ACUTE PANCREATITIS IN AKMOLA REGION ACCORDING TO EMERGENCY SURGERY

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Abstract

Background: Acute pancreatitis is a major issue in surgical practice, with high complications and mortality rates. It severely affects patient quality of life and places a significant economic strain on healthcare systems, making its study crucial for public health. This study aims to analyze trends in acute pancreatitis incidence in the Akmola region from 2009 to 2022.

Materials and methods: The study is based on a retrospective analysis of data from the Ministry of Health of the Republic of Kazakhstan according to the International Classification of Diseases-10 code: K85. Methods of health statistics and time series analysis were used to assess the dynamics of morbidity.

Results: There was an increase in the total number of hospitalizations from 865 cases in 2009 to 1.061 in 2022. The percentage of surgical interventions decreased from 5.7% to 4.2%, while the share of conservative treatment increased to 95.8%. The mortality rate among operated patients was 20.4% in 2019 and increased to 33.3% in 2022. The incidence of hospitalization increased from 117.1 per 100000 population in 2009 to 144.6 per 100000 population in 2022, with a decrease in the rate of late visits from 42.6 to 36.1 per 100000 population, respectively.

Conclusion. The study highlights the need to improve medical approaches to acute pancreatitis in the Akmola region. The results indicate the critical importance of early diagnosis and timely hospitalization to reduce complications and mortality. Additional research is needed to develop more effective clinical protocols.

Introduction

Acute pancreatitis represents a significant challenge in contemporary surgical practice, characterized by a high incidence of complications and a substantial mortality risk.[1] The urgency of accurate diagnosis and the necessity for effective therapeutic strategies highlight the complexity of managing this disease and underscore the importance of a multifaceted approach.[2]

The study of acute pancreatitis holds

considerable relevance in the realm of public health and medical practice, owing to its profound impact on patient quality of life and the economic burden on healthcare systems.[3] The incidence of acute pancreatitis is approximately 20 cases per 100.000 individuals annually,[4] with heightened risk among the elderly population. The risk factors for acute pancreatitis are varied, encompassing lifestyle factors such as alcohol consumption and smoking, as well as medical conditions like gallstone disease and metabolic disorders.[5]

Regional disparities in the incidence and outcomes of acute pancreatitis can be attributed to differences in the accessibility and quality of medical care, necessitating the adaptation of medical strategies to local conditions.[6]

In the context of the Akmola region, modifying diagnostic and treatment protocols, enhancing the training of medical personnel,[7] ensuring access to advanced diagnostic equipment, and establishing a rapid response system could markedly improve patient outcomes and alleviate the burden on the healthcare system.[8,9]

The objective of this study was to analyze the epidemiological trends of acute pancreatitis in the Akmola region.

Materials and Methods

Data Collection: This study is grounded on a retrospective analysis of data provided by *the Ministry of Health of the Republic of Kazakhstan* concerning acute pancreatitis (ICD-10: K85) from 2009 to 2022 in the Akmola region. The data were meticulously extracted from Form 14, which encompasses comprehensive information on all reported cases of acute pancreatitis within the specified region.

Statistical Analysis

Descriptive Analysis: This initial phase aimed to establish a general overview of hospital incidence through the calculation of incidence rates per 100.000 of the total population. This foundational step facilitated the subsequent in-depth analyses by providing a baseline understanding of the data.

Time Series Analysis: Advanced time series methods were employed to elucidate trends in incidence rates over the study period. This included the application of the least squares method for trend identification and calculation of the average annual growth or decline rates, thereby enabling a robust temporal assessment of disease trends.

Parametric and Nonparametric Methods: These statistical techniques were used to evaluate the statistical significance of the observed trends. The combination of these methods ensured a comprehensive analysis, addressing both normally and non-normally distributed data.[8,9]

All statistical computations were executed using Microsoft Excel for basic analyses and an advanced online statistical package for more sophisticated analyses, ensuring accuracy and reliability in the findings.

Ethical Considerations. This study was conducted exclusively using publicly accessible administrative data, negating the need for direct interaction with individual participants and, consequently, ethical approval. Nevertheless, all data handling procedures strictly adhered to *theLaw of the Republic of Kazakhstan No. 257-IV dated March 19, 2010, "On State Statistics".* Additionally, the confidentiality of information was rigorously maintained following the principles outlined by *the Ethical Principles for Medical Research Involving Human Subjects (World Medical Association Declaration of Helsinki, 2013)*, ensuring that data were utilized solely for statistical purposes.

Results

A retrospective analysis of hospitalization data for patients diagnosed with acute pancreatitis (ICD-10: K85) in hospitals within the Akmola region revealed a significant increase in the number of cases from 2009 to 2022. Specifically, in 2022, the number of hospitalized patients reached 1.061, representing a 22.7% increase compared to the 865 cases reported in 2009. Over the entire period analyzed, the total number of hospitalizations amounted to 13.642 patients.

The therapeutic approaches adopted in these cases were primarily conservative, with surgery being performed on 814 patients, accounting for 6% of the total cases. Conversely, conservative treatment was applied in 94% of cases, encompassing 12.828 patients (Figure 1).

Figure 1.
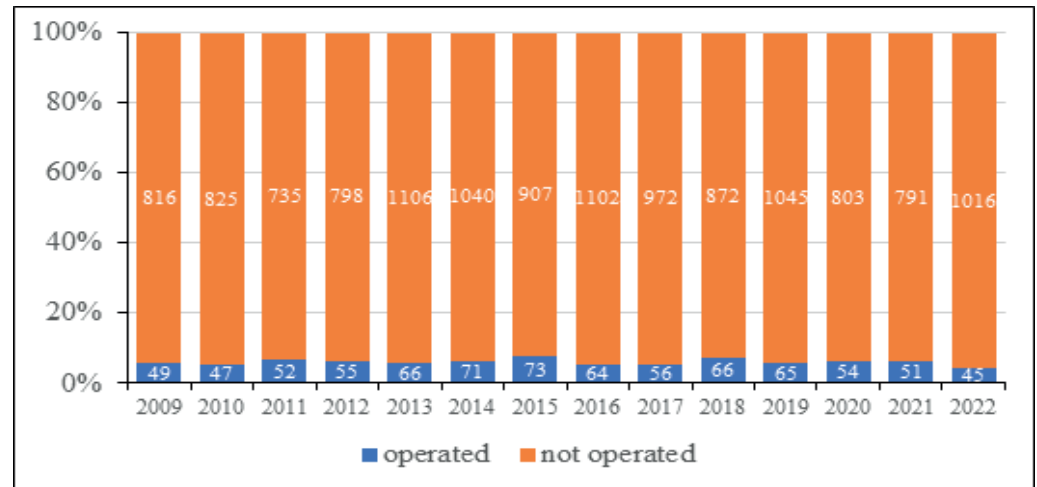The number of patients with acute pancreatitis in hospitals in Akmola region in 2009-2022
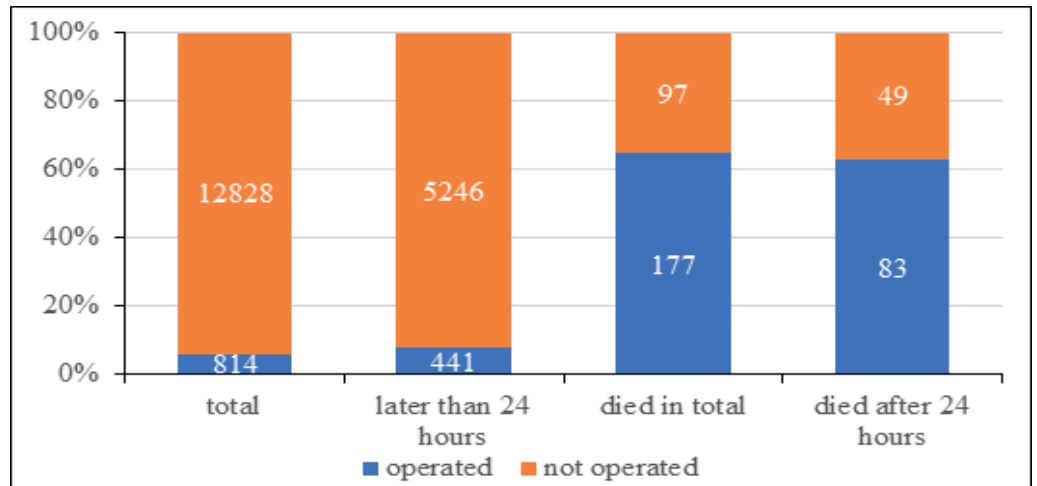
The dynamics of the proportion of surgical interventions during the reviewed period indicated a downward trend, decreasing from 5.7% (49 cases) in 2009 to 4.2% (45 cases) in 2022. This decline may reflect advancements and improvements in conservative treatment methods, as well as potential shifts in the criteria for selecting patients for surgical intervention. Additionally, enhancements in diagnosis and the optimization of primary care have been noted, contributing to the prevention of complications and reducing the necessity for surgical interventions (Figure 2).

Figure 2.
Dynamics of the number of operated/non-operated patients with acute pancreatitis in hospitals of Akmola region in 2009-2022


An analysis of mortality rates among patients diagnosed with acute pancreatitis revealed that 274 individuals succumbed to the condition over the 14-year period, constituting 2% of the total number of hospitalized patients. Among those who died, 35.4% (97 individuals) had not undergone surgery, whereas 64.6% (177 individuals) had undergone surgical procedures. The mortality dynamics among operated patients warrant particular attention; in 2009, the mortality rate among operated patients was 20.4% (10 out of 49 patients), which increased to 33.3% (15 out of 45) in 2022. This upward trend suggests potential issues in clinical practice or changes in the disease's nature.

Special attention should be directed towards analyzing the timing of hospital admissions. Out of the total number of patients with acute pancreatitis, 5.687 (41.7%) were admitted to the hospital more than 24 hours after the onset of symptoms. Among these, 441 patients (7.8%) underwent surgical intervention, with a mortality rate of 18.8% (83 deaths). In contrast, the mortality rate among those who did not undergo surgical treatment (5.246 patients) was signifi-

cantly lower at 0.9% (49 deaths) (Figure 1). These findings underscore the critical importance of early diagnosis and timely hospitalization in reducing mortality risks associated with acute pancreatitis. Further research to investigate the underlying causes of high mortality in specific years and among particular patient categories could contribute to the development of more effective clinical protocols and improved patient outcomes.

A study of the dynamics of hospital incidence of acute pancreatitis among the population of the Akmola region revealed a statistically significant increase in the incidence, rising from 117.1±4.0 cases per 100000 population in 2009 to 144.6±4.4 cases per 100000 population in 2022. This increase underscores the need for ongoing public health measures to address the rising burden of acute pancreatitis (Figure 3).
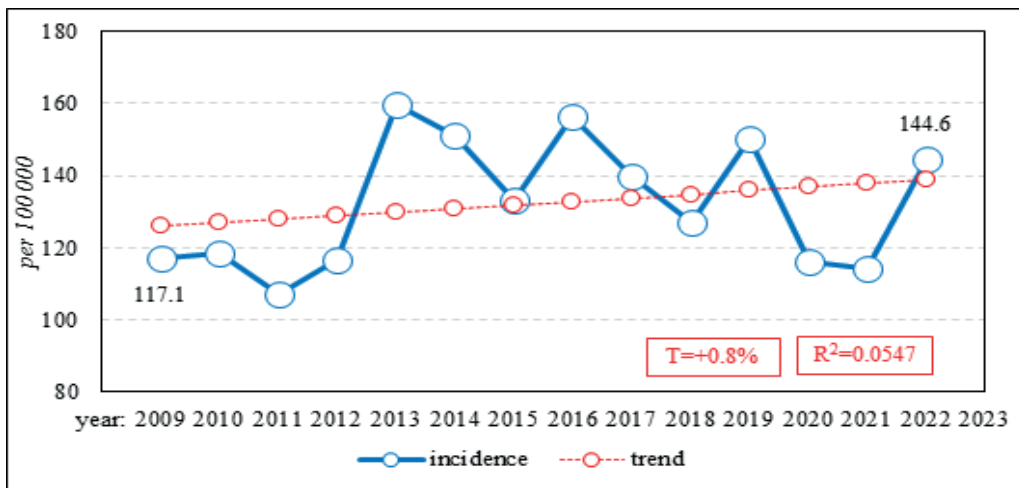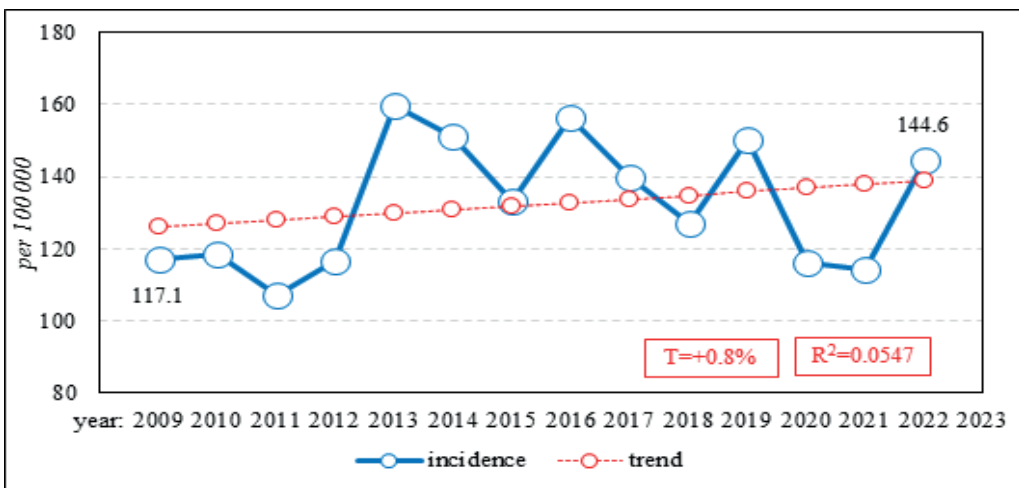

Figure 3.
Dynamics of hospital incidence of acute pancreatitis in Akmola region in 2009-2022

The t-test value of 4.62, with p=0.000, indicates the statistical significance of the observed changes in hospital morbidity within the region's population. The average annual hospital morbidity rate for the analyzed period was 132.4±4.8 cases per 100000 population, with a 95% confidence interval ranging from 123.0 to 141.7. This study highlights the necessity of continuous monitoring of epidemiological indica-

tors and analyzing factors contributing to morbidity trends, which can inform the development of targeted preventive and therapeutic interventions to enhance public health outcomes.

A study of the hospital incidence dynamics of acute pancreatitis due to delayed treatment (more than 24 hours after symptom onset) in the Akmola region revealed significant changes from 2009 to 2022 (Figure 4).

Figure 4.
Dynamics of late hospital incidence of acute pancreatitis in Akmola region in 2009-2022

In 2009, the average annual rate of hospitalizations associated with late treatment was 42.6±2.4 cases per 100000 population, with a 95% confidence interval from 37.9 to 47.3. By 2022, this rate had significantly decreased to 36.1±2.2 cases per 100000 population, with a 95% confidence interval from 31.8 to 40.5. The difference between the 2009 and 2022 data was statistically significant, as confirmed by a t-test value of 2.0 and a significance level of p=0.046. The analysis of the decline rate in late hospital morbidity indicators showed an average annual decrease of 4.5%. However, the coefficient of determination (R^2=0.2995) indicates a low degree of model approximation, reflecting the instability of the observed decreasing trend in late applicant morbidity. This decline may be associated with improved public awareness of the symptoms and complications of acute pancreatitis, increased early diagnosis programs, better access to medical care, and enhanced quality of primary care. These results underscore the importance of sustained awareness campaigns and improving healthcare service accessibility to prevent late referrals and reduce associated morbidity and mortality.

Discussion

Comparing the findings from the Akmola region with global data reveals several key aspects and differences in the epidemiology, diagnosis, and treatment of acute pancreatitis.

According to the Global Burden of Disease study, morbidity and mortality from acute pancreatitis vary significantly by region. Regions such as Eastern Europe exhibit high morbidity and mortality rates, aligning with the data from the Akmola region which also shows elevated incidence and mortality. These disparities can be attributed to differences in access to healthcare, the quality of medical services, and the prevalence of major risk factors such as alcohol consumption and smoking.[10,11]

International studies indicate an overall improvement in the outcomes of acute pancreatitis due to early diagnosis and effective initial management, which includes adequate rehydration and early nutritional support. This trend is mirrored in the Akmola region, where a decrease in the number of surgical interventions and an increase in conservative treatments have been observed. However, the high mortality rate among patients undergoing surgery, as noted in your study, suggests a need for further analysis of the quality of surgical care and the timeliness of medical intervention.[11]

The significance of timely access to qualified medical care in improving patient prognoses for acute pancreatitis is well-documented in international literature. Effective early treatment strategies, such as proper hydration and early nutrition, have been shown to reduce mortality and complication rates. These findings underscore the necessity for improving medical protocols and enhancing the training of healthcare professionals to optimize early-stage treatment of pancreatitis.[11]

Limitations: The limitations of this study include its retrospective design, which may not provide the same depth of clinical detail as prospective research. Additionally, focusing solely on the Akmola region may limit the broader applicability of the findings to other regions with varying healthcare systems and population characteristics. The study's reliance on administrative data introduces the possibility of variability in reporting accuracy and completeness.

What's known? Acute pancreatitis is a common and serious condition often requiring emergency surgery due to its potential for severe complications. Literature highlights the unpredictability of the disease's progression, with timely intervention being crucial to reducing mortality and minimizing the impact on healthcare resources.

What's new? The study provides new insights into the trends of acute pancreatitis in the Akmola region, showing an increase in hospitalizations and a shift towards conservative treatments over surgical interventions. It underscores the importance of early diagnosis and timely hospitalization in reducing complications and mortality, with the need for improved clinical protocols

Conclusion

The results underscore the importance of ongoing monitoring of epidemiological indicators and the analysis of factors contributing to changes in morbidity and mortality from acute pancre-

atitis. This continuous monitoring will enable the development of targeted preventive and therapeutic measures aimed at improving public health outcomes and reducing the burden on the healthcare system.By identifying and addressing the factors contributing to high mortality rates, particularly among surgical patients, and by refining treatment protocols, healthcare providers in the Akmola region can enhance the quality of care for patients with acute pancreatitis. This approach will not only improve patient outcomes but also help in the efficient allocation of healthcare resources.

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