

Impact of Offspring Death on Cognitive Health in Late Life: The Cache County Study

Daylee Greene, Ph.D., JoAnn T. Tschanz, Ph.D., Ken R. Smith, Ph.D., Truls Østbye, M.D., Ph.D., Chris Corcoran, Sc.D., Kathleen A. Welsh-Bohmer, Ph.D., Maria C. Norton, Ph.D. for the Cache County Investigators

Objective: *Experiencing the death of a child is associated with negative short-term mental health consequences, but less is known about cognitive outcomes and whether such associations extend to late life. We tested the hypothesis that experiencing an offspring death (OD) is associated with an increased rate of cognitive decline in late life. **Methods:** This population-based longitudinal study observed four cognitive statuses spaced 3–4 years apart, linked to an extensive database containing objective genealogic and vital statistics data. Home visits were conducted with 3,174 residents of a rural county in northern Utah, initially without dementia, aged 65–105. Cognitive status was measured with the Modified Mini-Mental State Exam at baseline and at 3-, 7-, and 10-year follow-ups. OD was obtained from the Utah Population Database, which contains statewide birth and death records. **Results:** In linear mixed models, controlling for age, gender, education, and apolipoprotein E status, subjects who experienced OD while younger than age 31 years experienced a significantly faster rate of cognitive decline in late life, but only if they had an $\epsilon 4$ allele. Reclassifying all OD (regardless of age) according to subsequent birth of another child, OD was only related to faster cognitive decline when there were no subsequent births. **Conclusion:** Experiencing OD in early adulthood has a long-term association with cognitive functioning in late life, with a gene–environment interaction at the apolipoprotein E locus. Subsequent birth of another child attenuates this association. (Am J Geriatr Psychiatry 2013; ■:■–■)*

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Received July 30, 2012; revised April 21, 2013; accepted May 9, 2013. From the Department of Family Consumer and Human Development (DG, MCN), Department of Psychology, Center for Epidemiologic Studies (JTT, MCN), and Department of Mathematics and Statistics, Center for Epidemiologic Studies (CC), Utah State University, Logan, UT; the Department of Family and Consumer Studies, Population Sciences, Huntsman Cancer Institute (KRS), University of Utah, Salt Lake City, UT; Duke Global Health Institute (TØ) and The Joseph and Kathleen Bryan Alzheimer's Disease Research Center (KAW-B), Duke University, Durham, NC; and Duke–NUS Graduate Medical School (TØ), Singapore. Presented in part at the 63rd annual conference of the Gerontological Society of America, New Orleans, November 19–23, 2010. Send correspondence and reprint request to Dr. Maria C. Norton, Department of Family Consumer and Human Development, Utah State University, 2905 Old Main Hill, Logan, UT 84322-2905. e-mail: maria.norton@usu.edu

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Impact of Offspring Death on Dementia Risk in Late Life

“There’s no tragedy in life like the death of a child. Things never get back to the way they were.”

—Dwight D. Eisenhower

INTRODUCTION

The death of any family member is difficult, but losing a child may be the most traumatic, because it is an “off-timing” event that violates the natural order of life. Further, it is often not the number of stressful events but rather the timing of these events that determines the amount of stress individuals experience.¹ Experiencing the death of a child may lead parents to have lasting psychological distress,² especially because it is associated with longer and more intense periods of grief than the loss of a spouse or parent.³ Some parents experience sadness not only for the loss of their child but also feel as though a part of themselves has died with their child.⁴

Bereavement-related stress after offspring death (OD) may be compounded by concomitant experiences. Nearly half of parents who experience the death of a child report strained marital relationships, lack of communication between spouses, or distancing in the relationship, often resulting in divorce.⁵ This added stress may result in negative lifestyle behaviors, also raising the risk of adverse health outcomes and mortality.^{6,7} Loss of a child may increase the risk of several negative health outcomes, such as myocardial infarction,⁸ diabetes,⁹ and multiple sclerosis.¹⁰ Thus, experiencing the death of a child disrupts parental health and well-being, with effects that may be manifested short and long term over the course of parents’ lives.¹¹

Less well studied is the potential impact of the death of a child or other close family member on late-life dementia risk. Death of a spouse has been associated with more rapid cognitive decline in later life¹² and death of a father during childhood with higher dementia risk,¹³ with a net of adjustment for socioeconomic status. Because most bereaved parents feel as though their grief is a continual process that does not have a definitive end,⁷ they experience stress from the loss of their child for a number of years after their child’s death.

A possible explanation for the association between chronic psychological stress and dementia risk derives from observations showing that chronic exposure to

psychological stress leads to a sustained increase in stress hormone production, which in turn can produce excess free radicals that may damage tissues and organs, including the brain.¹⁴ The *RCAN1* gene is thought to play a role in the development of tauopathies such as Alzheimer disease (AD), and *RCAN1* proteins can be induced by psychosocial and emotional stress.¹⁵ In addition, aged individuals have an impaired ability to discontinue the production of stress hormones (glucocorticoids); this may paradoxically lead to the so-called glucocorticoid cascade cycle that can have serious neurologic consequences.¹⁶

The objective of the current study was to assess the impact of a child’s death on cognitive decline in late life, hypothesizing that such adversity would be associated with chronic psychological stress and result in faster cognitive decline. This study used a large population-based sample of older adults, using objective records to define exposure to OD, thereby eliminating recall bias. Cognitive functioning generally declines over time as a natural function of age, and animal studies also suggest that neuronal resilience to stress may be lost with age, given that the brains of older rats self-repaired less readily after stress than younger rats.¹⁷ These observations suggest that the older the individual is when experiencing the death of a child, the greater the impact on cognitive health. However, young adults are much more likely than older adults to use coping strategies that suggest lower levels of impulse control and self-awareness, which are indicative of their lower levels of maturity.¹⁸ Younger individuals may therefore be less successful at coping with the traumatic event of losing a child. Although some evidence suggests that age of a child at death can influence the grieving process for parents,¹⁹ the findings are mixed regarding the link between OD and parental outcomes when using child’s age at death as an independent variable.²⁰ The current study therefore examined whether associations between OD and cognitive decline varied by timing of OD and age of the offspring at death. Furthermore, because women are 1.5–2 times as likely to experience depression (potential marker of psychological stress) than men,²¹ we hypothesized that this association would be stronger among women. Additionally, because apolipoprotein E (APOE) genotype has been shown to moderate associations between other psychosocial stressors and dementia risk, for

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