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## **Diabetes, Lack of Physical Activity and Sedentary Lifestyle as Risk Factors of Impaired Cognitive Function in the Elderly**

Geboren am 21.09.1975 in Mainz

Reifeprüfung am 23.06.1995 in Oppenheim

Studiengang der Fachrichtung Erziehungswissenschaft vom SS 1996 bis WS 2002/'03 an der Johannes Gutenberg-Universität Mainz

Studiengang der Fachrichtung Sportwissenschaft (MA-Nebenfach) vom WS 1997/'98 bis WS 2000/'01 an der Johannes Gutenberg-Universität Mainz

Diplom der Fachrichtung Erziehungswissenschaft/ Pädagogik am 19.09.2002  
an der Johannes Gutenberg-Universität Mainz

Promotionsfach: Epidemiologie

Doktorvater: Priv.-Doz. Dr. med. Til Stürmer, MPH

The aims of this dissertation were to focus on diabetes, lack of physical activity, and sedentary lifestyle as being risk factors of impaired cognitive function in the elderly. The findings in the literature concerning these risk factors in association with impaired cognitive function were controversial.

Another goal of this investigation was to test the chosen kind of measurement of cognitive function. The concept of a telephone interview on cognitive function was developed in the USA and the objective of this study was to examine the feasibility to assess cognitive function in the elderly using telephone interviews in Germany.

In 2003, all participants of an ongoing population-based cohort study aged 70 years or more were eligible for a telephone interview on cognitive function. Cognitive function was assessed using validated instruments, including the Telephone Interview for Cognitive Status, the East Boston Memory Test (immediate and delayed recall), the verbal fluency test, the HAWIE-R-“Vocabulary Test” and the HAWIE-R-“General Knowledge”, a prospective memory test, and a digit span backwards test were translated into German, if applicable. Information on diabetes was available from prior questionnaires and was validated in 2002. Usual hours of low and at least moderate intensity physical activity were assessed by self-administered questionnaire. Multivariable logistic regression was used to estimate odds ratios of an impaired cognitive function (below 25<sup>th</sup> percentile) and their 95% confidence intervals adjusting for age, sex, smoking, alcohol consumption, body mass index, physical exercise, educational level, and depressive symptoms.

Cognitive function was successfully assessed in an ongoing population-based cohort study of the elderly using telephone interviews. This method offers the ability to reach even persons who would not be able to come to an institute for an interview because of their health status. This fact could diminish positive selection, leading to a more representative sample due to the convenience for the participants. The findings presented here generalize the results of NHS to a population-based sample of men and women including a much broader range of educational levels, especially at the lower end. Specifically, some of the tests showed pronounced variability allowing cross-sectional analyses and are eventually expected to show bottom-effects in longitudinal assessment. While others were remembered very well and therefore showed ceiling-effects, they seem very valuable for longitudinal assessment to detect a possible decline in memory later on.

Further, the association between diabetes and cognitive function in the elderly was examined using the collected data of the subsample of the HeiDE study. In this population-based study on cognitive function in the elderly, diabetes was observed to be associated with a lower cognitive function using the TICS (immediate and delayed recall), the delayed recall EBMT, the HAWIE-R-“Vocabulary Test”, and digit span backwards test. The association between diabetes and cognitive function was a bit more pronounced in participants in whom diabetes was diagnosed 12 years (median) or more prior and in those without anti-diabetic treatment. Therefore, diabetes should be considered as a risk factor for impaired cognitive function in the elderly, which might be attenuated by treatment.

Furthermore, the objective was to examine the relation between lack of physical activity, sedentary lifestyle, and impaired cognitive function in the elderly. In this population-based study on cognitive function in the elderly, current as well as lifetime sedentary lifestyle and, to a lesser extent, lack of recommended physical activity were observed to be associated with a lower cognitive function as assessed by the Telephone Interview for Cognitive Status. The study presented here, as well as the current evidence from other studies, indicate that lack of recommended physical activity and especially a sedentary lifestyle might lead to an impaired cognitive function. Physical activity during the whole lifetime seems to have beneficial effects on overall health and should therefore be part of a healthy lifestyle. Activities like walking and biking at a low intensity level, i.e. not working up a sweat, might have an even more important protective effect.

The here reported results speak for the feasibility of this measurement of cognitive function via telephone, but further investigations are needed to test this interviewing method in epidemiological practice. One interesting question is, which inter- and intraindividual differences can be expected in cognitive change at a follow-up of the study population after approximately two years, and how strong is the willingness of participants to take part in a follow-up of this examination by telephone interview on cognitive function. In general the question how strong the intraindividual differences are in an assessment of the same interview on cognitive function depending on day or time seems to be very interesting (e.g. examination every second day for a period of two weeks).

The more differentiated assessment of potential risk factors (e.g. with blood samples for diabetes, or physical activity tests, diaries or accelerometers for physical activity), could deliver more stable models. The results of this doctoral thesis may contribute to further investigations with its findings presented here.