CORRESPONDENCE

Mild Cognitive Impairment and Dementia: The Importance of Modifiable Risk Factors

by PD Dr. med. Thorleif Etgen, Prof. Dr. med. Dirk Sander, Dr. phil. Horst Bickel, Prof. Dr. med. Hans Förstl in volume 44/2011

Prof. Dr. med. Thomas Behrens

Prof. Dr. med. Thomas Brüning

Institut für Prävention und Arbeitsmedizin der Deutschen Gesetzlichen Unfallversicherung, Institut der Ruhr-Universität Bochum (IPA), Bochum
behrens@ipa-dguv.de

Conflict of interest statement

The authors declare that no conflict of interest exists

Potential Work-Related Causes of Dementia

Next to a variety of modifiable, particularly cardiovascular risk factors (1), mild cognitive impairment or dementia may also be caused by occupational exposures.

While the influence of various occupational agents (such as solvents or pesticides) is only suggested in the literature, increasing evidence exists that head injury is associated with a higher incidence of risk or an accelerated onset of dementia. Although the underlying mechanisms are still unclear, the association may be explained by contusions of frontotemporal brain areas due to hitting the cranial bone. The frequently observed interaction with an elevated risk for carriers of the Apo ε4 allele suggests an additional genetic influence (2). An increased risk of cognitive impairment after head injury was reported in a recent U.S. cohort with five-year concurrent follow-up (3). Furthermore, mentally challenging occupations contribute to the cognitive reserve, which is a protective factor in the development of dementia (4).

As a result of demographic change, cognitive impairment and dementia will steadily increase. Extending the working lifetime in Germany will increasingly move the incidence of these diseases into the active professional life. Next to traditional health and safety measures, such as avoidance of exposures to hazardous substances or protection against work injuries, occupational medicine has to face new challenges in the context of primary prevention. Determining which measures can be taken at the occupational level to delay the onset of dementia in workers with signs of mild cognitive impairment will be of critical importance.

DOI: 10.3238/arztebl.2012.0283a

REFERENCES

1. Etgen T, Sander D, Bickel H, Förstl H: Mild cognitive impairment and dementia: the importance of modifiable risk factors. *Dtsch Arztebl Int* 2011; 108(44): 743–50.
2. Starkstein SE, Jorge R: Dementia after traumatic brain injury. *Int Psychogeriatr* 2005; 17: 93–107.
3. Unverzagt FW, et al.: Incidence and risk factors for cognitive impairment no dementia and mild cognitive impairment in African Americans. *Alzheimer Dis Assoc Disord* 2011; 25: 4–10.
4. Scarmeas N, Stern Y: Cognitive reserve: implications for diagnosis and prevention of Alzheimer's disease. *Curr Neurol Neurosci Rep* 2004; 4: 374–80.

Cognitive Conscious Stimuli With Movement

Etgen et al. explicitly point out that mild cognitive impairment and dementia can be modified by protectively by physical activity (1). This again reinforces old, timeless sayings such as that from the German physician Friedrich Hoffmann (1660–1742): “Physical exercise surpasses all drugs and is the universal medicine.” Neurobiological adaptations to motion include increased cerebral blood flow, new formation of spine, nerve cells, and capillaries, and synapsis hypertrophy, as well as increased gene expression of neurotrophic factors, such as brain-derived neurotrophic factor (BDNF), insulin-like growth factor 1 (IGF-1), and nerve growth factor (NGF); these responses play key roles in structural and functional brain changes (2). It appears that people with mild to moderate dementia can benefit from a progressive strength, balance, and functional exercise training several times a week, especially if this is combined with an individual dual-task training (3). Finally, I would like to point out that there is a negative association between the well-validated “five-times-sit-to-stand test” and global cognitive performance. Using this simple stand-up muscle test in general practices as a screening tool for cognitive impairment would be desirable (4).

DOI: 10.3238/arztebl.2012.0283b

REFERENCES

1. Etgen T, Sander D, Bickel H, Förstl H: Mild cognitive impairment and dementia: the importance of modifiable risk factors. *Dtsch Arztebl Int* 2011; 108(44): 743–50.
2. Foster PP, Rosenblatt KP, Kuljiš RO: Exercise-induced cognitive plasticity, implications for mild cognitive impairment and Alzheimer's disease. *Front Neurol* 2011; 2: 28.
3. Schwenk M: Entwicklung und Evaluation eines Trainingsprogramms zur Verbesserung von motorischen Leistungen und Dual-Task-Leistungen bei geriatrischen Patienten mit leichter bis mittelschwerer demenzieller Erkrankung – Eine randomisierte kontrollierte Studie [Dissertation]. Heidelberg: Ruprecht-Karls-Universität-Heidelberg; 2011.
4. Annweiler C, Schott AM, Abellan van Kan G, et al.: The Five-Times-Sit-to-Stand test, a marker of global cognitive functioning among community-dwelling older women. *J Nutr Health Aging* 2011; 15: 271–6.

Dr. oec. troph. Martin Hofmeister

Verbraucherzentrale Bayern e.V., Referat Lebensmittel und Ernährung, München
hofmeister@vzbayern.de

Conflict of interest statement

The author declares that no conflict of interest exists

In Reply:

We thank our colleagues for their valuable comments. Due to space limitations, we were unable to discuss all potentially relevant risk factors for development of a cognitive disorder and dementia in our review article, although of course numerous additional risk factors exist (such as mental illness, cognitive and social factors, etc.).

The important point made by Behrens and Brüning about the significance of work-associated risks of dementia is underscored by recent studies. For instance, a recent Swedish cohort study indicated that work-related stress (for example, low control over the job, high work requirements, and low social support) was associated with an increased risk for developing vascular dementia (1). With regard to traumatic dementia, martial artists are especially exposed, and we have pointed out so a year ago in this journal their inhuman working conditions (2). Cognitive reserve is desirable and undoubtedly associated with privileged working conditions (3). Neither can be produced at will, and therefore appropriate lifelong learning opportunities have to be provided.

Recent results from basic research as well as results from large prospective cohort studies and small randomized intervention studies support the hypothesis that physical activity plays protective role, as Dr Hofmeister points out. According to a recent meta-analysis, up to 50% of all dementias worldwide are due to seven potentially modifiable risk factors: physical inactivity, lack of education/training, depression, smoking, diabetes, high blood pressure, and obesity in middle age (4).

Due to the increase in both medical data about, and public interest for, modifiable risk factors, it can be anticipated that their practical importance in the coming decades will continue to rise. Similar to how

knowledge about the risks of smoking, alcohol, and obesity influenced the lifestyle in Europe over the last 50 years, we believe that knowledge about cognitive, emotional, social, and physical factors will lead to reasonable changes in this era of longevity.

DOI: 10.3238/arztebl.2012.0284

REFERENCES

1. Andel R, Crowe M, Hahn EA, et al.: Work-Related Stress May Increase the Risk of Vascular Dementia. *J Am Geriatr Soc* 2012; 60: 60–7.
2. Förstl H, Haass C, Hemmer B, Meyer B, Halle M: Boxen – akute Komplikationen und Spätfolgen – von der Gehirnerschütterung bis zur Demenz. *Deutsches Ärzteblatt* 2011; 107: 835–9.
3. Perneczky R, Alexopoulos P, Schmid G, et al.: Kognitive Reserve – ihre Bedeutung für die Prävention und Diagnose der Demenz. *Nervenarzt* 2011; 82: 325–30; 332–35.
4. Barnes DE, Yaffe K: The projected effect of risk factor reduction on Alzheimer's disease prevalence. *Lancet Neurol* 2011; 10: 819–28.
5. Etgen T, Sander D, Bickel H, Förstl H: Mild cognitive impairment and dementia: the importance of modifiable risk factors. *Dtsch Arztebl Int* 2011; 108(44): 743–50.

PD Dr. med. Thorleif Etgen

Klinik und Poliklinik für Psychiatrie und Psychotherapie, Technische Universität München

Neurologische Klinik, Kliniken Südostbayern – Klinikum Traunstein
thorleif.etgen@klinikum-traunstein.de

Dr. phil. Horst Bickel

Prof. Dr. med. Hans Förstl

Klinik und Poliklinik für Psychiatrie und Psychotherapie, Technische Universität München

Prof. Dr. med. Dirk Sander

Abteilung für Neurologie, Benedictus Krankenhaus, Tutzing
Klinik und Poliklinik für Neurologie, Technische Universität München

Conflict of interest statement

Dr. Bickel has received honoraria from Willmar Schwabe.

Prof. Förstl has received funding from Eisai, General Electric Lundbeck, Pfizer, Merz Janssen, Novartis, AstraZeneca, BMS, GSK, Lilly, Nutricia, Sanofi-Aventis, Schwabe, Servier, and other companies.

The remaining authors declare that no conflict of interest exists.