

Global Incidence, Prevalence, Mortality, and Burden of Pulmonary Arterial Hypertension: A 30-year Analysis and Future Projections

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Abstract

Background: Pulmonary arterial hypertension (PAH) is a progressive condition characterized by elevated pulmonary artery pressure, leading to substantial morbidity and healthcare burden globally. This study aimed to elucidate epidemiological trends and the global burden of PAH across diverse populations and regions, identifying knowledge gaps regarding its impact and risk factors. **Methods:** We analyzed data from the Global Burden of Disease 2021 study spanning 1990 to 2021, focusing on incidence, prevalence, mortality, disability-adjusted life years, age-standardized rates (ASRs), and average annual percentage change. Joinpoint regression was used to detect temporal shifts and calculate annual percentage change. All measures were stratified by sex, age, and sociodemographic index (SDI). Future trends were projected using the Bayesian age-period-cohort model. **Results:** Globally, the number of prevalent PAH cases increased from 105,703 in 1990 to 191,808 in 2021, although the age-standardized prevalence rate remained stable. PAH-related deaths rose from 14,842 to 22,021, while the age-standardized mortality rate (ASMR) declined, suggesting improvements in disease management. Males experienced greater reductions in ASMR and age-standardized death rate than females. Higher ASR were observed in low-SDI regions. Projections indicate that continued declines in ASMR through 2040, but a rising number of PAH cases, particularly among females. **Conclusions:** These findings highlight the importance of sustained surveillance and tailored public health strategies to reduce the burden of PAH and support efficient healthcare resource allocation in the face of evolving demographic and regional challenges.

Keywords

Pulmonary Arterial Hypertension, Global Burden of Disease, Epidemiological Trends and Burden, Disability-adjusted Life Years, Average Annual Percentage Change, Age-standardized Rates