THE GERONTOLOGICAL SOCIETY OF AMERICA®

Innovation in Aging
cite as: *Innovation in Aging*, 2020, Vol. 4, No. 1, 1–10
doi:10.1093/geroni/igz045
Advance Access publication January 1, 2020

OXFORD

Special Issue: Aging and Public Health: Original Report

Comorbid Chronic Conditions Among Older Adults with Subjective Cognitive Decline, United States, 2015–2017

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Received: June 20, 2019; Editorial Decision Date: October 11, 2019

Decision Editor: Steven M. Albert, PhD

Abstract

Background and Objectives: Subjective cognitive decline (SCD), the self-reported experience of worsening or more frequent confusion or memory loss, may be associated with the development or worsening of chronic conditions or complicating their self-management. The objectives of this study were to (i) establish the prevalence of chronic conditions and multiple chronic conditions among adults with SCD, and (ii) compare the prevalence of chronic conditions among people with and without SCD and SCD-related functional limitations.

Research Design and Methods: Data were analyzed from the Cognitive Decline module of the Behavioral Risk Factor Surveillance System administered in 49 states, DC, and Puerto Rico during 2015–2017. Analyses included 220,221 respondents aged 45 years or older who answered the SCD screening question and reported their chronic conditions. Weighted estimates were calculated and chi-square tests were used for comparisons.

Results: Persons with a history of stroke, heart disease, and chronic obstructive pulmonary disorder had significantly higher prevalence of SCD compared to those without. The prevalence of having at least one chronic condition was higher among adults with SCD compared to adults without SCD in each age group (45–64 years: 77.4% vs 47.1%, $p < .001$; ≥65 years: 86.3% vs 73.5%, $p < .001$). Among those with SCD, the prevalence of an SCD-related functional limitation was higher among those with at least one chronic condition compared to those with none (45–64 years: 63.3% vs 42.4%, $p < .001$; ≥65 years: 40.0% vs 25.1%, $p < .001$). Only half of adults with SCD and a chronic condition had discussed their SCD with a health care professional.

Discussion and Implications: SCD and chronic conditions commonly co-occur. Having a chronic condition was associated with greater SCD-related functional limitations. SCD might complicate the management of chronic conditions, and patients and providers should be aware of increased risk for cognitive decline in the presence of chronic diseases.

Translational Significance: This study demonstrates that many middle-age and older adults with memory problems have chronic diseases, including diabetes and heart disease. Depending on the cause, memory problems can be addressed in a number of ways with a health care provider. Early detection and diagnosis is important for memory loss in order to provide effective early interventions that can help preserve quality of life.

Keywords: Aging, Chronic disease, Cognitive dysfunction, Dementia

Background and Objectives

Subjective cognitive decline (SCD) is the self-reported experience of worsening or more frequent symptoms of confusion or memory loss within the past 12 months (1–3). SCD is a useful measure for the purpose of public health surveillance on cognitive function because it is an indicator of current and future needs within populations while being easy to administer in existing self-reported data systems (4). Therefore, in 2007, the Centers for Disease Control and Prevention (CDC) led the development of the Cognitive Decline optional module for use with the Behavioral Risk Factor Surveillances System (BRFSS) to collect systematic data about changes in thinking or memory among middle-aged and older adults (4). SCD can be one of the earliest signs of Alzheimer's disease, a form of dementia that can interfere with the independent living of daily life and eventually be fatal (1). Not everyone with SCD will develop Alzheimer's, but many do (5,6). Regardless of whether SCD leads to more significant cognitive decline, such as Alzheimer's or another dementia, confusion or memory problems can disrupt the ability of someone to live independently in a way that allows them to avoid risks to their future health.

The prevalence of both SCD and chronic conditions increases with age. Adults aged 65 years or older are more likely to report symptoms of SCD than those aged 45–64 years (3), and they are more likely to report multiple chronic conditions compared to adults aged 50 years or older (7). Furthermore, some chronic diseases might cause symptoms of SCD. Reliable data are emerging that suggest an association between cognitive impairment and heart disease and stroke (8), diabetes (9), and chronic kidney disease (10). The health burden of having SCD with a chronic condition or conditions may make it even more difficult to manage daily activities of life because of the functional limitations associated with both.

Mild cognitive impairment (MCI), a medical diagnosis that represents medical judgment borne from patient assessment by a physician, is a stage of symptomatic cognitive decline where adults exhibit greater cognitive decline compared to most adults their same age, but a decline that does not significantly affect their ability to function independently (11). Previous research has shown that MCI is associated with several chronic conditions (12–15). However, chronic disease status has not been extensively studied among adults with SCD, which is a subjective measure by an individual rather than a diagnosis by a physician. Comorbid chronic conditions among U.S. adults with SCD were examined in order to: (i) establish the prevalence of chronic conditions and multiple chronic conditions among middle-aged and older adults with SCD, and (ii) compare the prevalence of chronic conditions among people with and without SCD.

Research Design and Method

Data were analyzed from the 2015, 2016, and 2017 Behavioral Risk Factor Surveillance System (BRFSS), a random-digit-dialed, telephone (landline and cell phone) survey of noninstitutionalized adults aged 18 years or older that is conducted by health departments in all 50 states, the District of Columbia (DC), and several U.S. territories, and with the assistance of the CDC. An optional six-question module on cognitive decline asked of people aged 45 years or older included questions about SCD and associated difficulties performing activities or caring for oneself. For 2015–2017, 49 states (all except Pennsylvania) plus DC and Puerto Rico administered the SCD module at least once. In order to present the most recent data available, for states that administered the module in more than one year, data sets were concatenated and only the most recent year's data was included in the analysis. Because only single years of data for each state were included. No reweighting was necessary as part of this process.

Respondents who answered affirmatively to the question, "During the past 12 months, have you experienced confusion or memory loss that is happening more often or is getting worse?" were classified as having SCD. Respondents classified as having SCD were asked five subsequent questions as part of the module that assessed the following: (i) how often SCD caused them to give up day-to-day activities such as cooking, cleaning, taking medications, driving, or paying bills; (ii) how often they needed assistance with these day-to-day activities; (iii) how often were they able to get the help they needed; (iv) how often did SCD interfere with their ability to work, volunteer, or engage in social activities about the home; and (v) have they or someone they know discussed their confusion or memory loss with a health care professional. Respondents who reported that SCD always, usually, or sometimes (a) caused them to give up day-to-day activities or (b) interfered with their ability to work (questions [i] and [iv], previously) were classified as having SCD-related functional limitations.

The status of eight chronic conditions was assessed through self-reported medical history questions asked of all BRFSS respondents. Respondents with chronic conditions were those who reported that a health professional told them that they (i) currently have *asthma*; or ever had (ii) a heart attack, angina, or coronary *heart disease*; (iii) a *stroke*; (iv) *cancer* other than skin cancer; (v) *chronic obstructive pulmonary disease* (COPD), emphysema, or chronic bronchitis; (vi) some form of *arthritis*, rheumatoid arthritis, gout, lupus, or fibromyalgia; (vii) *kidney disease*, not including kidney stones, bladder infections, or incontinence; or (viii) *diabetes*, not including gestational, borderline, or prediabetes.

For each respondent, the number of these conditions were summed and categorized (zero, one, two, three or more, or any chronic conditions). To be included in this analysis, respondents must have provided yes or no responses to at least 4 of the 8 conditions assessed. Excluding 105 participants with missing or inadequate responses for less than 4 of the 8 chronic conditions, data from 220,221 respondents were included in the analysis,

including 23,473 with SCD and 196,748 without SCD. The excluded respondents were similar to those included in the study in terms of age group and race/ethnicity but were more likely to be women and to have a college education.

Respondents were classified by age group (45–64 and ≥65 years), sex (male and female), race or ethnicity (non-Hispanic white; non-Hispanic black; non-Hispanic American Indian and Alaska Native; non-Hispanic Asian and Pacific Islander; non-Hispanic of other or multiple races; and Hispanic), highest level of education (did not graduate high school; graduated high school or equivalent; attended college or technical school; and graduated from college or technical school), and living status (lives alone or does not live alone).

Statistical analyses were stratified by age group (45–64 years and ≥65 years) to account for the increased prevalence of chronic diseases among adults aged 65 years or older. Estimates are weighted on the basis of state population estimates and account for the complex sampling methods of BRFSS (16). Unadjusted prevalence ratios (PR) stratified by age group with 95% confidence intervals (CIs) were calculated. Rao–Scott chi-square tests were used to test for statistical differences. All analyses were performed by using appropriate survey commands in SAS 9.4 (SAS Institute Inc., Cary, NC). We considered $p < .05$ to indicate statistical significance.

Results

During 2015–2017, 11.1% (95% CI: 10.8–11.5) of adults aged 45 years or older reported SCD. Among adults aged 45–64 years, 10.8% (95% CI: 10.4–11.3) reported SCD, whereas 11.7% (11.2–12.2) of adults aged 65 years or older reported SCD ($p = .01$), Table 1. The percentages of adults with SCD and chronic diseases varied by several demographic characteristics. Among adults with SCD, the percentage of adults with at least one chronic disease increased with age. Among adults aged 45–64 years, more than 3 in 4 (77.4%) with SCD had at least one chronic disease compared to less than half (47.1%) of those without SCD. Similarly, among adults aged ≥65 and older, 86.3% with SCD had at least one chronic disease compared to 73.5% of those without SCD. Across groups defined by race and ethnicity, higher percentages of adults with SCD had at least one chronic disease compared to those without SCD. Those identifying as non-Hispanic Asian or Pacific Islander were a notable exception as they had a much higher proportion of adults with SCD but no chronic diseases (50.4%). However, the CIs around the prevalence of SCD in non-Hispanic Asian and Pacific Islanders in this study is wide. Small sample size might contribute to results that may be different in a study with a larger sample of these older adults.

The prevalence of SCD differed by chronic disease status. The prevalence of SCD was significantly higher in adults with a specific chronic disease compared to those without that chronic disease (Table 2). Regardless of age group, this was true for all chronic diseases examined in this study. For both age groups, the highest prevalence of SCD was in adults with a history of stroke, COPD, and heart disease. For adults aged 45–64 years, PRs show that the proportion of adults with SCD was 3.4-times greater (95% CI: 3.1–3.9) in persons with a history of stroke, 2.8-times greater (95% CI: 2.6–3.1) in those with history of heart disease, and 3.3-times greater (95% CI: 3.1–3.6) in persons with COPD. For adults ≥65 years, the proportion of adults with SCD was 2.1-times greater (95% CI: 1.9–2.4) in those with a history of stroke, 2.0-times greater (1.8–2.2) in those with COPD, and 1.8-times greater (95% CI: 1.6–2.0) in those with heart disease.

Regardless of age group, adults with SCD reported a higher prevalence of comorbid chronic conditions compared to those without SCD ($p < .001$ for all tests), Table 3. For adults aged 45–64 years, the prevalence of comorbid chronic conditions was at least 50% higher among persons with SCD compared to those without. The prevalence of several conditions was at least double among persons with SCD compared to those without, including kidney disease (PR = 2.9, 95% CI: 2.4–3.4), asthma (PR = 2.2, 95% CI: 2.0–2.4), and arthritis (PR = 2.0, 95% CI: 1.9–2.1). The prevalence of stroke (PR = 4.3, 95% CI: 3.6–5.0), COPD (PR = 3.6, 95% CI: 3.3–3.9), and heart disease (PR = 3.1, 95% CI: 2.7–3.4) were more than three-times greater in persons with SCD than among persons without SCD. More than one third (36.0%) of adults aged 45–64 years without SCD reported one comorbid chronic condition compared to more than half (56.2%) of those with SCD (PR = 1.6, 95% CI: 1.5–1.7).

Similar to adults aged 45–64 years, the prevalence of chronic conditions among adults aged ≥65 and older with SCD was significantly higher than among those without SCD (all $p < .001$). The prevalence of stroke among those with SCD (15.0%) was twice that of those without SCD (6.6%, PR = 2.3, 95% CI: 2.0–2.5). Among adults 65 years and older, 69.4% of those with SCD have only one chronic condition compared to 57.9% of those without SCD (PR = 1.2, 95% CI: 1.1–1.3). Those with SCD were more likely to have two or three chronic conditions compared to those without. The percentage of those with only one comorbid chronic condition among adults aged 65 years or older with SCD (29.9%) was significantly lower than among similarly aged adults without SCD (35.8%, $p < .001$) but was higher for having 2 or 3 or more chronic conditions. Nearly half (40.6%) of adults aged 65 years or older without SCD reported no comorbid chronic conditions, more than twice the percentage of those with SCD (18.8%, PR = 0.46, 95% CI: 0.41–0.52).

Regardless of age group, adults with SCD and at least one comorbid chronic condition were more likely to report SCD-related functional limitations ($p < .001$) compared to those with SCD and no reported comorbid chronic conditions (Table 4). More than half (54.2%) of adults aged 45–64 years and 41.0% of adults aged

Table 1. Demographic Characteristics of Adults Aged 45 Years or Older With and Without Comorbid Chronic Diseases by Subjective Cognitive Decline (SCD) Status, Behavioral Risk Factor Surveillance System (BRFSS), 2015–2017

	With subjective cognitive decline n = 23,473			Without subjective cognitive decline n = 196,748		
	Overall	No chronic diseases	At least 1 chronic disease	Overall	No chronic diseases	At least 1 chronic disease
N = 220,221	n = 23,473	n = 3,983	n = 19,490	n = 196,748	n = 76,778	n = 119,970
Category	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Age Group						
45–64 years	10.8 (10.4–11.3)	22.6 (20.6–24.6)	77.4 (75.4–79.4)	89.2 (88.7–89.6)	52.9 (51.1–53.8)	47.1 (46.2–47.9)
≥65 years	11.7 (11.2–12.2)	13.7 (12.0–15.3)	86.3 (84.7–88.0)	88.3 (87.8–88.8)	26.5 (25.7–27.2)	73.5 (72.8–74.3)
Sex						
Female	11.1 (10.6–11.5)	16.2 (14.4–18.1)	83.8 (81.9–85.6)	88.9 (88.5–89.4)	40.1 (39.3–40.9)	59.9 (59.1–60.7)
Male	11.3 (10.8–11.8)	22.2 (20.1–24.4)	77.8 (75.6–79.9)	88.7 (88.2–89.2)	46.4 (45.5–47.4)	53.6 (52.6–54.5)
Race and Ethnicity						
Non-Hispanic white	10.9 (10.6–11.3)	18.5 (17.0–20.1)	81.5 (79.9–83.0)	89.1 (88.7–89.4)	42.2 (41.6–42.8)	57.8 (57.2–58.4)
Non-Hispanic black	12.8 (11.6–13.9)	13.6 (11.0–16.3)	86.4 (83.7–89.0)	87.2 (86.1–88.4)	39.9 (37.8–42.0)	60.1 (58.0–62.2)
Non-Hispanic American Indian and Alaska Native	17.1 (13.7–20.5)	11.6 (4.5–18.7)	88.4 (81.3–95.5)	82.9 (79.5–86.3)	32.6 (27.3–37.9)	67.4 (62.1–72.7)
Non-Hispanic Asian and Pacific Islander	6.7 (4.3–9.2)	50.4 (32.2–68.5)	49.6 (31.5–67.8)	93.3 (90.8–95.7)	50.2 (31.2–40.1)	49.8 (42.9–56.6)
Non-Hispanic of other or multiple races	14.7 (12.2–17.2)	12.3 (6.8–17.7)	87.7 (82.3–93.2)	85.3 (82.8–87.8)	35.7 (31.2–40.1)	64.3 (59.9–68.8)
Hispanic	12.8 (9.5–12.4)	23.8 (18.0–29.6)	76.2 (70.4–82.0)	89.0 (87.6–90.5)	50.6 (48.0–53.2)	49.4 (46.8–52.0)
Highest Level of Education						
Did not graduate high school	17.9 (16.6–19.2)	17.3 (13.8–20.7)	82.7 (79.3–82.2)	82.1 (80.8 – 83.4)	33.6 (31.4–35.7)	66.4 (64.3–68.6)
Graduated high school	11.6 (11.1–12.2)	16.5 (14.8–18.2)	83.5 (81.8–85.2)	88.4 (87.8–88.9)	39.1 (38.0–40.2)	60.9 (59.8–62.0)
Attended college or technical school	11.5 (10.8–12.1)	17.9 (15.2–20.6)	82.1 (79.4–84.8)	88.5 (87.9–89.2)	42.2 (41.0–43.3)	57.8 (56.7–59.0)
Graduated from college or technical school	7.1 (6.6–7.5)	27.5 (23.9–31.2)	72.5 (72.5–68.8)	92.9 (92.5–93.4)	51.6 (50.6–52.6)	48.4 (47.4–49.4)
Living Status						
Lives alone	13.6 (13.0–14.2)	15.8 (14.2–17.3)	84.2 (82.7–85.8)	86.4 (85.8–87.0)	34.8 (33.9–35.7)	65.2 (64.3–66.1)
Does not live alone	10.3 (9.9–10.7)	20.6 (18.6–22.5)	79.4 (77.5–81.4)	89.7 (89.3–90.1)	45.5 (44.8–46.3)	54.5 (53.7–55.2)

Note: Frequencies presented are unweighted. Percentages and confidence intervals are weighted based on state population sizes.

Table 2. Adults Aged 45 Years or Older with Subjective Cognitive Decline (SCD) by Age Group and Chronic Disease Status, Behavioral Risk Factor Surveillance System (BRFSS), 2015–2017

Chronic disease	Adults 45–64 years, prevalence of SCD among those with chronic disease	Adults 45–64 years, prevalence of SCD among those without chronic disease	Prevalence ratio comparing SCD prevalence among people with and without chronic disease		Adults ≥65 years, prevalence of SCD among those with chronic disease	Adults ≥65 years, prevalence of SCD among those without chronic disease	Prevalence ratio comparing SCD prevalence among people with and without chronic disease	
	n = 59,219	*n* = 53,890			*n* = 80,241	*n* = 26,871		
N = 220,221	% (95% CI)	% (95% CI)	% (95% CI)	*p* value	% (95% CI)	% (95% CI)	% (95% CI)	*p* value
Heart disease	26.7 (24.5–29.0)	9.5 (9.0–9.9)	2.8 (2.6–3.1)	<.001	18.3 (16.9–19.6)	10.2 (9.7–10.8)	1.8 (1.6–2.0)	<.001
Stroke	33.9 (30.2–37.5)	9.9 (9.4–10.3)	3.4 (3.1–3.9)	<.001	23.0 (20.9–25.1)	10.7 (10.2–11.3)	2.1 (1.9–2.4)	<.001
Diabetes	17.8 (16.4–19.2)	9.6 (9.1–10.1)	1.9 (1.7–2.0)	<.001	15.2 (13.8–16.5)	10.6 (10.1–11.2)	1.4 (1.3–1.6)	<.001
Asthma	20.9 (19.1–22.7)	9.7 (9.2–10.2)	2.2 (2.0–2.4)	<.001	16.7 (14.9–18.5)	11.2 (10.7–11.7)	1.5 (1.3–1.7)	<.001
COPD[a]	30.1 (28.2–32.1)	9.1 (8.7–9.6)	3.3 (3.1–3.6)	<.001	20.6 (18.8–22.3)	10.4 (9.9–10.9)	2.0 (1.8–2.2)	<.001
Cancer	17.1 (15.2–18.9)	10.3 (9.8–10.7)	1.7 (1.5–1.9)	<.001	13.5 (12.3–14.7)	11.3 (10.7–11.9)	1.2 (1.1–1.3)	.001
Arthritis	19.6 (18.7–20.6)	6.3 (5.9–6.8)	3.1 (2.8–3.4)	<.001	14.7 (13.9–15.4)	8.6 (7.9–9.4)	1.7 (1.5–1.9)	<.001
Kidney disease	25.6 (22.4–28.7)	10.3 (9.8–10.7)	2.5 (2.2–2.8)	<.001	20.2 (18.1–22.2)	11.1 (10.6–11.6)	1.8 (1.6–2.0)	<.001
One comorbid chronic condition[b]	10.5 (9.7–11.2)	4.9 (4.4–5.4)	2.1 (1.9–2.4)	<.001	10.0 (9.0–10.9	6.3 (5.5–7.1)	1.6 (1.4–1.9)	<.001
Two comorbid chronic conditions[c]	20.2 (18.5–21.9)	7.0 (6.6–7.4)	2.9 (2.6–3.2)	<.001	13.0 (12.0–14.1)	8.5 (7.8–9.1)	1.5 (1.4–1.7)	<.001
Three or more comorbid chronic conditions[d]	31.5 (29.4–33.6)	8.8 (8.4–9.3)	3.6 (3.3–3.9)	<.001	20.9 (19.4–22.3)	9.7 (9.2–10.2)	2.1 (2.0–2.3)	<.001

Note: Frequencies presented are unweighted. Percentages and confidence intervals are weighted based on state population sizes. CI = Confidence interval.

[a]Chronic obstructive pulmonary disease (COPD).

[b]Reference group is those with no chronic conditions.

[c]Reference group is those with one or fewer chronic conditions.

[d]Reference group is those with two or fewer chronic conditions.

Table 3. Adults Aged 45 Years or Older Who Reported Comorbid Chronic Diseases by Age Group and Subjective Cognitive Decline (SCD) Status, Behavioral Risk Factor Surveillance System (BRFSS), 2015–2017

Chronic disease	Adults 45–64 years, prevalence of chronic disease among those with SCD	Adults 45–64 years, prevalence of chronic disease among those without SCD	Prevalence ratio comparing chronic disease prevalence among people with and without SCD		Adults ≥65 years, prevalence of chronic disease among those with SCD	Adults ≥65 years, prevalence of chronic disease among those without SCD	Prevalence ratio comparing chronic disease prevalence among people with and without SCD	
	n = 11,600	*n* = 101,509			*n* = 11,873	*n* = 95,239		
N = 220,221	% (95% CI)	% (95% CI)	% (95% CI)	*p* value	% (95% CI)	% (95% CI)	% (95% CI)	*p* value
Heart disease	17.5 (15.9–19.0)	5.7 (5.4–6.1)	3.1 (2.7–3.4)	<.001	27.6 (25.6–29.7)	16.3 (15.7–16.9)	1.7 (1.6–1.8)	<.001
Stroke	11.6 (10.3–12.9)	2.7 (2.4–3.0)	4.3 (3.6–5.0)	<.001	15.0 (13.5–16.6)	6.6 (6.3–7.0)	2.3 (2.0–2.5)	<.001
Diabetes	24.0 (22.3–25.7)	13.4 (12.8–14.0)	1.8 (1.6–2.0)	<.001	30.2 (27.9–32.5)	22.3 (21.5–23.1)	1.4 (1.2–1.5)	<.001
Asthma	18.5 (17.0–20.1)	8.5 (8.0–9.0)	2.2 (2.0–2.4)	<.001	11.8 (10.5–13.1)	7.8 (7.3–8.3)	1.5 (1.3–1.7)	<.001
COPD[a]	22.1 (20.5–23.7)	6.2 (5.9–6.5)	3.6 (3.3–3.9)	<.001	22.0 (20.1–23.8)	11.2 (10.6–11.8)	2.0 (1.8–2.2)	<.001
Cancer	11.6 (10.3–12.8)	6.8 (6.4–7.2)	1.7 (1.5–1.9)	<.001	20.7 (19.0–22.5)	17.5 (16.9–18.2)	1.2 (1.1–1.3)	<.001
Arthritis	60.3 (58.1–62.5)	29.6 (28.9–30.4)	2.0 (1.9–2.1)	<.001	63.9 (61.5–66.3)	49.4 (48.5–50.2)	1.3 (1.2–1.3)	<.001
Kidney disease	7.4 (6.4–8.4)	2.6 (2.4–2.8)	2.9 (2.4–3.4)	<.001	10.5 (9.4–11.6)	5.5 (5.2–5.8)	1.9 (1.7–2.2)	<.001
No comorbid chronic conditions	31.1 (28.5–33.7)	74.4 (73.5–75.2)	0.42 (0.38–0.46)	<.001	18.8 (16.6–21.0)	40.6 (39.5–41.6)	0.46 (0.41–0.52)	<.001
One comorbid chronic condition[b]	56.2 (53.0–59.4)	36.0 (35.2–36.9)	1.6 (1.5–1.7)	<.001	69.4 (65.8–72.9)	57.9 (56.8–58.9)	1.2 (1.1–1.3)	<.001
Two comorbid chronic conditions[c]	31.8 (29.3–34.3)	12.1 (11.6–12.7)	2.6 (2.4–2.9)	<.001	34.6 (34.0–39.3)	26.3 (25.4–27.1)	1.4 (1.3–1.5)	<.001
Three or more comorbid chronic conditions[d]	25.6 (23.9–27.3)	6.7 (6.3–7.2)	3.8 (3.5–4.2)	<.001	32.0 (29.9–34.1)	16.1 (15.5–16.8)	2.0 (1.8–2.1)	<.001

Note: Frequencies presented are unweighted. Percentages and confidence intervals are weighted based on state population sizes. CI = Confidence interval.

[a]Chronic obstructive pulmonary disease (COPD).

[b]Reference group is those with no chronic conditions.

[c]Reference group is those with one or fewer chronic conditions.

[d]Reference group is those with two or fewer chronic conditions.

Table 4. Characteristics of Subjective Cognitive Decline (SCD) Among Adults Aged 45 Years or Older with SCD by Comorbid Chronic Disease Status and Age Group, Behavioral Risk Factor Surveillance System (BRFSS), 2015–2017

	Adults 45–64 with at least 1 comorbid chronic conditions	Adults 45–64 with no comorbid chronic conditions		Adults ≥65 with at least 1 comorbid chronic conditions	Adults ≥65 with no comorbid chronic conditions	
	n = 9,244	*n* = 2,356		*n* = 10,246	*n* = 1,627	
N = 23,473	% (95% CI)	% (95% CI)	*p* value	% (95% CI)	% (95% CI)	*p* value
Ever discussed SCD with a health care professional	54.2 (51.8–56.5)	30.3 (26.0–24.7)	<.001	41.0 (38.6–43.3)	32.3 (25.4–39.3)	.029
Gave up household activities or chores because of SCD	51.2 (48.8–53.5)	30.8 (26.2–35.5)	<.001	32.2 (30.0–34.4)	20.7 (14.1–27.4)	.005
SCD interfered with ability to work, volunteer, or engage in social activities outside the home	49.5 (47.1–51.8)	29.0 (24.3–33.7)	<.001	24.8 (22.8–26.8)	16.4 (9.8–23.0)	.037
SCD-related functional limitations[a]	63.3 (61.1–65.6)	42.4 (37.2–47.6)	<.001	40.0 (37.6–42.3)	25.1 (18.6–31.7)	<.001

Note: Frequencies presented are unweighted. Percentages and confidence intervals are weighted based on state population sizes. CI = Confidence interval.
[a]Defined as the presence of either of a respondent reporting that SCD always, usually, or sometimes (a) caused them to give up household chores or activities or (b) interfered with their ability to work, volunteer, or engage in social activities outside the home.

65 years or older with SCD reported discussing their more frequent of worsening confusion or memory loss with a health care professional. These percentages were significantly higher than for those without comorbid chronic conditions, where only 30.3% of adults aged 45–64 years and 32.3% of adults aged 65 years or older discussed SCD with a health care professional. Regardless of age group, those with at least one comorbid chronic condition were more likely to report having to always, usually, or sometimes give up household activities because of SCD when compared to those with SCD but with no comorbid chronic conditions.

Discussion and Implications

More than 1 in 10 adults aged 45 years or older reported SCD. Comorbid chronic conditions were a significant health burden for persons with SCD. Adults with a history of stroke, COPD, and heart disease had the highest prevalence of SCD. Regardless of age, adults with SCD had two- or three-times the prevalence of some chronic conditions compared to those without SCD. Additionally, among those with SCD, the prevalence of all chronic diseases studied were at least 50% higher compared to those without SCD. Heart disease, arthritis, asthma, and chronic kidney disease were twice as prevalent, and stroke and COPD were three-times as prevalent among adults with SCD compared to those without. This demonstrates a significant health burden of chronic diseases among all adults with SCD regardless of age.

Based on this study, adults with chronic diseases have greater prevalence of SCD. Stroke, the chronic disease associated with the highest prevalence of SCD in this study, is a condition that, by definition, affects the brain and can result in cognitive decline, including dementia (17). Persons with a history of stroke may have arterial flow issues or damage due to infarcts that can affect cognition. Additionally, heart disease is associated with vascular dementia, a form of cognitive decline where changes in blood vessels affect cognition. Furthermore, previous research shows that COPD is associated with cognitive decline most likely due to problems associated with hypoxia (18,19).

Chronic disease symptoms and associated treatments vary from patient to patient. An increased risk for SCD may have a multifactor cause not limited to the disease itself but also be related to disease severity, additional comorbidities, or treatments. Chronic conditions, including heart disease, diabetes, and COPD, often require close medical management and self-care activities, such as taking medications as prescribed, engaging in regular physical activity, tracking symptoms, and following a specific diet to ensure that adverse health outcomes can be avoided to the extent reasonably expected (20,21). Successful management may prevent or delay progression, disability, and hospitalizations caused by chronic diseases. However, management strategies can be made more complex with each additional chronic disease a person must manage. Multiple medication regimens, risk of drug interactions among multiple medications, more medical specialists with accompanying medical appointments, and daily testing across varying comorbid conditions can be difficult. Managing a chronic condition can be made increasingly difficult with the presence of memory loss or confusion. Adults with Alzheimer's disease have difficulty managing multiple chronic conditions because of cognitive changes in executive function. However, it can be easily hypothesized that persons with memory problems or confusion—even those who would not be considered as having dementia—could also have a more difficult time managing

chronic conditions, especially if multiple chronic conditions are present. More research on this is needed, especially on ways to assist patients with memory problems who still have to manage multiple chronic conditions.

The presence of or treatment for some chronic conditions might cause SCD to be missed. If a person has memory problems co-occurring with a chronic condition or treatment, SCD might be regarded as related to the condition or the treatment and not to early stages of a dementia. This might cause the patient not to report these symptoms, or the provider to misattribute them to another cause (such as a medication side effect). Furthermore, if the symptoms are considered minor by the patient, a provider may encourage the patient to continue with the treatment, especially if the patient is otherwise managing treatment well. Short of changing a patient's effective chronic disease treatment regimen, it might be difficult to use existing cognitive assessment tools to correctly determine if memory problems are related to a chronic condition, medication, normal cognitive aging, or early stages of symptomatic dementia.

Symptoms of untreated or undertreated chronic conditions, like hypothyroidism, might cause symptoms of SCD. Similarly, there are several classes of medications used to treat chronic conditions with side effects that can cause memory problems. Several types of medications prescribed for conditions among older adults can have side effects affecting memory, including (but not limited to) drugs to help lower cholesterol (statins), provide pain relief (opioids), treat depression (tricyclic antidepressants), aid in sleep (nonbenzodiazepine sedative hypnotics), treat incontinence (anticholinergics), and manage hypertension (beta blockers) (22). If a patient presents with memory complaints while taking one of these prescribed medications, the assumption might be that SCD symptoms can most likely be attributed to the medication. If a change in treatment regimen is sought, it is important to follow-up after an appropriate amount of time to reassess symptoms of cognitive impairment. Health care providers should consider formal cognitive assessment if symptoms of SCD cannot be addressed through changes in treatment. If no change in treatment is made, this might be a missed opportunity to assess SCD to determine whether it is a medication side effect or might be from another cause, such as Alzheimer's disease or another dementia. If the latter, then valuable time could be lost when opportunities for early detection and intervention exist to help change the course of decline among adults with the earliest stages of dementia (1).

There are a number of personal and societal benefits associated with early diagnosis (1). Firstly, a medical assessment can help determine if SCD is the result of something other than Alzheimer's disease, including (but not limited to) another chronic condition, a medication side effect, an infection, or a nutritional deficiency. If Alzheimer's disease is the cause, while there is no cure for Alzheimer's, patients can find some benefit in receiving treatment to lessen symptoms and these treatments are often more effective at earlier stages in the disease. Early diagnosis also provides for an opportunity to participate in clinical trials where novel treatments may be used to determine their effectiveness in treating Alzheimer's. Early diagnosis also provides an opportunity to work with family members and other potential caregivers to talk about plans for long-term care and caregiving needs. It can also empower a patient to make informed decisions regarding their future care instead of having those decisions made by others at later stages of the disease.

A related concern could be that SCD might cause the presence of other chronic conditions to be missed. Persons with SCD might not wish to go to a physician because of fear of a dementia diagnosis and might subsequently not receive testing that could detect other chronic conditions early, when treatment is often most effective. This study, however, showed that adults with chronic conditions were more likely to report talking to a health care professional about their SCD than those without comorbid chronic conditions. This could be because of more frequent health care visits as a result of the chronic condition and/or greater comfort with their health care provider. This likelihood of persons discussing their SCD further strengthens the need for older adults to receive regular medical visits where an inventory of symptoms includes memory loss and confusion. In addition, this expanded symptom list would strengthen the need for providers to be aware of opportunities to assess and discuss memory-related symptoms and opportunities to be compensated through the use of billing codes, such as Current Procedure Terminology code 99483, that reimburse for provider visits discussing care planning options with patients with cognitive impairment (23).

This study is subject to several limitations. Factors associated with comorbid chronic conditions, such as obesity, were not examined in persons with SCD. Because the study focused on SCD by using a self-report telephone survey, an objective assessment of cognitive decline could not be completed. However, a recent population-based study using in-person objective cognitive performance testing has shown that persons with SCD have lower average scores on cognitive performance tests compared to those without SCD (24). In addition, people with SCD symptoms may have failed to report them either as a result of memory problems or because they were unwilling to disclose them to the interviewer because of perceived stigma. It also is possible that respondents with cognitive decline were more likely to terminate the BRFSS survey early and therefore not answer the Cognitive Decline Module questions, but we have no way to evaluate this. Additionally, our measure of SCD asks only about changes in memory or thinking which may not capture the full range of experiences related to cognitive decline (25). The BRFSS does not include questions about chronic disease management, so we were not able to compare the effect

of SCD on management itself. Additionally, the BRFSS cannot account for persons with a chronic condition, such as diabetes, but have not had it formally diagnosed by a health care professional. Finally, the BRFSS only samples from noninstitutionalized older adults and therefore does not represent people living in settings like nursing homes or long-term care facilities. It is likely that that both SCD and chronic conditions are more common among these middle-aged and older adults, and also possible that the relationship between SCD and chronic conditions differs for them.

Symptoms of SCD are a concern, regardless of source. This population-based study demonstrates that SCD is more common among persons with chronic diseases. It also shows that adults with certain chronic conditions, like stroke, COPD, and heart disease, are more likely to report SCD and that SCD commonly co-occurs with chronic conditions, which could complicate the management of these conditions. Persons with SCD should consider speaking to a health care professional about their symptoms of memory loss or confusion. In addition, if a health care provider has a concern about possible mismanagement of chronic conditions, a cognitive assessment might be appropriate. Both patients and providers should be aware that the risk for SCD may increase in the presence of certain (or multiple) chronic diseases and should factor this into assessments and care planning. Patients, their caregivers, and health care providers might find it valuable to work together to develop a management plan that can assist in managing all chronic conditions and revisit established plans to ensure maximum positive health outcomes. Chronic condition self-care interventions delivered in community or health care settings should consider the importance of an individual's cognitive status, including SCD.

Conflict of Interest

None reported.

Funding

The work for this project was completed through the use of programmatic funds appropriated to the Centers for Disease Control and Prevention.

Acknowledgment

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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