

Conference Paper

Identifying Risk of Dementia Using Subjective Cognitive Decline (Scd) Instruments Among Elderly in Bandung, Indonesia

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Abstract

Cognitive decline in the elderly is often referred to as dementia. Dementia is an effect of the aging process, which impacts the brain function. The subjective cognitive decline happens when a person's cognitive perceptions experience decline but remain within parameters considered normal. A screening process for this condition is one of the efforts which can improve welfare services for the elderly. Subjective Cognitive Decline (SCD) is cognitive self-reports that assess subjective cognitive impairment abilities by prompting the recall of frequently experienced events. SCD has a double function, as an instrument for both early detection and the prevention of disease. This study aims to identify the risk of dementia using a Subjective Cognitive Decline (SCD) instrument. This research was conducted using a quantitative descriptive method with a cross-sectional approach. 187 elderly were taken as the sample by consecutive sampling methods, and data were analyzed using univariate analysis. This study showed that most of the respondents have a poor subjective cognitive decline, with 54.0%. The domains that have the most cognitive decline were the orientation with 78.1%, 76.5% of executive function, 68.4% of memory, and 59.4% of language. Demographic data associated with subjective cognitive decline showed poorly in female gender with 55.6%, age > 90 years with 55.3%, high school education with 70.4%, married status with 57.1%, and unemployed with 53.2%. This study concludes that the results of SCD with poor subjective cognitive decline have a risk of developing dementia.

Keywords: Dementia, elderly, subjective cognitive decline

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1. Introduction

Indonesia is a country with a high elderly number, Indonesia is in the top five globally, and those numbers are predicted to increase compared to the adult population in 2050-2100 (Infodatin, 2012). Based on the population census results in 2014, the number of

elderlies in Indonesia reached 18,781 million, and it is estimated that in 2025 the number will increase to reach 36 million (1). This number shows that Indonesia has begun to enter the era of an aging population. The increase in the number of elderlies is an elderly challenge, especially for the health sector. Moreover, it can come with degenerative diseases, non-communicable diseases, and other mental health problems (2).

The aging process in the elderly generally starts to appear at 45 years old and will cause severe problems at around 60 years old (3). One of the health problems associated with the aging process's symptoms is a decline in cognitive function (4). Cognitive decline with the symptoms of forgetfulness or often called dementia. Dementia is an effect of aging, which has an impact on the destruction of brain function. It is estimated that about 39% of people aged 50-59 years experienced fail to remember things and an increase of 85% when the elderly are over 80 years old (5). Mild Cognitive Impairment (MCI) is an intermediate symptom between age-related memory and cognitive impairment (Age-Associated Memory Impairment / AAMI) and dementia (6).

High cognitive decline has a risk of developing dementia, where dementia is a collection of symptoms that refer to decreased brain function, including reduced memory, impaired thinking, behavior processes, and changes in mental or emotional conditions. Alzheimer's dementia is the most common dementia case, with about 60-80% of Alzheimer's disease is a neurodegenerative disorder (7). This shows that cognitive decline is a normal part of the aging process of the elderly who will experience retardation even though the intelligence will be stable or physically will decline.

The screening process is one of the efforts to improve welfare services for the elderly. By the screening, early detection can be held, and early treatment can be given. Then it might be resulted as one of the treatments to slow the severity of dementia. Various screening tools are used, but Subjective Cognitive Decline (SCD) has a double function, both as an instrument for early detection and disease prevention. SCD is targeted at self-reported memory with subjective perceived cognitive changes because the memory domains are most commonly experienced as MCI disorders and develop dementia. SCD is also used as an early symptom test before psychometric tests to distinguish that cognitive decline is frail. The application of SCD also be used for the elderly who have limitations in reading and writing, and its application is easy to accept, low cost, and practical. Therefore, this study aimed at using a Subjective Cognitive Decline (SCD) instrument as tools to identify the risk of dementia. Also, to analyze more depth in several domains: memory, language, orientation, attention, executive function, and visuospatial.

2. Methods

2.1. Study Design

This study used a descriptive quantitative design with a cross-sectional approach to identify cognitive decline and each domain—this study conducted in Bandung, Indonesia.

2.2. Sample

The target population in this study was the elderly in Bandung. Consecutive sampling used to recruit a sample with the inclusion criteria of the elderly was 60 years or older and able to communicate. Elderly with comorbidities could interfere with the measurement, the elderly with mental disorders, the elderly with hearing loss, and the elderly who could not speak were excluded.

Estimation of sample size was calculated via G-Power Software Version 3.0.10 using exact test, statistical test proportion difference from constant (binomial test, one sample case) with assumption $\alpha = 0,05$, medium effect size = 0,15, power level = 0,9 and constant proportion = 0,65. A sample size of 187 was needed with 10% attrition rate.

2.3. Instrument

Two instruments in the Indonesian version were used in this study. First is the demographic questionnaire, which included age, sex, level of education, and employment status. The second questionnaire is Subjective Cognitive Decline (SCD). The SCD is a self-reported cognitive status produced by the Subjective Cognitive-Initiative (SCD-I) Working Group that included researchers for Alzheimer's Disease and SCD's special interests, launched in October 2012. SCD, used as a feature in detecting and preventing diseases that will develop into dementia, contains 30 questions with 6 domains: memory, attention, language, visuospatial, executive function, and orientation. The instrument is obtained from HHS (Department of Human Health and Service) Public Access. Permission to use the questionnaire was obtained from a member of the SCD-I through email. The translation process was conducted with experts, and Cronbach's alpha of this study showed 0.809.

2.4. Data Collection

Data were collected by the researcher after obtained approval from the Institutional Review Board (IRB) of STIKEP PPNI Jawa Barat and get permission from the vice of Primary Health Care Center at Bandung. The researcher and cadre approached the participants by visited the elderly's home and explained study purpose, ethical considerations such as Beneficence dan nonmaleficence, Anonymity, Veracity, and Justice, also described the content of the questionnaire. After getting consent, the researcher asked the participant to complete the SCD (Subjective Cognitive Decline). After completing the questionnaire, the participant returned the questionnaire, and the researcher rechecked the questionnaire sheets' completeness.

2.5. Data Analysis

Data analysis was performed using IBM SPSS version 25 for Windows. To measure normality distribution, Kolmogorov-Smirnovtest was used, statistic = 0,104; df = 82 dan with significant value $0,028 < 0,05$. Univariate analysis was used to describe demographic participants and SCD variable. Data were showed using distribution frequency and percentage for categoric level, then mean and standard deviation for continuous level.

3. Result

The number of participants in this study is 187. Based on table 1, the average age of participant are 79.09 ± 9.630 years old; 49.7% (n=93) in elementary school level of education; 68.4% (n=128) were unemployed and 82.4% (n=154) were married.

Based on the data in Table 2 showed that most of the respondents have a poor subjective cognitive decline; 54.0%. Based on table 3, the domains that have the most poorly cognitive decline were the Orientation domain of 78.1%, 76.5% of Executive Function, 68.4% of Memory and 59.4% of Language. Demographic data associated with subjective cognitive decline based on table 4 showed poorly in female gender with 55.6%, age > 90 years with 55.3%, high school education with 70.4%, married status with 57.1%, and unemployed 53.2%.

TABLE 1: Demographic Data (n=187)

| Variable | Categoric | N | Percentage (%) |
|--------------------|--------------------|---------|----------------|
| Gender | Female | 117 | 62.6% |
| | Male | 70 | 37.4% |
| Level of Education | Uneducated | 33 | 17.6% |
| | Elementary School | 93 | 49.7% |
| | Junior High School | 29 | 15.5% |
| | Senior High School | 27 | 14.4% |
| | University | 5 | 2.7% |
| Employment Status | Unemployed | 128 | 68.4% |
| | Employed | 59 | 31.6% |
| Marital Status | Married | 154 | 82.4% |
| | Widowed | 33 | 17.6% |
| Variable | Mean (SD) | Minimum | Maximum |
| Age | 79.09 ± 9.630 | 60 | 97 |

TABLE 2: Subjective Cognitive Decline (n=187)

| Categories | Frequency | Percentage (%) |
|------------|-----------|----------------|
| Poor | 101 | 54.0% |
| Well | 86 | 46.0 % |
| Total | 187 | 100% |

4. Discussion

This study shows more than half of the elderly experienced poor subjective cognitive decline (54.0%). Poor subjective cognitive decline is indicated by a cognitive response that the elderly often forget something but remain considered normal, difficulty in making decisions, frequent nightmares, confusion, or reveal and realize physiological symptoms (8). The severity of subjective cognitive decline symptoms is associated with dementia, especially anxiety and depression(9). Patients with mild cognitive impairment have two extreme possibilities: either high risk of Alzheimer’s disease or a partial return to normal cognitive function. Mild cognitive decline is not a definitive diagnosis of neurodegenerative disease(10). This result is that cognitive decline in the elderly can be seen as a result of the aging process changes, and the reaction to these changes is different in each person and depends on the individual(11).

Several factors can affect cognitive function changes in the elderly, including age; the results showed a poor subjective cognitive decline at age > 90 years. This can happen due to an increase in the number of tissue cells, which leads to aging. The aging process will decrease the nervous system’s function, such as the shrinking of the brain

TABLE 3: Frequency Distribution of Subjective Cognitive Decline based on Domain (n=187)

| Characteristic of Subjective Cognitive Decline | Frequency | Percentage (%) |
|--|-----------|----------------|
| Memory | | |
| Poor | 128 | 68.4% |
| Well | 59 | 31.6% |
| Orientation | | |
| Poor | 146 | 78.1% |
| Well | 41 | 21.9% |
| Visuospatial | | |
| Poor | 83 | 44.4% |
| Well | 104 | 55.6% |
| Language | | |
| Poor | 111 | 59.4% |
| Well | 76 | 40.6% |
| Executive Function | | |
| Poor | 143 | 76.5% |
| Well | 44 | 23.5% |
| Attention | | |
| Poor | 110 | 58.8% |
| Well | 77 | 41.2% |

and biochemical changes in the CNS, causing a decline in cognitive function (12). Another factor is gender; the results showed that the subjective cognitive decline was poor in females, although the results showed no significant difference. This result is similar (13, 14), which states that men are more at risk of experiencing cognitive changes at an earlier age than women. Still, women are more at risk of experiencing cognitive decline at an advanced age. This event can happen due to the role of the sex hormone oestrogen that can change cognitive function. Oestrogen receptors are found in the brain areas that play a role in maintaining brain function, such as learning and memory functions.

Other factors, such as education level, showed that the elderly with senior high school had the highest cognitive decline. This result confirmed (15) that education can stimulate mental activity, which is useful for neurochemistry and the influence of brain structures. According to the synaptic reserve hypothesis theory, people with higher education have more brain synapses than people with lower education. When the synapse is destroyed due to Alzheimer's disease, another synapse will replace the damaged one.

In this study, each domain of subjective cognitive decline was included in poor categoric. This is in line with (16), which states that a person experiences subjective cognitive decline when one of the cognitive domains is often felt. It can lead to a

TABLE 4: Frequency Distribution of Subjective Cognitive Decline based on Demographic Data (n=187)

| Variable | Total n (%) | Subjective Cognitive Decline | | P-value |
|--------------------------------------|-------------------|------------------------------|------------|---------|
| | | Poor | Well | |
| Gender | | | | |
| Female | 117 (62.6) | 65 (55.6%) | 52 (44.4%) | 0.582 |
| Male | 70 (37.4) | 36 (51.4%) | 34 (48.6%) | |
| Age(Mean \pm SD) | 79.09 \pm 9.630 | | | 0.043 |
| <90 years old | 140 (74.9) | 75 (53.6%) | 65 (46.4%) | 0.86 |
| >90 years old | 47 (25.1) | 26 (55.3%) | 21 (44.7%) | |
| Level of Education | | | | |
| Uneducated | 33 (17.6) | 21 (63.6%) | 12 (36.4%) | 0.63 |
| Elementary School | 93 (49.7) | 41 (44.1%) | 52 (55.9%) | |
| Junior High School | 29 (15.5) | 17 (58.6%) | 12 (41.4%) | |
| Senior High School | 27 (14.4) | 19 (70.4%) | 8 (29.6%) | |
| University | 5 (2.7) | 3 (60.0%) | 2 (40.0%) | |
| | | | | |
| Marital Status | | | | |
| Married | 154 (82.4) | 88 (57.1%) | 66 (42.9%) | 0.720 |
| Widowed | 33 (17.6) | 13 (39.4%) | 20 (60.6%) | |
| Employment Status | | | | |
| Unemployed | 128 (68.4) | 68 (53.2%) | 60 (46.9%) | 0.720 |
| Employed | 59 (31.9) | 33 (55.9%) | 26 (44.1%) | |

decline in objective cognitive performance and may demonstrate beliefs about cognitive decline with the aging process.

The analysis based on domain showed that orientation, executive function, memory, and language have the highest percentage. The orientation domain is explained by short-term memory, which is the individual's ability to assess new memories or remember names concerning people. In this study, orientation was measured by asking the elderly to reference people, such as asking their family member names, close friends, or remembering some relatives. Orientation towards people shows "overlearned" information. The elderly who fail to remember or say their name reflects the negativism, distractions, hearing loss, or language acceptance disorder of their own (17).

Similar to the orientation domain, the executive function domain resulted in poor function. The elderly felt some symptoms like failure to remember planned activities. Such they forgot to do the following activity. Another symptom is they sure about starting to forget somethings. One study (18) states that to perform executive functions, the

multifocal neuronal system needs to integrate with the cortex of the frontal lobe, basal ganglion, and thalamus. Impaired executive function is mostly caused by metabolic disorders, intoxication, cerebral infections, head trauma, brain tumors, frontal lobe lesions, and degeneration, damaging the nervous system.

The language domain also showed a poor result. This study's results are consistent with the previous research (19). In the presence of language disorders, the elderly will find it hard to express and understand writing and pronounce words. Wernicke's brain area changes will show receptive aphasia movements, which are not audible or difficult to understand. Damage of Wernicke's area will cause obstacles to understanding both in speaking and writing.

The frequency distribution of the memory domain resulted in most of the respondents having poor memory capability. The ability to remember means being able to save and bring back something that has been experienced. However, it does not mean that everything experienced will be completely stored in memory because memory has a limited ability (20). In this study, the perceptions were measured by asking the elderly to remember things that had happened or had been done recently. If the elderly is unable to remember, the information will be lost from the system memory. However, it is different from long-term memory, remembering the past, and using the information to be used today. This is shown by how the elderly remember the past few years or a few days ago, then disclosed (21).

The elderly will experience a drastic physical decline and affect their cognitive function, especially their intelligence level and memory. The ability to remember is related to remembering past events and the elderly's intelligence ability of the elderly in calculating things such as counting and the decline in the ability of the elderly to carry out their activities (22).

5. Conclusion

The description of subjective cognitive decline in this study was poor. It can lead to the risk of developing dementia. The most poorly subjective cognitive decline domain was orientation, executive function, language, and memory. Based on those results, health workers are expected to do preventive measures in at-risk populations, such as females aged over 60, low educated elderly, and complex environments. As well as being able to apply the initial screening of dementia using the SCD (Subjective Cognitive Decline) instrument.

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