Multilevel Regression Model - Evaluate Relationship Between Early Years' Activities of Daily Living and Alzheimer's Disease Onset Accounting for Influence of Key Sociodemographic Factors Using a Longitudinal Household Survey Data

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Abstract : Background: Biomedical efforts to treat Alzheimer's disease (AD) have typically produced mixed to poor results, while more lifestyle-focused treatments such as exercise may fare better than existing biomedical treatments. A few promising studies have indicated that activities of daily life (ADL) may be a useful way of predicting AD. However, the existing cross-sectional studies fail to show how functional-related issues such as ADL in early years predict AD and how social factors influence health either in addition to or in interaction with individual risk factors. This study would helpbetterscreening and early treatments for the elderly population and healthcare practice. The findings have significance academically and practically in terms of creating positive social change. Methodology: The purpose of this quantitative historical, correlational study was to examine the relationship between early years' ADL and the development of AD in later years. The studyincluded 4,526participantsderived fromRAND HRS dataset. The Health and Retirement Study (HRS) is a longitudinal household survey data set that is available forresearchof retirement and health among the elderly in the United States. The sample was selected by the completion of survey questionnaire about AD and dementia. The variablethat indicates whether the participant has been diagnosed with AD was the dependent variable. The ADL indices and changes in ADL were the independent variables. A four-step multilevel regression model approach was utilized to address the research questions. Results: Amongst 4,526 patients who completed the AD and dementia questionnaire, 144 (3.1%) were diagnosed with AD. Of the 4,526 participants, 3,465 (76.6%) have high school and upper education degrees,4,074 (90.0%) were above poverty threshold. The model evaluatedthe effect of ADL and change in ADL on onset of AD in late years while allowing the intercept of the model to vary by level of education. The results suggested that the only significant predictor of the onset of AD was changes in early years' ADL (b = 20.253, z = 2.761, p < .05). However, the result of the sensitivity analysis (b = 7.562, z = 1.900, p =.058), which included more control variables and increased the observation period of ADL, are not supported this finding. The model also estimated whether the variances of random effect vary by Level-2 variables. The results suggested that the variances associated with random slopes were approximately zero, suggesting that the relationship between early years' ADL were not influenced bysociodemographic factors. Conclusion: The finding indicated that an increase in changes in ADL leads to an increase in the probability of onset AD in the future. However, this finding is not support in a broad observation period model. The study also failed to reject the hypothesis that the sociodemographic factors explained significant amounts of variance in random effect. Recommendations were then made for future research and practice based on these limitations and the significance of the findings.

Keywords : alzheimer's disease, epidemiology, moderation, multilevel modeling

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