Dinars (DZD). Data analysis performed with Microsoft Excel 2021.

Results

Study population

Between January and July 2024, the Algerian National Poison Control Center (**PCC**) received **6,663 calls**, including 6,431 poisoning cases and 232 information requests. Most cases were **unintentional poisonings (n = 4,711)**, followed by **intentional cases (n = 1,309)** and **undetermined (n = 411)**. Children accounted for the majority of patients (n = 4,407). Calls mainly originated from healthcare professionals (> 93 %).

Clinical management

•**Unintentional poisonings (n = 4,711):**
  ▪ 8.3 % managed at home, 1.5 % under observation without treatment, 49.3 % under observation with treatment, 32.3 % hospitalized.
•**Intentional poisonings (n = 1,309):**
  ▪ 0.8 % managed at home, 0.5 % under observation without treatment, 32.1 % under observation with treatment, 60.4 % hospitalized.
•Clinical outcomes (documented cases) showed **a complete recovery without sequelae in nearly all home-managed or observation cases,** with **no deaths reported.**

Economic impact

•Observed hospitalizations with **PCC** intervention: 2,312 cases (38.4 %).
•Hypothetical scenario without **PCC**: all non-hospitalized cases admitted, totaling 5,535 hospitalizations.
•Hospitalizations avoided: 3,223.
•Unit hospital cost: 4,297.91 DZD/day (Tlemcen University Hospital study).
•Estimated savings: ≈ 13.85 million DZD over 7 months.
•Efficiency indicator: ≈ 2,301 DZD saved per case managed by CA

Conclusions

The Algerian National Poison Control Center (PCC plays a critical role in poisoning management by ensuring timely and tailored patient orientation. Its intervention prevents a substantial number of unnecessary hospitalizations, thereby optimizing resource use and generating significant savings for the public healthcare system.

On average, each case managed by PCC saved ≈ 2,301 DZD in avoidable hospital costs, confirming its positive economic impact. These findings highlight the strategic importance of PCC services in Algeria and support the need to strengthen its visibility, accessibility, and sustainable funding. Promoting systematic use of PCC expertise by healthcare professionals and the public can further enhance its clinical and economic benefits.

Competing interests: The authors declare that they have no competing interests

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