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Research Paper

The cross-sectional association between severity of non-cognitive disability and self-reported worsening memory

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Abstract

Background: Research has demonstrated a clear association between cognitive decline and non-cognitive disability; however, all of these studies focus on disability as a correlate or result of some level of cognitive impairment or dysfunction. The relationship between disability and cognition is likely a complex one, that is currently incompletely described in the literature.

Objectives: Our objective was to estimate the prevalence of long-term, non-cognitive disability using a population-representative sample of adults aged 18 and older, and then estimate the association between long-term, non-cognitive disability and self-reported worsening memory.

Methods: Using the 2009 Florida Behavioral Risk Factor Surveillance System (BRFSS), we measured the relationship between non-cognitive disability and worsening memory using multivariable logistic regression analysis weighted to account for the complex sampling design of the BRFSS. We also estimated the adjusted odds of worsening memory by disability severity, classified according to the types of assistance needed.

Results: Approximately 18% (95% confidence interval = (16%, 19%)) of Floridians were living with a long-term, non-cognitive disability in 2009. Among adults with no disability during or prior to the last year, only 5% reported worsening memory. The proportion of Floridians reporting worsening memory increases with increasing severity of disability-related limitations. In a multivariable logistic regression model, odds of worsening memory increased significantly with severity of disability-related limitations.

Conclusions: These results highlight the association between non-cognitive disability and subsequent increased odds of worsening memory, independent of several other known risk factors, and a dose-response association with disability-related limitations.

Keywords: Disability; Memory impairment; BRFSS; Instrumental Activities of Daily Living; Activities of Daily Living

Disability has been variously defined for the purposes of surveillance, health and social services programs, and research, often with a focus on functional impairment.[1] As a result, disability, defined with a focus on physical impairment, may be perceived as being independent of cognitive impairment affecting the mind. In fact, the two are intimately connected.[2–4] While there are many different models of disability and the disablement process,[5–7] our view of disability is aligned with the World Health Organization's (WHO) International classification of Functioning, Disability, and Health (ICF).[7] That is, disability is not simply the consequence of a disease or disease process,[8] rather it is one's life experience as measured by a complex mixture of health, function, participation, and the social and physical environment. Impairments may be intrinsic to the

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individual, but the notion of disability incorporates the context in which the individual with impairment lives out his or her life. To put it another way, disability is a gap between personal capability and environmental demand.[5]

Previous research demonstrates a clear association between cognitive decline and non-cognitive disability[9–12]; however, all of these studies focus on disability as a correlate or result of some level of cognitive impairment or dysfunction. For example, worsening memory may lead to limitations in activities of daily living including self-care[13] and may interfere with health maintenance activities like taking medications as prescribed.[14] An important gap in the research literature concerns the effects of non-cognitive disability on subsequent worsening memory and confusion. There is still much to learn about the relationship, including the direction, temporal sequence, and strength of association. Research is needed that can tease out the nuances of this association, and perhaps identify effective interventions to limit the effect of non-cognitive disability on worsening memory.

As a preliminary step toward that goal, we estimated the association between long-term, non-cognitive disability and self-reported worsening memory or confusion during the previous 12 months — both overall and by severity of non-cognitive disability — in a population-representative sample of Floridians, aged and 18 and older. We hypothesized that the proportion of people who reported worsening memory or confusion in the previous 12 months would be greater among those with more severe disability-related limitations.

Methods

Study population

The current study utilizes data collected from Floridians on the 2009 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an ongoing, random digit-dialed telephone survey of non-institutionalized adults age 18 and older in the United States and its territories.[15–17] The BRFSS is coordinated by the Centers for Disease Prevention and Control (CDC) and administered at the state level. Annually, the BRFSS collects a variety of demographic, health behavior, health outcome, and health care access information designed to represent the age, sex, and racial/ethnic characteristics of all non-institutionalized adults in a state.[18] In 2009, the Florida BRFSS used a disproportionate stratified sampling design that randomly selects telephone numbers from a probability sample of households with telephones.[18] In order to provide relevant state population estimates, individual BRFSS participants are assigned a weight, or a value that accounts for sampling design and survey non-response.[18]

In the current analysis — more fully described below — we combine six separate questions about disability: (1) any activity limitations, (2) use of special equipment, (3) IADL assistance needs (state-added), (4) ADL assistance needs (state-added), (5) main condition or disability limiting activities (state-added), and (6) duration of disability (state-added). Together, these six questions about disability experience form our exposure variable of primary interest. We also use a state-added question about worsening memory or confusion as our outcome variable of primary interest. The only instance of this specific combination of questions appearing simultaneously on the BRFSS occurred in Florida between April 2009 and December 2009.

Measures of disability

The BRFSS includes two questions to measure prevalence of disability. Participants were considered to have a disability if they answered ‘‘yes’’ to one or both of the following questions: ‘‘Are you limited in any way in any activities because of physical, mental, or emotional problems?’’ and, ‘‘Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone? [Include occasional use or use in certain circumstances.]’’ This definition is consistent with CDC’s definition of disability and also consistent with the WHO ICF broad definitions of impairment and function.[7,19]

Disability is a broad term, and the ways in which individuals experience disability are as diverse as the individuals themselves. During 2009, the Florida Office on Disability and Health[20] partnered with the state BRFSS office to capture a more specific description of this experience by including measures of severity and duration of disability-related limitations (DRL), as well as major type of disability. In addition to the usual disability questions, Participants were asked, ‘‘Because of any impairment or health problem, do you need the help of other persons in handling your routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?’’ and ‘‘Because of any impairment or health problem, do you need the help of other persons with your personal care needs, such as eating, bathing, dressing, or getting around the house?’’ These two questions are closely aligned with the definitions of Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL) respectively and also have been used as part of an optional module on the BRFSS previously (2000 BRFSS optional module questionnaire example at http://www.cdc.gov/brfss/questionnaires/pdf-ques/2000brfss.pdf).

To better understand the main type of disability individuals were living with, we asked, ‘‘What is your main health condition or disability that limits your activity?’’ The list of possible answers was as follows: Physical impairment or disability, learning or intellectual disability, memory or cognitive disability, emotional problems, hearing disability, blindness, or speech impairment. We considered