Menopause: The Journal of The North American Menopause Society
Vol. 24, No. 1, pp. 000-000
DOI: 10.1097/GME.0000000000000710

Ages at menarche and menopause and reproductive lifespan as predictors of exceptional longevity in women: the Women's Health Initiative

Aladdin H. Shadyab, PhD,[1,2] Caroline A. Macera, PhD,[2] Richard A. Shaffer, PhD,[2] Sonia Jain, PhD,[3] Linda C. Gallo, PhD,[4] Margery L.S. Gass, MD,[5] Molly E. Waring, PhD,[6] Marcia L. Stefanick, PhD,[7] and Andrea Z. LaCroix, PhD[8]

Abstract

Objective: The aim of the present study was to investigate associations between reproductive factors and survival to age 90 years.

Methods: This was a prospective study of postmenopausal women from the Women's Health Initiative recruited from 1993 to 1998 and followed until the last outcomes evaluation on August 29, 2014. Participants included 16,251 women born on or before August 29, 1924 for whom survival to age 90 during follow-up was ascertained. Women were classified as having survived to age 90 (exceptional longevity) or died before age 90. Multivariable logistic regression models were used to evaluate associations of ages at menarche and menopause (natural or surgical) and reproductive lifespan with longevity, adjusting for demographic, lifestyle, and reproductive characteristics.

Results: Participants were on average aged 74.7 years (range, 69-81 y) at baseline. Of 16,251 women, 8,892 (55%) survived to age 90. Women aged at least 12 years at menarche had modestly increased odds of longevity (odds ratio [OR], 1.09; 95% CI, 1.00-1.19). There was a significant trend toward increased longevity for later age at menopause (natural or surgical; $P_{trend} = 0.01$), with ORs (95% CIs) of 1.19 (1.04-1.36) and 1.18 (1.02-1.36) for 50 to 54 and at least 55 compared with less than 40 years, respectively. Later age at natural menopause as a separate exposure was also significantly associated with increased longevity ($P_{trend} = 0.02$). Longer reproductive lifespan was significantly associated with increased longevity ($P_{trend} = 0.008$). The odds of longevity were 13% (OR 1.13; 95% CI, 1.03-1.25) higher in women with more than 40 compared with less than 33 reproductive years.

Conclusions: Reproductive characteristics were associated with late-age survival in older women.

Key Words: Aging – Lifespan – Longevity – Menarche – Menopause.

The number of women aged 90 years or older in the United States has increased dramatically in the past century. Currently estimated at 1.3 million, this demographic is expected to quadruple by 2050.[1] Despite this rapid increase, exceptional longevity is still considered a rare phenomenon.[2] Factors predisposing to a long lifespan in women are not fully understood.

Although ages at menarche and menopause have been studied in relation to cardiovascular disease (CVD), diabetes, and mortality in previous reports,[3-26] their association with longevity has received little attention. Later ages at menarche and menopause have been associated with reduced all-cause and cardiovascular mortality risk in some[4-6,9,13] but not all[7,8,11] studies. Longer reproductive lifespan, defined as

Received March 22, 2016; revised and accepted May 10, 2016.

From the [1]San Diego State University/University of California San Diego Joint-Doctoral Program in Public Health (Epidemiology), San Diego, CA; [2]Division of Epidemiology, Graduate School of Public Health, San Diego State University, San Diego, CA; [3]Division of Biostatistics and Bioinformatics, Department of Family Medicine and Public Health, University of California, San Diego School of Medicine, La Jolla, CA; [4]Department of Psychology, San Diego State University, San Diego, CA; [5]The North American Menopause Society, Emeritus, Cleveland, OH; [6]Departments of Quantitative Health Sciences and Obstetrics and Gynecology, University of Massachusetts Medical School, Worcester, MA; [7]Department of Medicine, Stanford Center for Prevention Research, Stanford University School of Medicine, Stanford, CA; and [8]Division of Epidemiology, Department of Family Medicine and Public Health, University of California, San Diego School of Medicine, La Jolla, CA.

Funding/support: This study was supported by grant KL2TR000160 (Dr. Waring) from the National Institutes of Health. The WHI Program is funded by contracts HHSN268201100046C, HHSN268201100001C, HHSN268201100002C, HHSN268201100003C, HHSN26820110000 4C, and HHSN271201100004C from the National Heart, Lung, and Blood Institute, National Institutes of Health, US Department of Health and Human Services. The National Heart, Lung, and Blood Institute has representation on the WHI Steering Committee, which governed the design and conduct of the study, the interpretation of the data, and preparation and approval of manuscripts.

Financial disclosure/conflicts of interest: None reported.

Address correspondence to: Aladdin H. Shadyab, PhD, San Diego State University/University of California, San Diego Joint-Doctoral Program in Public Health (Epidemiology), Family Medicine and Public Health, University of California, San Diego, 9500 Gilman Drive #0725, La Jolla, CA 92093. E-mail: aladdinhs@yahoo.com