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Risk Factors of Subjective Cognitive Decline among Older People with Low Socioeconomic Status

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ABSTRACT

The aim of the study is to investigate the predictors associated with Subjective Cognitive Decline (SCD) especially among older people with low socioeconomic status. This was a cross- sectional study involving older people with low socioeconomic status in Kelantan, which is one of the poorest states in Malaysia. Data of anthropometry, body composition, cognitive function, sarcopenia, depressive symptoms, medical history, blood pressure and polypharmacy were obtained via face-to-face interview. SCD was determined by a single item in the Geriatric Depression Scale (GDS). Variables were analysed using the binary logistic regression model for identification of risk factors. A total of 293 older people with mean age of 69.1 years old was recruited. The SCD proportion in this study was 24.6%. One unit increase in Geriatric Depression Scale (GDS) score increases risk of subjective cognitive decline by odds of 1.814 (OR=0.595: 95% CI:1.441–2.283; p<0.001). Meanwhile, those with diabetes have a tendency of 2.972 to have SCD as compared to non-diabetics (OR=1.089: 95% CI:1.062–8.315; p<0.038). The prevalence of SCD in this study is high and may contribute to cognitive impairment. The predictors of SCD were larger waist circumference, having diabetes, and increasing score in GDS. SCD must be screened earlier and healthy lifestyle must be emphasized. Routine screening and monitoring of non-communicable disease risk factors are important for the prevention of SCD.

Keywords: cognitive impairment, depressive symptoms, socioeconomic status, subjective cognitive decline, older people

INTRODUCTION

Subjective Cognitive Decline (SCD) is a term indicating perception of worsening memory and frequent episodes of confusion for the past 12 months among individuals with normal cognition (Jessen *et al.* 2020). Although SCD is considered as subjective, it is one of the earliest manifestations of dementia that can affect the daily living of older people (Taylor *et al.* 2020). SCD is more common among older population as compared to younger people. Data obtained from the Behavioral Risk Factor Surveillance System found that SCD prevalence was higher among older people aged 65 years and above (11.7%) as compared to those within the age of 45–64 years old (10.8%). SCD was more prevalent among American older adults with at least one chronic disease such as stroke, heart diseases, chronic obstructive pulmonary diseases, kidney diseases and arthritis (Taylor *et al.* 2020). Findings from sixteen ageing cohort studies from 15 countries around the world demonstrated higher SCD among men than women, in lower education level, among Asian and Black Africans as compared to White people and in lower and middle-income countries as compared to higher income countries (Röhr *et al.* 2020). In addition, a meta-analysis of longitudinal studies has also shown that SCD increases risk of future cognitive impairment by 2.29-fold and a 2.16-fold excess risk for dementia (Wang *et al.* 2022).

Persistent worrying of having troubled cognition in SCD increase the likelihood of developing Alzheimer`s Disease (AD) in the future. Older people with SCD have 2.3 times higher risk of developing dementia and mild cognitive impairment due to higher exposure

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to oxidative stress (Lin *et al.* 2022; Dainy *et al.* 2018). Findings from a study by Schwarz *et al.* (2021) demonstrated that SCD severity is closely associated with regional cerebral beta-amyloid load (Schwarz *et al.* 2021). Role of socioeconomic status of an individual during childhood, across adulthood or in late-life towards cognitive function have been explored. Underprivileged socioeconomic status such as low parental socioeconomic status during childhood, low level of education, and limited income may lead to late-life cognitive performance due to structural brain changes (volume of hippocampus and frontal cortex) and functional brain activity (differing activation in the network of prefrontal, hippocampus and parietal working memory areas) (Künzi *et al.* 2021).

The Korean Community Health Survey found that SCD was reported by 17.4% of middle-aged adults and 29.4% of older adults; with older age, female and lower education as the risk factors of SCD (Roh *et al.* 2021). A cohort study comprising 1,165 cognitively normal older adults from the Chinese Alzheimer`s Biomarker and LifestyIE (CABLE) identified eight predictors of SCD namely older age, thyroid diseases, minimal anxiety symptoms, daytime dysfunction, female sex, anemia, sedentary lifestyle and loneliness (Wen *et al.* 2021). Lifestyle factors such as stress, depression, and sleep deprivation are also contributors to SCD (Miley-Akerstedt *et al.* 2019). Evidence also suggested that SCD is caused by psychological problems such as personality trait of neuroticism and family history of AD (Hill & Mogle 2018).

Malaysia, which is an ageing nation, is expected to face the problem of socioeconomic inequality among older adults due to limited savings and unemployment. The prevalence of older adults aged 65 years and older is 7.1% which is estimated to increase to 14.5% by year 2040 (Rosli *et al.* 2021). Low socioeconomic-status older adults are unable to meet their basic needs for establishing a decent standard of living such as proper clothing, good food, and comfortable house. Poverty among older adults is very high in Malaysia and issues related to social welfare will become very prominent (Shahar *et al.* 2019). A study conducted among 2004 older adults from the low socioeconomic status group demonstrated positive association between financial well-being and cognitive function (Foong *et al.* 2021). High socioeconomic status is related to better access to nutritious food, health care, and participation in mental and social demanding activities which reduces risk against cognitive decline (Nazri *et al.* 2021). A recent systematic review revealed that dementia among older people in Malaysia was reported to be 14.3% (Anuar *et al.* 2022). To our best knowledge, there is limited studies in Malaysia exploring the concept of subjective cognitive decline. As socioeconomic status is one of the contributors to SCD, it is essential to investigate the proportion of SCD among the low socioeconomic older adults as well as identify the possible predictors of SCD among older people.

METHODS

Design, location, and time

This is a cross-sectional study conducted among older adults with low-socioeconomic status in one of the poorest states in Malaysia, Kelantan. This study is a part of another study which investigated the predictors of sarcopenia among older adults in Kelantan. This study had been granted ethical approval from the organization`s ethics committee.

A total of 293 older adults aged 60 years and above participated in this study. Low socioeconomic status was defined as older people having education level of primary school and below and had household income below MYR3,030 (DOSM 2020). The exclusion criteria of the study were older adults with dementia (as diagnosed by doctors and reported by caregivers), those with physical limitations such as wheelchair bound or on crutches, and older adults with severe health problems such as cancer, end stage renal disease on haemodialysis, major depression, and psychiatric illness.

This study had been conducted during the Covid-19 lockdown period from October 2020 to May 2021 in five districts in Kelantan which was accessible and safe. Other districts in Kelantan were declared as red zones with high cases of Covid-19.

Sampling

Participants were able to provide written informed consent for participation in this study. Eligible participants were selected with the assistance of the village chief. Participants were contacted via telephone call or home visit. Trained

interviewers conducted face-to-face interview using questionnaire. Proper social distancing with hand sanitation and temperature check were ensured throughout the data collection process. Data collection was conducted in small groups. A total of 293 older people were selected for this study The sample size had been calculated using the population prevalence formula, $n = \frac{z^2 p (1-p)}{d^2}$ z was the 95% confidence interval (1.96), p was the prevalence of older adults with muscle wasting in Kelantan (23.8%), d was the precision set at 5% (0.05).

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This study has obtained ethical approval from the Human Research Ethics Committee Universiti Sains Malaysia (USM) (USM/JePeM/19070433). Informed consent has been obtained prior to recruitment of subjects.

Data collection

The data collection was conducted by the researcher with the assistance of enumerators in the field of nutrition via interview administered method.

Sociodemographic. Sociodemographic data consisted of sex, marital status, education level, household income, ethnicity, age, living status, employment status and smoking status.

Medical and falls history and supplement intake. This part includes questions regarding the presence of chronic diseases such as hypertension, high cholesterol, diabetes, heart diseases, stroke, kidney diseases, cancer, lung disease, arthritis, gastrointestinal diseases, urinary incontinence and other health problems. Medication intake of the subjects was recorded, and polypharmacy was defined as intake of five or more medications. Intake of vitamin, mineral or herbal supplement were recorded too.

Blood pressure. Blood pressure readings were measured twice using digital blood pressure monitoring machine. Readings were taken in relaxed condition to the nearest mmHg. If the systolic readings were above 140 mmHg or diastolic values were above 90 mmHg, subjects were asked to refer to a doctor for further consultation.

Anthropometry and body composition. Weight, height, body mass index, mid upper arm circumference, waist circumference, and hip circumference were recorded. Weight was measured to the nearest kg using Karada Scan Omron Body Composition Monitor (HBF-214). During weight measurement, subjects were asked to remove the items in the pockets and stand straight on the weighing scale.

Weight was recorded twice consecutively and the mean measurement was recorded for analysis. Meanwhile, height was measured to the nearest meter using the Seca stadiometer. Height measurement for subjects with scoliosis were assessed using arm span. Arm span was assessed as the distance between one middle finger`s tip to another middle finger`s tip. On the other hand, body mass index was calculated by dividing weight with square of height and categorized according to the cut-off point by Nutrition Screening Initiative (NSI) 1991 for older adults, namely underweight (less than 24 kg/m$^{2)}$, normal (24–27 kg/m^2) and overweight (>27 kg/m^2). Calf circumference is the widest section of the calf and was measured to the nearest cm in the sitting position with feet touching the ground. Furthermore, waist circumference, the assessment of abdominal obesity, was measured at the midpoint between the lowest last palpable rib and the top of the iliac crest. Hip circumference is the widest part of the pelvis and was measured to the nearest cm.

Body composition was analysis using the Karada Scan Omron Body Composition Monitor HBF-214 for assessing skeletal muscle mass and body fat percentage. Subjects were reminded to avoid caffeine, energy drinks and carbonated beverages 12 hours before examination, to take of sufficient quantity of water, to avoid exercising before examination, and to avoid wearing jewelleries or any metal-based ornaments during examination.

Sarcopenia status. Sarcopenia was assessed according to the revised Asian Work Group for Sarcopenia (AWGS) guidelines (Chen *et al.* 2020). A person was diagnosed with sarcopenia when they had low muscle mass and low muscle strength or low muscle performance. Severe sarcopenia was determined when an individual had poor score for muscle mass, muscle strength and muscle performance. Muscle strength was assessed using hand grip strength, while muscle

mass was assed using Skeletal Muscle Index (SMI). SMI was calculated by dividing muscle mass with square of height. Low muscle mass was indicated by <7 kg/m² in males and <5.7 kg/m² in females (Fung *et al.* 2019). Poor hand grip strength was indicated by <28.0 kg for men and <18.0 kg for women. On the other hand, the short physical performance battery (SPPB) test was used for determining muscle performance. The total score of SPBB was the sum of the three tests with the score ranging from 0 to 12. Higher score indicated better muscle function especially at the lower extremity (Yasuda *et al.* 2017). Subjects with less or equal to nine points were considered having poor physical performance. Sarcopenia status was categorized into three categories namely normal, sarcopenia, and severe sarcopenia.

Cognitive function. The Malay version of Addenbrooke`s Cognitive Examination (ACE) III was used to assess cognitive function. It had good reliability with Cronbach alpha`s value of 0.829. ACEIII consisted of five domains of attention, memory, fluency, language and visuospatial. Score of ≤74 is categorized as risk of dementia (Kan *et al.* 2019).

Subjective cognitive decline. Subjective Cognitive Decline (SCD) was assessed using a single question from the Geriatric Depression Scale-15 (GDS 15) (item 10) which asked the subjects if they had memory decline. If subjects answered `yes`, this indicated the presence of subjective cognitive decline.

Depressive symptoms. Depressive symptom was determined using the short form 15-item Geriatric Depression Scale (GDS-15). GDS-15 had internal consistency value of 0.8 (Nyut *et al.* 2009). The final scoring for GDS was calculated by adding the scores for each individual answers. Presence of depressive symptoms were indicated by the score of 5 and above (Vanoh *et al.* 2016).

Data analysis

Data were analysed by using SPSS version 26.0. Normality testing was done based on histogram. For normally-distributed data, independent t-test was used whereas for non-normal distribution, Mann-Whitney test was used to test mean/median differences between categorical variable with two groups (presence of subjective cognitive decline) and numerical variable (age, education years, weight, body circumference, blood pressure). On the other hand, Chi-Square test has been employed to determine the association between two categorical variables. Predictors of subjective cognitive decline had been determined using binary logistic regression model adjusted for gender, education level, age, household income and Body Mass Index (BMI). Dependent variable was subjective cognitive decline with binary option (presence of depressive symptoms or none).

RESULTS AND DISCUSSION

Proportion of subjective cognitive decline (SCD) in this population was 24.6%. Sociodemographic parameters showed no significance difference between subjects with and without SCD (Table 1). Although not significant, findings showed that 50% of men and women in this study had SCD and 91.7% of those with SCD had household income lower than MYR900.

Proportion of SCD in this study was 24.6% and this is parallel with the findings of pooled study conducted among 39,387 older adults from 15 countries around the world which found prevalence of SCD between 25.1–26.1% (Röhr *et al.* 2020). In a Greek study comprising 1,456 older adults, 28.0% of the subjects responded positively when a single question about memory decline was asked (Vlachos *et al.* 2019). Varying prevalence rates are due to lack of standardization in the tools used for assessing SCD and the heterogeneity of the study population. Different studies used different approaches for assessing SCD. Some studies assessed SCD just by asking a single question of either open-ended, close-ended, or dichotomous, and some other studies target specific impairment related to domains such as naming, orientation, shopping, transportation, and calculation. The questionnaires used for assessing SCD have large variability. SCD must not be taken lightly as it is indeed a warning sign of neurodegenerative diseases. Patient who complained of SCD have higher risk of developing impaired cognition, and psychiatric issues such as depression, sleep disorders, daytime sleepiness, and forgetfulness (Wei *et al.* 2019).

Geriatric Depression Scale (GDS), which indicated depressive symptoms, showed significant differences among the subjects . Those with SCD had higher GDS score, which indicated

Table 1. Sociodemographic, lifestyle and sarcopenia status of subjects (n %) or median (IQR)

Parameters	Subjective cognitive decline		*p*
	Yes	No	
Gender			
Men	36 (50.0)	100 (45.2)	0.483
Women	36 (50.0)	121 (54.8)	
Education years, Median (IQR)	8.0 (6.0)	7.0 (8.0)	0.311
Household income			
<MYR900	66 (91.7)	202 (91.4)	0.944
MYR901–3,030	6 (8.3)	19 (8.6)	
Marital status			
Married	56 (77.8)	148 (67.0)	0.083
Unmarried/Widowed	16 (22.2)	73 (33.0)	
Smoking status			
Yes	17 (23.6)	47 (21.3)	0.676
No	55 (76.4)	174 (78.7)	
Sarcopenia status			
Normal	41 (56.9)	132 (59.7)	0.803
Sarcopenia	18 (25.0)	47 (21.3)	
Severe sarcopenia	13 (18.1)	42 (19.0)	
Polypharmacy			
Yes	2 (2.8)	2 (0.9)	0.234
No	70 (97.2)	219 (99.1)	

MYR: Malaysian Ringgit: IQR: Interquartile Range

presence of depressive symptoms, as compared to those without SCD (p<0.001). There were no significant differences in the association between SCD with anthropometry, blood pressure and cognitive function (Table 2).

Those with SCD reported significantly lower proportion of hypercholesterolemia (47.2%) and diabetes (63.9%), while high blood pressure was higher among those with SCD(62.5%) (p<0.05) (Table 3).

Table 2. Comparison and association between SCD and anthropometry, blood pressure and cognitive function median (IQR) or n (%)

Parameters	Subjective cognitive decline		*p*
	Yes	No	
Weight, kg, Median (IQR)	59.3 (19.1)	58.4 (16.2)	0.329
Hip circumference, cm, Median (IQR)	91.7 (14.0)	91.5 (11.8)	0.960
Waist circumference, cm Median (IQR)	86.0 (17.0)	82.0 (18.8)	0.194
Calf circumference, cm Median (IQR)	32.0 (5.5)	31.5 (4.5)	0.085
Systolic blood pressure, mmHg Median (IQR)	152.5 (33.0)	149.0 (35.0)	0.667
Diastolic blood pressure, mmHg, Median (IQR)	79.0 (15.0)	80.0 (15.0)	0.876
GDS score, Median(IQR)	5.0 (4.0)	3.0 (2.0)	p<0.001*
Body mass index, n (%)			
Underweight	32 (44.4)	111 (50.2)	
Normal	19 (26.4)	48 (21.7)	0.633
Overweight	21 (29.2)	62 (28.1)	
Cognitive function, n (%)			
Normal	12 (16.7)	50 (22.6)	0.322
Impaired	60 (83.3)	171 (77.4)	

SCD: Subjective Cognitive Decline; IQR: Interquartile Range; GDS: Geriatric Depression Scale

Table 3. Association between subjective cognitive decline and comorbidities (n %)

Parameters	Subjective cognitive decline		*p*
	Yes	No	
Hypercholesterolemia			
Yes	25 (47.2)	41 (29.7)	0.023*
No	28 (52.8)	97 (77.6)	
High blood pressure			
Yes	45 (62.5)	103 (46.6)	0.019*
No	27 (37.5)	118 (53.4)	
Heart diseases			
Yes	2 (2.8)	16 (7.2)	0.171
No	70 (97.2)	205 (92.8)	
Diabetes			
Yes	26 (36.1)	43 (19.5)	0.004*
No	46 (63.9)	178 (80.5)	
Stroke			
Yes	1 (1.4)	5 (2.3)	0.649
No	71 (98.6)	216 (97.7)	
Renal diseases			
Yes	3 (4.2)	7 (3.2)	0.685
No	69 (95.8)	214 (96.8)	
Lung diseases			
Yes	0 (0.0)	5 (2.3)	0.198
No	72 (100.0)	216 (97.7)	
Arthritis			
Yes	15 (20.8)	48 (21.7)	0.874
No	57 (79.2)	173 (78.3)	
Gastrointestinal diseases			
Yes	12 (16.7)	29 (13.1)	0.451
No	60 (83.3)	192 (86.9)	
Incontinence			
Yes	10 (13.9)	15 (6.6)	0.061
No	62 (86.1)	206 (93.2)	

Table 4 depicts the predictors of subjective cognitive decline. Predictors of SCD based on the regression model are waist circumference, diabetes, and geriatric depression scale GDS. Greater waist circumference increases the odds of subjective cognitive decline by 1.059 (OR=0.057; 95% CI:1.005–1.116). Meanwhile, one unit increase in GDS score increases risk of SCD by odds of 1.814 (OR=0.595; 95% CI:1.441–2.283; p<0.001). Meanwhile, those with diabetes have a tendency of 2.972 to have subjective cognitive decline as compared to non-diabetics (OR=1.089; 95% CI: 1.062–8.315; p<0.038) (Table 4).

Multivariate regression model has revealed that the predictors of SCD are having greater waist circumference, higher score in GDS and having diabetes. Higher BMI and visceral adipose tissue are related with poor cognitive functioning. Central adiposity either at mid-life or at late-life is associated with greater rate of cognitive decline. Adiposity over the life course is associated with brain atrophy, white matter changes, and blood brain barrier integrity due to the presence of inflammatory markers and cytokines which may increase the risk of cognitive decline (West *et al.* 2017). Central adiposity is a risk factor of comorbidities such as hypertension, diabetes and hyperlipidemia which are also associated with dementia (Chen *et al.* 2022). Besides that, increased waist circumference is a component of metabolic syndrome which induces insulin resistance, hyperglycemia, dyslipidemia and hypertension. Insulin plays an important role in regulating neural metabolism and stimulates

Table 4. Predictors of subjective cognitive decline

Variables	B	SE	Exp (B)	95% CI for Exp (B)		*p*
				Lower	Upper	
Waist circumference	0.057	0.027	1.059	1.005	1.116	0.031*
Body mass index	-0.045	0.071	0.956	0.832	1.099	0.528
GDS score	0.595	0.117	1.814	1.441	2.283	0.000*
Systolic blood pressure	0.002	0.009	1.002	0.985	1.020	0.788
Cognitive function	-0.029	0.015	0.971	0.943	1.000	0.047*
High blood pressure	-0.371	0.527	0.690	0.246	1.940	0.482
High cholesterol	0.667	0.517	1.949	0.708	5.367	0.197
Diabetes	1.089	0.525	2.972	1.062	8.315	0.038*
Heart diseases	-1.740	1.220	0.176	0.016	1.920	0.154
Arthritis	1.214	0.722	3.366	0.818	13.850	0.093
Sarcopenia status						
Sarcopenia	0.027	0.541	0.960	1.027	2.968	0.356
Severe sarcopenia	-0.453	0.643	0.481	0.636	2.243	0.180

Model adjusted for age, gender, income, education years and smoking status

GDS: Geriatric Depression Scale; *Significant at $p<0.05$

glucose uptake in the regions of hippocampal and medial temporal lobe. Presence of insulin resistance in the hippocampus affects the spatial learning and synaptic plasticity (Hou *et al.* 2019). Women with metabolic syndrome were found to have poor scores in domains such as executive function and language (West *et al.* 2016).

Subjective cognitive decline has close relationship with diabetes mellitus. A recent systematic review has shown that type 2 diabetes mellitus or pre-diabetes is associated with cognitive impairment (Papunen *et al.* 2020). A population based cohort study consisting of 3363 participants from the Swedish National Study on Aging and Care-Kungsholmen found that poorly controlled blood glucose is associated with double risk of cognitive impairment and triple risk of cognitive impairment progressing to dementia (Dove *et al.* 2021). Chronic hyperglycaemia is associated with inflammation, oxidative stress and increased advanced glycation end products which contribute to accelerated cognitive decline. In addition, chronic elevation of blood glucose causes loss of endothelial cells, glial cells and neurons which are responsible for maintaining integrity of blood brain barrier (Marseglia *et al.* 2019).

Higher score in GDS, which indicated depressive symptoms, has been linked with SCD in the current study. Older adults with SCD and depression are vulnerable to developing cognitive impairment. Depression and SCD contributed to two important neurobiological pathways which increases risk of neurocognitive disorders. Monoaminergic system in the brain stem is linked with depression while cholinergic system in the basal forebrain is associated with SCD (Liew 2019). On the other hand, findings from the studies of neuroanatomical regions revealed that depression has been linked with atrophy of the entorhinal, and left middle frontal cortices, while SCD is associated with dysfunction of the left middle frontal cortices (Liew 2019). Systematic review has shown evidence from longitudinal studies that SCD was associated with depressive symptoms (Hill *et al.* 2016). In addition, relationship between SCD and depression still exist even after adjusting for sociodemographic characteristics and objective cognitive performance. Another study demonstrated that depression is associated with worsening of SCD-related outcomes such as needing help with daily activities, and disturbance in work and social activities. In fact, the same study found that link between depression and poorer SCD-related outcomes among younger age group of 45–69 years old (Brown *et al.* 2022).

The strength of this study is that it was conducted among low socioeconomic status older adults in one of the poorest states in Malaysia. Socioeconomic status, which comprised of education level, household income and occupation, has great influence on cognitive

function of older adults. Underprivileged older adults may improve their mental wellbeing with proper social network and familial support (Tadai *et al.* 2023). Thus, stakeholders should identify strategies for increasing social capital for reducing socioeconomic inequality, increasing accessibility to health care services, and educating older adults on positive health-related behaviour. Moreover, this study used the interview-administered method for obtaining data for reducing bias. Meanwhile, the limitation of this study is that the results could not be generalized to the whole Malaysian population as it has been conducted in only one state in Malaysia and involving only one ethnic group.

CONCLUSION

In conclusion, the proportion of subjective cognitive decline among older adults with low socioeconomic status in this study was 24.6% which was comparable with other studies. Regression model revealed that the possible predictors of subjective cognitive decline were diabetes, higher GDS score and larger waist circumference indicating abdominal obesity. Previous literatures had highlighted that subjective cognitive decline increased the risk of dementia. Thus, subjective cognitive decline must be screened earlier, and healthy lifestyle must be emphasized.

RECOMMENDATIONS

Screening for SCD among older adults is essential. Proper management of chronic diseases such as maintaining optimal level of blood glucose or diabetes screening is essential for reducing risk of cognitive impairment. Furthermore, stress and depression among older adults can be managed with good social network, physical activity and access to psychological treatment. Abdominal obesity must be minimized with healthy diet and physical activity. Thus, future studies can focus on the effectiveness of these intervention programs as well as investigate the changes in biomarkers among those with subjective cognitive decline.

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DECLARATION OF INTERESTS

All authors have no competing interest to declare that are relevant to the content of this article.

REFERENCES

Anuar MFM, Ganapathy SS, Lee Ann T, Alias N, Omar A. 2022. Prevalence of dementia in Malaysia: A systematic review. J Health Manag 18(1):78−86.

Brown MJ, Hill NL, Haider MR. 2022. Age and gender disparities in depression and subjective cognitive decline-related outcomes. Aging Ment Health 26(1):48−55. https://doi.org/10.1080/13607863.2020.1861214

Chen LK, Woo J, Assantachai P, Auyeung TW, Chou MY, Iijima K, Jang HC, Kang L, Kim M, Kim S *et al.* 2020. Asian working group for sarcopenia: 2019 consensus update on sarcopenia diagnosis and treatment. J Am Med Dir Assoc 21(3):300−307. https://doi.org/10.1016/j.jamda.2019.12.012

Chen R, Cai G, Xu S, Sun Q, Luo J, Wang Y, Li M, Lin H, Liu J. 2022. Body mass index related to executive function and hippocampal subregion volume in subjective cognitive decline. Front Aging Neurosci 14:905035. https://doi.org/10.3389/fnagi.2022.905035

Dainy NC, Kusharto CM, Madanijah S, Nasrun MWS, Turana Y. 2018. Nutritional status, physical activity, oxidative stress, and cognitive function in pre-elderly and elderly. J Gizi Pangan 13(3):117−122. https://doi.org/10.25182/jgp.2018.13.3.117-122

Dove A, Shang Y, Xu W, Grande G, Laukka EJ, Fratiglioni L, Marseglia A. 2021. The impact of diabetes on cognitive impairment and its progression to dementia. Alzheimer's Dement 17(11):1769−1778. https://doi.org/10.1002/alz.12482

Foong HF, Haron SA, Koris R, Hamid TA, Ibrahim R. 2021. Relationship between financial well-being, life satisfaction, and cognitive function among low-income community-

dwelling older adults: the moderating role of sex. Psychogeriatrics 21(4):586−595. https://doi.org/10.1111/psyg.12709

Fung FY, Koh YLE, Malhotra R, Ostbye T, Lee PY, Shariff Ghazali S, Tan NC. 2019. Prevalence of and factors associated with sarcopenia among multi-ethnic ambulatory older Asians with type 2 diabetes mellitus in a primary care setting. BMC Geriatr 19:1−10. https://doi.org/10.1186/s12877-019-1137-8

Hill NL, Mogle J, Wion R, Munoz E, DePasquale N, Yevchak AM, Parisi JM. 2016. Subjective cognitive impairment and affective symptoms: A systematic review. The Gerontologist 56(6):109−127. https://doi.org/10.1093/geront/gnw091

Hill NL, Mogle J. 2018. Alzheimer's disease risk factors as mediators of subjective memory impairment and objective memory decline: Protocol for a construct-level replication analysis. BMC Geriatr 18(1):1−8. https://doi.org/10.1186/s12877-018-0954-5

Hou Q, Guan Y, Yu W, Liu X, Wu L, Xiao M, Lü Y. 2019. Associations between obesity and cognitive impairment in the Chinese elderly: An observational study. Clin Interv Aging 2019:367−373. https://doi.org/10.2147/CIA.S192050

Jessen F, Amariglio RE, Buckley RF, van der Flier WM, Han Y, Molinuevo JL, Rabin L, Rentz DM, Rodriguez-Gomez O, Saykin AJ *et al.* 2020. The characterisation of subjective cognitive decline. Lancet Neurol 19(3):271−278. https://doi.org/10.1016/S1474-4422(19)30368-0

Kan KC, Subramaniam P, Shahrizaila N, Kamaruzzaman SB, Razali R, Ghazali SE. 2019. Validation of the Malay version of addenbrooke's cognitive examination III in detecting mild cognitive impairment and dementia. Dement Geriatr Cogn Disord Extra 9(1):66−76. https://doi.org/10.1159/000495107

Künzi M, Joly-Burra E, Zuber S, Haas M, Tinello D, Da Silva Coelho C, Hering A, Ihle A, Laera G, Mikneviciute G *et al.* 2021. The relationship between life course socioeconomic conditions and objective and subjective memory in older age. Brain Sci 11(1):61. https://doi.org/10.3390/brainsci11010061

Liew TM. 2019. Depression, subjective cognitive decline, and the risk of neurocognitive disorders. Alzheimer's Res Ther 11(1):1−8. https://doi.org/10.1186/s13195-019-0527-7

Lin LH, Wang SB, Xu WQ, Hu Q, Zhang P, Ke Y, Huang JH, Ding KR, Li XL, Hou CL *et al.* 2022. Subjective cognitive decline symptoms and its association with socio-demographic characteristics and common chronic diseases in the southern Chinese older adults. BMC Public Health 22(1):1−9. https://doi.org/10.1186/s12889-022-12522-4

Marseglia A, Fratiglioni L, Kalpouzos G, Wang R, Bäckman L, Xu W. 2019. Prediabetes and diabetes accelerate cognitive decline and predict microvascular lesions: A population-based cohort study. Alzheimer's Dement 15(1):25−33. https://doi.org/10.1016/j.jalz.2018.06.3060

Miley-Akerstedt A, Jelic V, Marklund K, Walles H, Åkerstedt T, Hagman G, Andersson C. 2019. Lifestyle factors are important contributors to subjective memory complaints among patients without objective memory impairment or positive neurochemical biomarkers for Alzheimer's disease. Dement Geriatr Cogn Disord Extra 8(3):439−452. https://doi.org/10.1159/000493749

Nazri NS, Vanoh D, Leng SK. 2021. Malnutrition, low diet quality and its risk factors among older adults with low socio-economic status: A scoping review. Nutr Res Reviews 34(1):107−116. https://doi.org/10.1017/S0954422420000189

Nyunt MSZ, Fones C, Niti M, Ng TP. 2009. Criterion-based validity and reliability of the geriatric depression screening scale (GDS-15) in a large validation sample of community-living Asian older adults. Aging Ment Health 13(3):376−382. https://doi.org/10.1080/13607860902861027

Papunen S, Mustakallio-Könönen A, Auvinen J, Timonen M, Keinänen-Kiukaanniemi S, Sebert S. 2020. The association between diabetes and cognitive changes during aging. Scand J Prim Health Care 38(3):281−290. https://doi.org/10.1080/02813432.2020.1802140

Roh M, Dan H, Kim O. 2021. Influencing factors of subjective cognitive impairment in middle-aged and older adults. Int J Environ Res Public Health 18(21):11488. https://doi.org/10.3390/ijerph182111488

Röhr S, Pabst A, Riedel-Heller SG, Jessen F, Turana Y, Handajani YS, Brayne C, Matthews FE, Stephan BC, Lipton RB *et al.* 2020. Estimating prevalence of subjective cognitive decline in and across international cohort studies of aging: A COSMIC study. Alzheimer's Res Ther 12(1):1−14. https://doi.org/10.1186/s13195-020-00734-y

Rosli R, Goodson M, Tan MO, Mohan D, Reidpath D, Allotey O, Kamaruzzaman S, Chin AV, Robinson L. 2021. Challenges and research priorities for dementia car in Malaysia from the perspective of health and allied health professionals. Int J Environ Res Public Health 18(21):11010. https://doi.org/10.3390/ijerph182111010

Schwarz C, Lange C, Benson GS, Horn N, Wurdack K, Lukas M, Buchert R, Wirth M, Flöel A. 2021. Severity of subjective cognitive complaints and worries in older adults are associated with cerebral amyloid-β load. Front Aging Neurosci 13:675583. https://doi.org/10.3389/fnagi.2021.675583

Shahar S, Vanoh D, Ludin AFM, Singh DKA, Hamid TA. 2019. Factors associated with poor socioeconomic status among Malaysian older adults: An analysis according to urban and rural settings. BMC Public Health 19(4):1−12. https://doi.org/10.1186/s12889-019-6866-2

Tadai ME, Straughan PT, Cheong G, Yi RNW, Er TY. 2023. The effects of SES, social support, and resilience on older adults' well-being during COVID-19: Evidence from Singapore. Urban Governance 3(1):14−21. https://doi.org/10.1016/j.ugj.2023.02.002

Taylor CA, Bouldin ED, Greenlund KJ, McGuire LC. 2020. Comorbid chronic conditions among older adults with subjective cognitive decline, United States, 2015−2017. Innov Aging 4(1):igz045. https://doi.org/10.1093/geroni/igz045

Vanoh D, Suzana S, Yahya HM, Hamid TA. 2016. Prevalence and determinants of depressive disorders among community-dwelling older adults: Findings from the towards useful aging study. Int J Gerontol 10(2):81−85. https://doi.org/10.1016/j.ijge.2016.02.001

Vlachos GS, Cosentino S, Kosmidis MH, Anastasiou CA, Yannakoulia M, Dardiotis E, Hadjigeorgiou, G, Sakka P, Ntanasi E, Scarmeas N. 2019. Prevalence and determinants of subjective cognitive decline in a representative Greek elderly population. Int J Geriatr Psychiatry 34(6):846−854. https://doi.org/10.1002/gps.5073

Wang X, Wang M, Wang X, Zhou F, Jiang J, Liu H, Han Y. 2022. Subjective cognitive decline-related worries modulate the relationship between global amyloid load and gray matter volume in preclinical Alzheimer's disease. Brain Imaging Behav 16(3):1088−1097. https://doi.org/10.1007/s11682-021-00558-w

Wei YC, Huang LY, Chen CK, Lin C, Shyu YC, Chen YL, Huang WY, Lin CP. 2019. Subjective cognitive decline in the community is affected at multiple aspects of mental health and life quality: a cross-sectional study of the community medicine of Keelung Chang Gung Memorial Hospital. Dement Geriatr Cogn Disord Extra 9(1):152−162. https://doi.org/10.1159/000497222

Wen C, Hu H, Ou YN, Bi YL, Ma YH, Tan L, Yu JT. 2021. Risk factors for subjective cognitive decline: The CABLE study. Transl Psychiatry 11(1):576. https://doi.org/10.1038/s41398-021-01711-1

West NA, Lirette ST, Cannon VA, Turner ST, Mosley Jr TH, Windham BG. 2017. Adiposity, change in adiposity, and cognitive decline in mid-and late life. J Am Geriatr Soc 65(6):1282−1288. https://doi.org/10.1111/jgs.14786

West RK, Ravona-Springer R, Heymann A, Schmeidler J, Leroith D, Koifman K, D'Arcy RC, Song X, Guerrero-Berroa, E, Preiss R *et al.* 2016. Waist circumference is correlated with poorer cognition in elderly type 2 diabetes women. Alzheimer's Dement 12(8):925−929. https://doi.org/10.1016/j.jalz.2016.03.017

Yasuda T, Fukumura K, Nakajima T. 2017. Short physical performance battery for middle-aged and older adult cardiovascular disease patients: Implication for strength tests and lower extremity morphological evaluation. J Phys Ther Sci 29(4):748−753. https://doi.org/10.1589/jpts.29.748