

Original Research

Increased Incidence of Early Mortality in POSNA Members: A Canary in the Coal Mine?

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Abstract:

Background: In light of increasing productivity demands and modern changes to work/life balance, physician wellness has become a more pertinent topic among physicians. Although wellness can be challenging to quantify, mortality represents a definitive parameter. We investigated whether modern pediatric orthopaedic surgeons are at higher risk for early mortality than their historic cohorts.

Methods: Data was collected from the Pediatric Orthopaedic Society of North America (POSNA), which records the passing of its members. The members were sorted into the decennial nearest their birth year. Using publicly available data from the U.S. Social Security Administration, we determined life expectancy from age 45 for all deceased members (LE45) and compared this to their actual age at death.

Results: There were a total of 70 deceased POSNA members included. POSNA members born nearest the decennials of 1930 and 1940 had only one instance of a member dying more than 15 years prior to their expected age at death, compared to 10 instances from the 1950 and 1960 decennials. There was one member each from the 1950 and 1960 decennials dying more than 30 years prior to their expected age at death, compared to three from the 1970 decennial.

Conclusions: Although this data is difficult to analyze due to limitations in the cohort size, the results are concerning and highlight the importance of more understanding of physician wellness. Additional study is necessary to further investigate if younger surgeons are at risk for early mortality.

Level of Evidence: Level 4, case series

Key Concepts:

- Recognition of physician burnout and wellness is increasing.
- In recent decades there appears to be an increasing number of POSNA members passing away before expected ages.
- While mortality is difficult to directly link to burnout and wellness issues, the findings of the current study merit further investigation.

Introduction

In recent years, the importance of physician wellness has received increasing recognition among practicing physicians, whose busy work schedules and lifestyles can have negative impacts on work productivity and personal well-being.¹ Poor physician wellness increases the risk for negative mental health outcomes in physicians and also compromises the quality, safety, and efficiency of medical care for patients.² A study from 2009 showed that when physicians frequently work shifts longer than 24 hours, the resulting fatigue can lead to increased risk of burnout, percutaneous needle stick injuries, motor vehicle crashes, and near miss incidents when driving home.¹

Although parameters to measure wellness are difficult to assess, mortality represents a definitive outcome. While some causes of death may seem clear and obvious, others can result from myriad causes over a lifetime. Suicide rates for physicians are estimated to be six times higher than in the general population.¹ Cardiovascular mortality is also higher than average and 8-12% of all practicing physicians are expected to develop a substance abuse disorder at some point in their career.¹

Surgeons have been identified as a high-risk physician group. In a 2016 study of 7,825 surgeons across specialties, 509 (6.4%) surgeons admitted to having suicidal ideation in the year prior to the survey.³ Though the prevalence among surgeons aged 25 to 34 years and 35 to 44 years were similar to that of the general population within the same age groups, suicidal ideation among surgeons aged 45 to 54 years, 55 to 64 years,

and older than 65 compared to the age-matched general population were 1.5 to 3.0 times more common.³

With increasing demands for productivity in modern medicine combined with increases in dual-income families, younger pediatric orthopaedic surgeons may find themselves struggling to maintain work-life balance. Recently, a practice partner of one of the authors passed away at a relatively young age and was the impetus to learn more about mortality among pediatric orthopaedic surgeons. We, therefore, analyzed data from the Pediatric Orthopaedic Surgeons of North America (POSNA) membership database to better understand whether there is an increase in mortality in the current generation of pediatric orthopaedic surgeons.

Materials and Methods

Data was collected from a POSNA database of members, which included the date of birth and the date of death. We elected to use data from members who practiced mostly or entirely within the United States (U.S.) to reduce variability. Each time a member passed away, the name and date of death were documented by POSNA. A total of 95 U.S.-based POSNA members had died at the time of data collection (April 2022). Our hypothesis was that there was an increased rate of early mortality in more recently born POSNA members. In order to correct for changing life expectancy, we calculated an expected age at death for each member utilizing data from the actuarial tables found at the U.S. Social Security Administration (SSA) (<https://www.ssa.gov/OACT/NOTES/as120/LOT.html>).

We sorted members into the decennial nearest their year of birth. For example, members born within the years from 1935 to 1944 would be sorted into the 1940 group. We then needed to choose a floor age from which we would calculate life expectancy. We elected to measure this from 45 years of age, as opposed to from birth, as this would eliminate early-in-life confounders (e.g., infant mortality) and create a more uniform cohort (i.e., 45-year-old pediatric orthopaedic surgeons practicing in the U.S.). Only one of the 95 members had predeceased 45 years of age; this member was the only deceased member in the 1980 decennial and was excluded from analysis. With our age floor of 45 years, we established a cutoff birth year at 1926, as any member born prior to 1926 would have been older than 45 at the time of the founding of the Pediatric Orthopaedic Society (POSNA's predecessor) in 1971 and might have missed inclusion. This eliminated 25 additional members.

Using the SSA actuarial tables, we determined life expectancy from age 45 (LE45) for each remaining member (n=70) based on gender and dates of birth using the closest decennial (Table 1). We applied the industry standard for life expectancy literature using the value of 15 years to equal one standard deviation (SD). We then calculated how many members from each decennial preceded their LE45 by one or more standard deviations.

Results

Seventy POSNA members born between decennials 1930 and 1970 and meeting our inclusion criteria had died as of April 1, 2022 (Table 2). For the members born

Table 1. Average Life Expectancy from Age 45 Years by Decennial

Decennial	LE45 Females	LE45 Males
1930	80.9	76.1
1940	81.7	77.7
1950	82.5	78.8
1960	83.3	79.7
1970	84	80.5

Table 2. POSNA Members Not Reaching LE45

Decennial Nearest Birth Year	Deceased Members	Members Not Reaching LE45 by at Least:	
		15 years	30 years
1930	27	0	0
1940	22	1	0
1950	14	6	1
1960	4	4	1
1970	3	3	3

Each member who did not reach LE45 by 30 years was included in the count for the number of members who did not reach LE45 by 15 years.

in the earliest decennial (1930), none died one standard deviation prior to their LE45. While only one POSNA member from the 1940 decennial died 1SD prior to their LE45, 10 members from the 1950 and 1960 decennials died at least 1SD prior. No members from the 1930 and 1940 decennials died 2SD prior to their LE 45, compared to one each in the 1950 and 1960 decennials, and three in the 1970 decennial.

Discussion

Our analysis of the POSNA membership database found that amongst the members born in the more recent decennials, there appears to be an increasing number of POSNA members who missed their LE45 by one or two standard deviations. Mortality data has been reported for other physician groups. In 2000, a cohort of 40,285 anesthesiologists was assembled from the Physician Master File (PMF) maintained by the American Medical Association.⁴ Another cohort of 136,834 internists was collected from the PMF for comparison.⁴ The standard mortality ratios for major causes of death among male and female anesthesiologists and internists were lower than that of the general population.⁴ However, male anesthesiologists showed a 34% excess risk of death from accidental poisoning compared to the general population.⁴ Female anesthesiologists and internists showed an elevated risk of suicide compared to their counterparts in the general population.⁴ The higher risk

of death from accidental poisoning or suicide amongst internists and anesthesiologists is worth considering because it points to specific causes of death that may be more common among specific physician cohorts.⁴ Given the findings from the aforementioned studies, it will be key to consider the causes of increased mortality specific to the work and the demands of pediatric orthopaedic surgeons.

There is existing literature on potential causes of early mortality specific to orthopaedic surgeons compared to the general population. A 2009 study found that female orthopaedic surgeons had a prevalence of cancer that was 85% higher than that of the general U.S. female population.⁵ Moreover, the analysis showed that female orthopaedic surgeons had a statistically significant 2.9-fold higher prevalence of breast cancer compared to the general U.S. female population.⁵ One potential explanation for these findings was the low-dose radiation exposure during clinical practice for orthopaedic surgeons.⁵

In some studies, physician mortality has been directly compared to mortality in the general population. A study from 2000 collected data from the National Occupational Mortality Surveillance and analyzed the causes of death among Caucasian and Black male physicians who passed away between 1984 and 1995.⁶ The results showed that both Caucasian and Black physicians were older when they died compared with others in the population.⁶ These results further suggest improved mortality in older generation physician groups, which aligns with the findings from our analysis.

In the conversation on physician wellness and mortality, burnout is a common topic of discussion, as it affects an estimated 75% of physicians in some studies.⁷ Limited effort to maintain personal health and wellness can exacerbate burnout and increase susceptibility to early mortality.⁷ In 2005, Cohen and Patten recorded that 17% of resident doctors rated their mental health as fair or poor, which is more than double the amount reported in the general population.⁸ Though there are ways to address mental health concerns, there is a limited

emphasis on self-care amongst physicians based on some studies. For example, in one study of Canadian physicians, 18% identified as depressed; only one in four of those considered getting help, and only 2% actually did.¹ Certain prevalent physician personality traits (e.g., perfectionism, workaholism, and “type A personalities”) are associated with adverse health outcomes, including burnout, depression, anxiety, eating disorders, and cardiovascular disease.¹

With regard to surgeons, there have been strong associations found between burnout and personal well-being. A 2009 landmark study of members of the American College of Surgeons revealed that 40% of responding surgeons screened positively for burnout, and 30 percent screened positively for symptoms of depression.⁹ Among orthopaedic surgeons specifically, the prevalence of burnout is also notable. Shanafelt et al. found that nearly half of orthopaedic surgeons experienced symptoms of burnout—slightly less than physicians in emergency medicine, general internal medicine, and family medicine subspecialties.¹⁰

Studies have attempted to clarify the underlying causes of mortality in physicians, including possible associations with poor mental health. In 2003, Hendin et al. claimed that suicide is a disproportionately high cause of mortality in physicians, particularly in female physicians.¹¹ The authors point out that, in the general population, the suicide rate of men is more than four times higher than that of women, but among physicians, the rate for women is comparable to that in male physicians.¹¹ Depression is a common risk factor for suicide, and Hendin et al. argue that it is as common in physicians as it is in the general population.¹¹ The consensus statement cites that the lifetime prevalence of self-reported depression in physicians is about 13% for men and 20% for women, which is similar to that of the general population.¹¹ In the aforementioned 2000 study from Biola et al. of mortality rates among male Caucasian and Black physicians, the researchers found that physicians’ top 10 causes of death were essentially the same as that of the general population.⁶ However,

the Caucasian male physicians in the study were more likely than other Caucasian male professionals to die from external causes of injury (e.g., air and space transport accidents, accidental poisonings, suicide and self-inflicted injury, and drug-related causes), hepatitis (excluding chronic nonviral), malignant melanoma of the skin, Alzheimer's disease, pancreatic cancer, cerebrovascular disease, and non-acute myocardial infarction ischemic heart disease.⁷ Caucasian female physicians aged 90 years or less were significantly more likely to die compared to other female professionals from cancers of the genital (noncervical) organs, drug-related deaths, and suicide and self-inflicted injury.⁶ The above studies show that physicians are at a higher risk of dying from accidents, suicide, and drug-related causes. In the context of this paper, it is important to consider how wellness may play a role in these causes.

Limitations

There are important limitations to this study. Given the ever-changing POSNA membership, an overall surgeon count has been rapidly increasing and may account for the increasing numbers seen. Unfortunately, membership counts prior to 2010 were not obtainable as POSNA records were converted to digital in 2010 and we were thus unable to correct for changing surgeon numbers with time. On the other hand, the younger groups did not have the same opportunity to pass away further from their LE45. Future study may show that this increase in early mortality is not as significant as this early analysis demonstrates. The causes of death are not well documented, so it is not known why mortality is higher among the younger POSNA surgeons in this study's cohort. The studied cohort is overwhelmingly male and white, so our data may not be applicable to female and underrepresented minority POSNA members.

Conclusion

For POSNA members born from the 1950 decennial onward, there seems to be a higher risk for early mortality. These preliminary results are concerning and require more investigation to better understand these potential trends. In the meantime, these findings highlight the importance of studying physician wellness and to discern whether there is a link between wellness and mortality.

Disclaimer

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