# Psychological stress in relation to dementia and brain structural changes

**Akademisk avhandling**

som för avläggande av medicine doktorsexamen vid Göteborgs Universitet kommer att offentligt försvaras fredagen den 14 september 2012 kl. 13.00 i Mölndalsaulan.

Mölndalssjukhus. Göteborgsvägen 31. Mölndal.

by

**Lena Johansson**

This work is based on following articles:

I. Lena Johansson, Xinxin Guo, Margda Waern, Svante Östling, Deborah Gustafson, Calle Bengtsson, Ingmar Skoog. *Midlife Psychological Stress and Risk of Dementia: A 35-Year Longitudinal Population Study.* Brain. 2010; 133:2217-24

II. Lena Johansson, Ingmar Skoog, Deborah R Gustafson, Pernille J. Olesen, Margda Waern, Calle Bengtsson, Cecilia Björkelund, Leonardo Pantoni, Michela Simoni, Lauren Lissner, Xinxin Guo. *Midlife Psychological Distress Associated With Late-Life Brain Atrophy and White Matter Lesions: A 32-Year Population Study of Women.* Psychosomatic Medicine 2012; 74:120Y125

III. Lena Johansson, Xinxin Guo, Tore Hällström, Maria C Norton, Margda Waern, Svante Östling, Calle Bengtsson, Ingmar Skoog. *Common psychosocial life stressors in relation to perceived stress and Alzheimer's disease over 38 years.* (manuscript)

Opponent: Professor emerita Marie Åsberg, Institutionen för kliniska vetenskaper

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# ABSTRACT

Psychological stress has been recognized as an increasing public health problem with serious consequences in both physical and mental health. Women reported a higher prevalence of psychological stress, especially in midlife. Earlier studies suggested that psychological stress may cause neuronal degeneration and brain damage by changes in endocrine, metabolic, cardiovascular, and immune systems. The aim of this thesis was to examine whether midlife psychological stress and psychosocial life stressors were associated with increased risks of dementia and brain structural changes in late-life.

The thesis is part of *the Prospective Population Study of Women* in Gothenburg, which was initiated in 1968 with an examination of a representative sample of women (n=1462, participation rate 90%) born in 1908, 1914, 1918, 1922, and 1930. Follow-ups were performed in 1974-75, 1980-81, 1992-93, 2000-02, and 2005-07. Psychological stress was reported according to a standardized question in all examinations, and 18 predefined psychosocial life stressors were rated in 1968. Dementia and subtypes of dementia were diagnosed according to DSM-III-R criteria, based on information from neuropsychiatric examinations, informant interviews, hospital records and registry data. White matter lesions (WMLs), cortical atrophy, and ventricles sizes were measured in computerized tomography (CT) scans of the brain in 2000-02.

In *Study I*, longstanding psychological stress, reported in midlife in 1968-69, 1974-75 and 1980-81, was associated with increased risk of dementia and Alzheimer's disease (AD). Women who reported stress at two or three examinations had higher risks of developing dementia than women reporting no stress or stress at only one examination. In *Study II*, midlife longstanding psychological stress was associated with late-life brain changes, including WMLs, ventricular enlargement and atrophy in temporal lobes on brain CT scans. In *Study III*, number of psychosocial life stressors in 1968-69 was associated with perceived stress in 1968-69 and all of the following examinations until 2005-07. Number of stressors in midlife was also associated with incident dementia and AD.

These studies suggested that psychological stress in midlife increased the risks of dementia and brain structural changes in late-life. Common life stressors related to work, family, marriage and socio-economy had severe and longstanding psychological and physiological consequences. Studies imply the importance of adequate intervention of stress in middle-aged women.



**ISBN:** 978-91-628-8523-6, http://hdl.handle.net/2077/29211