Mortality trends and disparities in myeloproliferative disorders in the united states (US): A nationwide demographic and geographic analysis (1999–2020) using CDC WONDER data

M. Fatima [1], A. Ijaz [1], F. Fatima [2], A. Raza [2], I. Shahid [1], I. Ahmed [1]
1. King Edward Medical University, Lahore, Pakistan
2. Services Institute of Medical Sciences, Lahore, Pakistan

Introduction

Myeloproliferative Disorders (MPDs) are rare but life-threatening disorders that occur due to dysfunction of the bone marrow, which results in excess red blood cells, white blood cells, or platelet production. Polycythemia vera (PV), essential thrombocythemia (ET), and primary myelofibrosis (PMF) fall under MPDs.

Aim

This study aims to explore the mortality trends due to myeloproliferative disorders, stratified by demographics and geographic regions in the US from 1999 to 2020.

Methods

Data was extracted from the CDC WONDER database (2018-2023) involving ICD-10 Codes: D47.1 using Age-Adjusted Mortality Rate (AAMR) per 1,00,000 individuals. Join point regression (Version 5.3.0 National Cancer Institute) was used to assess Annual Percent Changes (APCs) and Average APCs (AAPCs) with a 95% Confidence Interval. Mortality trends were analyzed for different variables like gender, age, race, urbanization, states, and census regions.

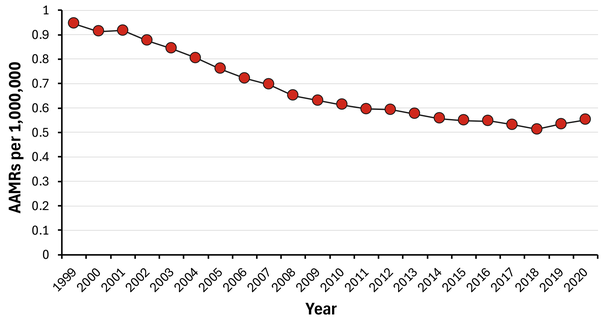
Discussion

The findings of our analysis align with earlier U.S. findings (1999–2006) showing a -3.4% APC when MPDs were the underlying cause of death.[1] Therapeutic advances, especially JAK inhibitors like ruxolitinib (approved in 2011) and fedratinib, have played a key role, with studies showing a 53% reduction in mortality post–ruxolitinib.[2] Men showed a greater mortality burden in our study. Men carry a higher burden of JAK2 V617F and accumulate high-risk somatic mutations (such as ASXL1, U2AF1, SRSF2, EZH2), which are associated with significantly poorer survival.[3] Blacks in our study showed the steepest decline in mortality, while Whites showed the highest AAMRs. This aligns with the racial disparities in CVD-related MPD mortality in a study by Agarwal et al.[4] Enhanced diagnostic criteria, incorporating WHO updates and JAK2 mutation identification, have facilitated earlier intervention and more accurate prognostication, resulting in a consistent decline in mortality over the past two decades.

Results

48,951 deaths occurred from 1999 to 2020. AAMR decreased from 1999(0.96) to 2020 (0.55) with AAPC of -2.53 (95% CI: -2.18 to -2.88). Male AAMR (0.88) was higher than that of females (0.55), but the decrease in male mortality (AAPC: -3.07; 95%CI: -3.48 to -2.66) was more than that of females (AAPC: -2.51; 95%CI: -3.05 to -1.98). The Midwest had the highest AAMR (0.77), followed by the West (0.68), Northeast (0.67), and South (0.57). All regions showed a decrease in AAPC. The drop in mortality was the most pronounced for the South (AAPC: -3.15). AAMR was highest for the Whites (0.69), followed by Blacks (0.47) and then Asians (0.38). The Blacks showed the greatest decrease (AAPC: -3.39). AAMR was the lowest for Arizona (0.46) and the highest for North Dakota (0.97). Micropolitan areas (nonmetro) had the highest AAMR (0.74) than Large Central Metro (0.602). Micropolitan areas exhibited a greater drop in mortality (AAPC: -2.76%) than metropolitan areas.

Trends in Myeloproliferative Disorders-Related Mortality in the US from 1999 to 2020



Conclusion

From 1999 to 2020, there was a significant drop in MPD-related mortality. Males, the Whites, adults ≥75 years, rural areas, and the Midwest had higher AAMRs. Our findings underscore the need for targeted interventions to control these disparities.

References

1. Recent decline in the U.S. death rate from myeloproliferative neoplasms, 1999–2006, *Cancer Epidemiology*
2. Fedratinib, a newly approved treatment for patients with myeloproliferative neoplasm-associated myelofibrosis, *Leukemia*
3. Sex determines the presentation and outcomes in MPN and is related to sex-specific differences in the mutational burden, *Blood Advances*
4. Trends and disparities in cardiovascular disease–related mortality among adults with myeloproliferative neoplasms in USA, *European Heart Journal*

The authors declare no conflict of interest

SOHO2025