Lifestyle changes might prevent Alzheimer's disease

Jin-Tai Yu[1], Lan Tan[2]

[1]Memory and Aging Center, Department of Neurology, University of California San Francisco, 675 Nelson Rising Lane, Suite 190, Box 1207, San Francisco, CA 94158, USA; [2]Department of Neurology, Qingdao Municipal Hospital, School of Medicine, Qingdao University, No.5 Donghai Middle Road, Qingdao 266071, China

Correspondence to: Jin-Tai Yu, Associate Editor-in-Chief of Annals of Translational Medicine. Memory and Aging Center, Department of Neurology, University of California San Francisco, 675 Nelson Rising Lane, Suite 190, Box 1207, San Francisco, CA 94158, USA. Email: jintai.yu@ucsf.edu; Lan Tan. Department of Neurology, Qingdao Municipal Hospital, School of Medicine, Qingdao University, No.5 Donghai Middle Road, Qingdao, Shandong Province 266071, China. Email: dr.tanlan@163.com.

Submitted Aug 25, 2015. Accepted for publication Aug 25, 2015.
doi: 10.3978/j.issn.2305-5839.2015.09.02
View this article at: http://dx.doi.org/10.3978/j.issn.2305-5839.2015.09.02

Recently, *TIME* and *U.S News & World Report* simultaneously reported our research titled "Meta-analysis of modifiable risk factors for Alzheimer's disease" published in *Journal of Neurology, Neurosurgery, and Psychiatry* (*JNNP*) (1). As leading authors of that paper, here, we summarized the main findings and stories behind that paper.

Age-standardized prevalence of Alzheimer's disease (AD) for those aged ≥60 years varied in a narrow band, 5-7% in most world regions (2). It was estimated that 35.6 million people lived with dementia worldwide in 2010, with numbers expected to almost double every 20 years, to 65.7 million in 2030 and 115.4 million in 2050 (2). As the most common type of dementia, AD accounts for approximately 60%, which exposed great burden to both societies and families (3).

Over the past 100+ years, researchers have never stopped to investigate the pathogenic mechanisms, prevention and therapy for AD. However, we had currently no effective drugs for this disease. Hence, it is increasingly attracting people's attentions to figure out how to prevent its occurrence. In the preventative perspective, Alzheimer's risk factors can be roughly categorized into two types: unmodifiable factors and modifiable factors (4). The former majorly refers to genetic underpinnings, aging and sex (female), *et al*.; and the latter comprises seven domains, including pre-existing physical disease, lifestyle, occupation, clinical drugs/therapy, blood biochemistry, diet, and mental psychology, which are exactly the potential targets for preventative strategies (4).

We planned to conduct a systematic and large-scale work to roundly evaluate the modifiable risk factors for AD in 2012. This challenging program was not to be initiated due to the huge workload until Wei Xu, one diligent graduate student in the team, readily accepted the research in the end of 2013. Under the supervision of Prof. Tan Lan and I, with assistant of professional statisticians, the team spent about one year in database searching, paper screening, data collecting and analyzing. Finally, 323 eligible papers in which 93 modifiable factors were identified were selected from roughly 17,000 literatures. After the statistical analysis, the results accounted for over 400 pages. Finally, the paper was accepted by *JNNP*. Encouragingly, the work was chose for press release by *BMJ* press and attracted attentions of multiple international news medias, such as *TIME*, *U.S News & World Report*, *CNBC*, *ABC National Radio*, *New York Daily News*, *et al*.

The study found the significant associations of 36 factors categorized into six domains (including drugs, diet, biochemistry, mental health, lifestyle and pre-existing disease) with Alzheimer's occurrence (1). The most significant risk factor is heavy smoking while the most significant protective factor is healthy diet, for example the Mediterranean diet. Furthermore, we graded the evidence strength of meta-analysis for each factor based on two major domains: pooled sample size and the heterogeneity of each analysis. We found 11 risk factor with grade I evidence strength, including heavy smoking, low DBP, high BMI in midlife, carotid atherosclerosis, DM-2 in Asian population, low BMI, low educational attainment, high tHcy level, depression, SBP >160 mmHg and frailty. Among these

risk factors, a total of 9 risk factors (including obesity in mid-life, current smoking in Asian population, carotid atherosclerosis, diabetes mellitus type 2 in Asian population, low educational attainment, high total homocysteine level, depression, high systolic blood pressure ≥160 mmHg, and frailty) for which global prevalence was accessible were selected for calculating population attributable risk (PAR). The combined PAR% indicated that these nine potentially modifiable risk factors were associated with up to roughly 66% of AD cases globally. Additionally, our study also found grade I evidence for 18 protective factors, including coffee/caffeine drinking, high folate intake, cognitive activity, high vitamin E intake, high vitamin C intake, current statin use, arthritis, light-to-moderate drinking, ever alcohol use, ever use of estrogens, anti-hypertensive medications, NASIDs use, high BMI in late-life, high Aβ42/40 ratio and some pre-existing diseases including arthritis, heart disease, metabolic syndrome, and cancer.

The study suggested that lifestyle changes might prevent AD, which may be helpful to make preventative strategies for clinicians and the public. Also, these findings might contribute to developing the preventive guidelines for AD in the future. Meanwhile, larger prospective cohort studies and clinical trials targeting these factors warrant to further test and verify the cause-and-effect relationship between these modifiable factors and AD.

Cite this article as: Yu JT, Tan L. Lifestyle changes might prevent Alzheimer's disease. Ann Transl Med 2015;3(15):222. doi: 10.3978/j.issn.2305-5839.2015.09.02

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

References

1. Xu W, Tan L, Wang HF, et al. Meta-analysis of modifiable risk factors for Alzheimer's disease. J Neurol Neurosurg Psychiatry 2015. [Epub ahead of print].
2. Prince M, Bryce R, Albanese E, et al. The global prevalence of dementia: a systematic review and metaanalysis. Alzheimers Dement 2013;9:63-75.e2.
3. Wimo A, Jönsson L, Bond J, et al. The worldwide economic impact of dementia 2010. Alzheimers Dement 2013;9:1-11.e3.
4. Jiang T, Yu JT, Tian Y, et al. Epidemiology and etiology of Alzheimer's disease: from genetic to non-genetic factors. Curr Alzheimer Res 2013;10:852-67.

