Post-reproductive Change of Sex Gap in Total and Cause-specific Mortality

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Extended Abstract

Context. Sex disparity in mortality has been widely documented, but how the sex mortality gap vary across the life span and underlying cause of death and what biological and social processes contribute to such variation are not well understood.

Objective. To test the hypothesis of post-reproductive reduction of sex mortality gap by modeling age variations in sex differences in total and cause-specific mortality risks.

Design, Setting, and Participants. The National Health and Nutrition Examination Survey (NHANES) Linked Mortality study, a population-based study of community-dwelling adults aged 17 and older surveyed and examined in 1988 – 2004 and followed up through 2006.

Main Outcome Measures. Mortality from all causes, circulatory diseases, malignant neoplasms (lung and other cancers), infectious and parasitic diseases, pneumonia and influenza (P&I), external, and other causes.

Results. A total of 1,902 deaths were recorded in the analytic sample for the follow-up period of up to 18 years (average=9.2 years). Descriptive analyses show higher male mortality rates (per 100,000 person-years) for all ages and causes except non-lung cancers in which mortality rates are higher for females in ages 17-44 and decreases in the ratios (smaller male excesses) in ages 45 and above for non-cancer mortalities. Multivariate analyses using Cox regression models show that adjusting for all other risk factors, post-reproductive male excesses decrease for total

mortality and mortality from circulatory diseases, infection diseases, and P&I; no clear sex difference during reproductive ages but a large male excess afterwards are observed for cancer mortality; and no significant age variations in the male excesses exist for external and residual causes of death. Differential exposures to social status and behaviors, physiological dysregulation, and morbidity account for the post-reproductive reductions of sex mortality gaps completely in the case of circulatory diseases, partially or minimally in the other causes of death. Social status and relationship indicated by race, education, family income, and marital status are more important risk factors for mortality in younger ages, behavioral and lifestyle factors including smoking, alcohol use, and physical activity are significant for all ages, and physiological dysregulation indicated by inflammation, metabolic disorders, and other markers of frailty is more predictive of mortality in old ages.

Conclusions. Sex difference in human mortality risk is not universal in either direction or magnitude but has strong age variations and is cause-specific. Biological and social behavioral factors jointly and independently affect age changes in sex mortality gaps. And their effects differ across stages of the life course and causes of death. Additional population-based studies of age changes in rate of acceleration of mortality risk by detailed cancer site are needed to further test the biological basis of the post-reproductive change in sex difference in cancer mortality.