



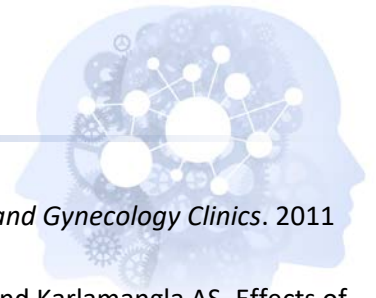
SWAN Fact Sheet: Memory and Cognition During and After the Menopause Transition*

Many areas of the brain, such as the hippocampus and prefrontal cortex, are rich in estrogen receptors. This has led researchers to hypothesize that falling estrogen levels during the menopause transition might cause difficulties with memory and other aspects of cognition. The SWAN study followed a cohort of women through the menopause transition, and longitudinally tracked their performance on tests of verbal memory, working memory and cognitive processing speed; we list below the major findings.

- About two-thirds of women reported memory complaints such as forgetfulness during the menopause transition [1].
- In premenopause, objective measures of both verbal memory and processing speed improved with repeat testing, demonstrating the ability to improve with practice. In perimenopause however, this improvement with practice was not seen, consistent with the women's perception of memory and cognition difficulties. This perimenopausal decrement appears to be time-limited, as improvement with practice was seen again in early postmenopause [2].
- Sleep and mood problems increase during the menopause transition. Lack of sleep is linked to poor memory and difficulty focusing one's thoughts; depression and anxiety impair effort and performance on cognition testing.
 - SWAN women with depressive symptoms did perform less well on tests of processing speed, and women with anxiety symptoms showed smaller practice-related improvements in verbal memory scores.
 - During the menopause transition, self-reported measures of sleep and hot flashes were not associated with decrements in memory, processing speed, or practice-related improvements [3].
 - In early postmenopause however, women with sleep difficulties such as greater wakefulness and sleep fragmentation, scored lower on cognitive processing speed [4].
- After menopause (which occurs on average at age 52) cognitive processing speed fell, but declines in verbal and working memory scores did not typically start until later, after ages 58 and 61 years, respectively [5,6].
- Women with high blood pressure, elevated glucose, and obesity, and women who reported financial hardship experienced faster declines in cognitive processing speed [6,7,8].

What can you do?

- Address sleep problems by modifying your sleep habits or talking with a health professional to come up with possible solutions. Many sleep apps are available to improve sleep. For more information, refer to the SWAN sleep fact sheet.
- Other studies have found that objectively measured hot flashes are associated with memory difficulties. If you are experiencing hot flashes, discuss them with your health care provider. Refer to the SWAN hot flashes fact sheet.
- Address mood and anxiety symptoms during the menopause transition; discuss them with your healthcare provider.
- If memory changes come on suddenly, you should report them to your primary health care provider.
- Working with your health care provider to control blood pressure, glucose and weight is important for overall health. Whether controlling these conditions also lessens cognitive decline is being tested in ongoing clinical trials.



For more information, please check out:

1. Greendale GA, Derby CA, and Maki PM. Perimenopause and cognition. *Obstetrics and Gynecology Clinics*. 2011 Sep 1;38(3):519-35.
2. Greendale GA, Huang MH, Wight RG, Seeman TE, Luetters C, Avis NE, Johnston J, and Karlamangla AS. Effects of the menopause transition and hormone use on cognitive performance in mid-life women. *Neurology* 2009; 72: 1850-1857.
3. Greendale GA, Wight RG, Huang MH, Avis N, Gold E, Joffe H, Seeman T, Vuge M, and Karlamangla AS. Menopause-associated symptoms and cognitive performance: Results from the Study of Women's Health Across the Nation. *Amer J Epidemiol* 2010; 171(11): 1214-1224
4. Swanson LM, Hood MM, Hall MH, Kravitz HM, Matthews KA, Joffe H, Thurston RC, Butters MA, Ruppert K, Harlow SD. Associations between sleep and cognitive performance in a racially/ethnically diverse cohort: the Study of Women's Health Across the Nation. *Sleep*. 2021 Feb;44(2):zsaa182.
5. Karlamangla AS, Lachman ME, Han W-J, Huang M-H, and Greendale GA. Evidence for cognitive aging in midlife women: Study of Women's Health Across the Nation. *PLoS One* 2017 January 3;DOI:10.1371/journal.pone.0169008
6. Greendale GA, Han W, Huang M, Upchurch DM, Karvonen-Gutierrez C, Avis NE, and Karlamangla AS. Longitudinal assessment of physical activity and cognitive outcomes among women at midlife. *JAMA Netw Open*. 2021 Mar 1;4(3):e213227
7. Kazlauskaite R, Janssen I, Wilson RS, Appelhans BM, Evans DA, Arvanitakis Z, El Khoudary SR, Kravitz HM. Is midlife metabolic syndrome associated with cognitive function change? The study of women's health across the nation. *The Journal of Clinical Endocrinology & Metabolism*. 2020 Apr1;105(4):e1093-105.
8. Derby CA, Hutchins F, Greendale GA, Matthews KA, Sternfeld B, Everson-Rose SA, Kazlauskaite R, Whitmer RA, Brooks MM. Cardiovascular risk and midlife cognitive decline in the Study of Women's Health Across the Nation. *Alzheimer's & Dementia*. 2021 Mar 12.

*SWAN recognizes that race is a social construct and that including race/ethnicity in describing our findings is complicated, with there being reasons for and against doing such. We and others are actively reviewing the best approach to ensure that we provide patients with the best information about their health.