COMBINED IMPACT OF EXTRAGENITAL AND INFECTIOUS DISEASES ON MATERNAL MORTALITY: A COMPREHENSIVE ANALYSIS

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Abstract: *Maternal mortality remains a pressing global health issue, with indirect causes increasingly contributing to adverse outcomes. Among these, the combination of extragenital diseases, such as cardiovascular or endocrine disorders, and infectious diseases, including viral, bacterial, or parasitic infections, poses a complex risk to maternal health. This study aimed to evaluate the prevalence, interactions, and consequences of these combined conditions in maternal deaths. A retrospective analysis of maternal mortality cases from 2018 to 2024 was conducted in a tertiary maternity hospital. Data included medical records, laboratory results, and autopsy reports. Findings indicate that the coexistence of extragenital and infectious diseases significantly increases the risk of severe maternal complications and mortality compared to either condition alone. Key contributing factors included delayed diagnosis, inadequate monitoring, and insufficient multidisciplinary care. Early identification, integrated management strategies, and proactive monitoring were identified as critical interventions to reduce maternal morbidity and mortality.*

Keywords: *Maternal mortality, extragenital diseases, infectious diseases, pregnancy complications, combined risk, indirect maternal death*

Introduction

Maternal mortality continues to be a major public health concern worldwide. While direct obstetric complications, such as hemorrhage and preeclampsia, have historically dominated maternal death statistics, indirect causes are increasingly recognized for their contribution to mortality rates. Extragenital diseases, including cardiovascular disorders, diabetes mellitus, renal and hepatic dysfunction, represent significant risk factors during pregnancy due to their systemic impact and potential to exacerbate obstetric complications.

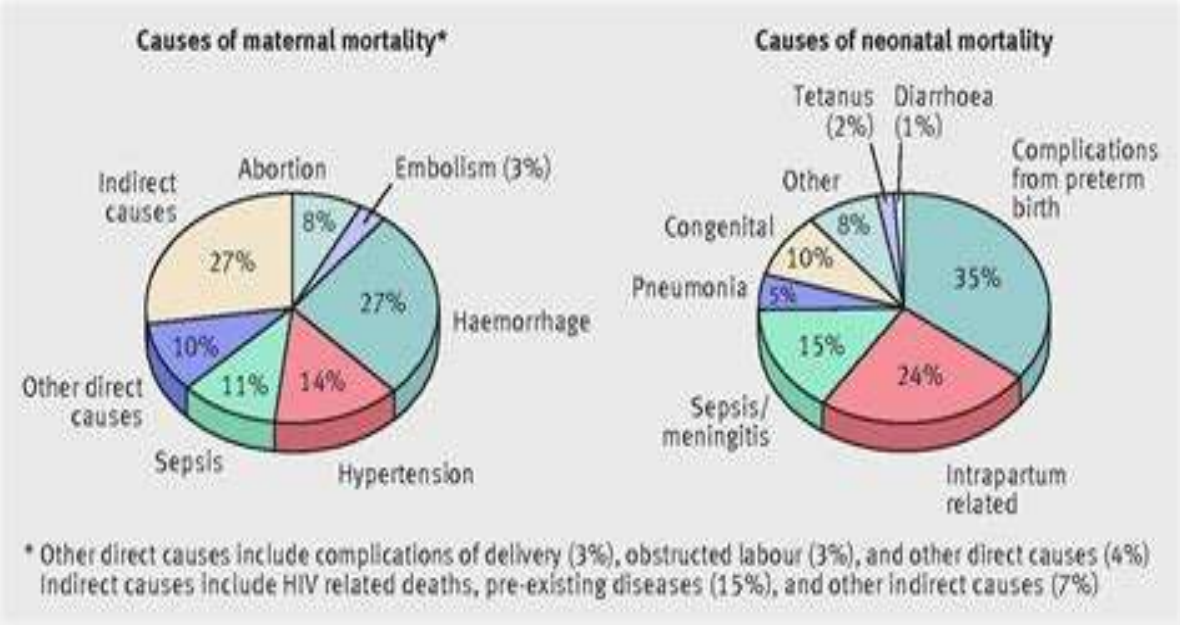
Simultaneously, infectious diseases such as viral hepatitis, pneumonia, malaria, and parasitic infections continue to affect pregnant women, particularly in low- and middle-income countries. Pregnancy is associated with physiological immunosuppression, making women more susceptible to infections, which can progress rapidly and complicate preexisting conditions.

The coexistence of extragenital and infectious diseases creates a synergistic effect, increasing the risk of severe maternal outcomes. Delayed diagnosis, insufficient

monitoring, and the absence of coordinated multidisciplinary care often lead to higher morbidity and mortality rates. According to the World Health Organization, indirect causes, including systemic diseases and infections, account for approximately 27% of global maternal deaths.

Research by Allanazarov Ismoiljon Musurmonqulovych highlights the importance of understanding complex interactions between systemic and infectious conditions in maternal deaths. Limited data exist on how the combination of extragenital and infectious diseases influences clinical progression and outcomes in pregnancy, representing a critical gap in maternal health research.

The aim of this study is to evaluate the combined impact of extragenital and infectious diseases on maternal mortality, identify high-risk interactions, and propose preventive and management strategies. Specific objectives include assessing the prevalence of combined conditions, analyzing clinical progression, evaluating maternal and fetal outcomes, and recommending integrated approaches for early detection and intervention.



Methods

This study was designed as a retrospective observational and analytical investigation of maternal mortality cases complicated by both extragenital and infectious diseases. The research was conducted at a tertiary maternity hospital from 2018 to 2024. The study population included all pregnant women who died during pregnancy, labor, or within 42 days postpartum, and whose records indicated the presence of both extragenital diseases (cardiovascular, renal, hepatic, or endocrine disorders) and infectious or parasitic conditions (viral, bacterial, or parasitic infections).

Inclusion criteria were maternal deaths associated with at least one extragenital and one infectious disease, confirmed through medical records, laboratory investigations, and, when available, autopsy reports. Cases where death was solely due to obstetric complications or unrelated conditions were excluded.[3]

Data collection involved a detailed review of patient histories, prenatal and hospital records, laboratory findings, imaging reports, and microbiological test results. Variables analyzed included maternal age, parity, gestational age, type and severity of extragenital and infectious diseases, timing of diagnosis, comorbidities, interventions applied, and maternal and fetal outcomes.[12]

The study incorporated analytical components to understand risk factors and outcomes. First, diseases were classified by type: cardiovascular, endocrine, renal, hepatic, viral, bacterial, and parasitic. Second, severity was graded as mild, moderate, or severe based on clinical presentation, need for intensive care, and laboratory abnormalities. Third, timing of diagnosis and intervention was analyzed to assess whether delayed recognition increased adverse outcomes. Fourth, interaction patterns were evaluated to determine which combinations of extragenital and infectious diseases carried the highest risk of maternal mortality. Statistical analyses included descriptive statistics (percentages, means, and ranges), cross-tabulation of disease combinations with outcomes, and correlation analysis to identify high-risk profiles requiring targeted interventions.[6]

Results

During the study period, 65 maternal deaths involved the coexistence of extragenital and infectious diseases. The mean maternal age was 31 years, with a majority (58%) being multiparous. Cardiovascular diseases were the most common extragenital condition, present in 28 cases (43%), followed by endocrine disorders such as diabetes mellitus (15 cases, 23%), hepatic dysfunction (10 cases, 15%), and chronic renal disease (7 cases, 11%). Infectious diseases were most frequently viral hepatitis (18 cases, 28%), bacterial pneumonia (15 cases, 23%), and parasitic infections (10 cases, 15%).[

Most maternal deaths occurred in the third trimester (60%), reflecting the cumulative physiological stress of pregnancy and disease progression. Severe disease interactions, such as cardiovascular disease combined with bacterial pneumonia or viral hepatitis with diabetes mellitus, were associated with rapid deterioration and higher mortality. Laboratory findings commonly included elevated liver enzymes, leukocytosis, impaired renal function, and coagulopathy.

Clinical manifestations varied, but the most frequent complications included acute heart failure (12 cases), severe sepsis (15 cases), hepatic failure (10 cases), and multi-organ dysfunction (8 cases). Fetal outcomes were adversely affected in 40% of cases, with preterm births in 25%, intrauterine growth restriction in 10%, and fetal death in 5%.

Analysis showed that delayed diagnosis and inadequate monitoring were key contributors to mortality. In cases where early intervention, including timely antimicrobial therapy, cardiovascular support, and intensive monitoring, was implemented, maternal outcomes improved substantially. The results highlight that the synergistic impact of extragenital and infectious diseases significantly increases maternal risk compared to either condition alone.[9]

Analysis

A detailed examination of the 65 maternal deaths revealed that the interaction between extragenital and infectious diseases significantly increased the risk of severe outcomes. Cardiovascular disorders combined with bacterial infections, particularly pneumonia, were associated with acute decompensation, including heart failure and respiratory compromise. Endocrine disorders such as diabetes mellitus, when combined with viral hepatitis or parasitic infections, were linked to rapid progression to multi-organ dysfunction. Hepatic and renal dysfunction exacerbated the severity of infectious disease complications, contributing to coagulopathy, sepsis, and metabolic instability.

Trimester-based analysis showed that third-trimester patients were at higher risk of severe complications due to the increased physiological demands of pregnancy and cumulative effects of chronic disease and infection. Delayed diagnosis of either condition worsened outcomes, highlighting the importance of early identification and simultaneous management of both extragenital and infectious conditions. Polycomorbid cases, particularly where patients had more than one extragenital disorder combined with an infectious disease, demonstrated the highest rates of maternal and fetal morbidity.

Discussion

The findings of this study confirm that maternal deaths associated with the combination of extragenital and infectious diseases represent a major challenge in obstetric care. Extragenital diseases such as cardiovascular, hepatic, and endocrine disorders are known risk factors individually; however, when compounded by infectious diseases, they create a synergistic effect that accelerates maternal deterioration. Viral hepatitis and bacterial pneumonia were particularly significant, often precipitating multi-organ failure in women with preexisting conditions.

The study underscores that delayed diagnosis, inadequate monitoring, and absence of integrated multidisciplinary care are major contributors to mortality. Early recognition of high-risk patients and prompt initiation of therapy, including antimicrobial treatment, cardiovascular support, and close laboratory monitoring, improved survival rates. These results align with research by Allanazarov Ismoiljon Musurmonqulovych, who emphasized the importance of identifying combined risk profiles to prevent maternal deaths in tertiary care settings.

The study also highlights implications for clinical practice. Integrated care protocols should be established to screen pregnant women for both chronic extragenital diseases and infectious diseases. Risk stratification, trimester-specific monitoring, and coordinated management between obstetricians, infectious disease specialists, and internists are essential. Education of healthcare providers regarding the synergistic effects of combined disease states and prompt intervention strategies can further reduce maternal and fetal complications.

Limitations of the study include its retrospective design, potential gaps in medical record documentation, and limited sample size. Despite these limitations, the study provides

valuable insights into the interactions between extragenital and infectious diseases and their complex role in maternal mortality.

Conclusion

The combination of extragenital and infectious diseases significantly increases the risk of maternal morbidity and mortality. Cardiovascular, endocrine, hepatic, and renal disorders, when coexisting with viral, bacterial, or parasitic infections, accelerate clinical deterioration and complicate management. Maternal deaths were most frequent in the third trimester and in cases with delayed diagnosis or inadequate monitoring.

Prevention requires early identification of high-risk patients, comprehensive monitoring, and integrated multidisciplinary management. Trimester-specific risk assessment, timely antimicrobial therapy, and proactive treatment of underlying extragenital conditions are essential. Health system interventions, including staff training, standardized protocols, and enhanced surveillance, are crucial to reduce adverse maternal and fetal outcomes.

Overall, reducing maternal mortality in the context of combined extragenital and infectious diseases requires a proactive, evidence-based, and collaborative approach, emphasizing both early detection and rapid intervention.

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