International Journal of Gerontology 16 (2022) 308–309
https://doi.org/10.6890/IJGE.202207_16(3).0028

International Journal of Gerontology

journal homepage: http://www.sgecm.org.tw/ijge/

Brief Communication

Association between Adult Height and Subjective Cognitive Decline in a Korean Nationwide Survey

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ARTICLE INFO

Accepted 22 November 2021

Keywords:
body height,
cognitive dysfunction,
dementia,
growth and development

SUMMARY

Relationship between adult height and cognitive impairment remains unclear. The present study used data collected during the 2019 Korea Community Health Survey. The study population was composed of 150,742 persons aged ≥ 40 years, and the study outcome was subjective cognitive decline (SCD). Covariates included comorbidities, health-related habits, social status, mental health, social contact, and family history of dementia. Approximately one in five subjects presented with SCD, which was more frequent in women. Factors associated with SCD varied by gender. A multivariate regression model revealed that height was significantly related to SCD in men but not in women even after adjustment for covariates.

1. Introduction

Although studies have reported shorter people are at increased risk of dementia,[1,2] the association between stature and cognitive decline remains inconsistent.[3–5] Results from the Shanghai Aging Study indicated that body height is not associated with cognitive impairment in both genders.[5] The nature of that association has been studied in different regions, and the majority of studies have been conducted using relatively small, non-representative samples and lacked consideration of potential covariates (e.g., health-related habits and aggregated cardiovascular risk indices[6,7]), which limits their generalizabilities to specific subgroups.[3–5,8] In this study, we examined the relationship between adult height and cognitive function using data in a nationwide Korean database.

2. Methods

Korea Community Health Surveys (KCHSs) have been conducted annually since 2008 by the Korea Centers for Disease Control and Prevention using a multistage sampling design, with face-to-face interviewing.[9] We identified 157,949 individuals aged ≥ 40 years with no history of dementia. After excluding individuals with missing subjective cognitive decline (SCD) values or an extremely abnormal height (< 100 cm or > 300 cm) or weight (> 200 kg), 150,742 individuals were included in the final analysis. All participants of KCHS provided written informed consent, and the Institutional Review Board (IRB) of Gachon University Gil Medical Center approved the protocol of the present study (IRB no., GCIRB2020-462).

The outcome variable was SCD, which was assessed using a question "During the last year, have you experienced memory loss or more severe or frequent episodes of confusion?" Body mass index was calculated by dividing weight in kilograms by height in meters squared. Participants were considered "frequent drinkers" if they drank more than 2 days per week. Regular exercise was defined as weekly physical activity of moderate-intensity more than five times or vigorous-intensity activity more than three times. Information on menopause, educational attainment, marital status, and physician-diagnosed hypertension and type 2 diabetes was collected. Perceived stress was assessed by the question "How much stress do you experience in your daily life?" Responding moderate or severe were considered to experience stress. Depressive mood was measured by the yes-no question: "Have you ever felt sadness or despair continuously for more than 2 weeks during the past year?" Social contact was defined as meeting non-cohabiting individual more than one time a week. Information regarding KCHS data is described in detail elsewhere.[9]

The analysis was conducted separately for men and women. Additionally, as age is the strongest moderator on the relationship between height and cognition, age-adjusted comparison was done. A backward stepwise multivariate logistic regression model was used to identify factors associated with SCD. The analysis was carried out using STATA MP 17.0 (Stata Corp., College Station, TX), and statistical significance was accepted for p values < 0.05.

3. Results

Descriptive statistics of participants are presented in Supplementary Table 1. Approximately 21% of participants presented SCD (n = 31,708). For both genders, individuals with SCD had lower socioeconomic status, poorer mental health, less social contact, and were more likely to have a family history of dementia and be shorter than those without SCD (Supplementary Table 2). Table 1 identifies factors associated with SCD. In contrast to women, a shorter height was

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Table 1
Factors associated with subjective cognitive decline.

	Male (n = 66,323)		Female (n = 82,927)	
	OR[a] (95% CI)	*p*-value	OR[a] (95% CI)	*p*-value
Tall height, per 1-cm	0.99 (0.99–1.00)	< 0.001		
Old age, per 1-year	1.04 (1.04–1.04)	< 0.001	1.03 (1.03–1.03)	< 0.001
Menopause			1.14 (1.07–1.21)	< 0.001
Frequent alcohol drinking			1.10 (1.03–1.18)	0.003
Low educational attainment	1.25 (1.19–1.31)	< 0.001	1.15 (1.10–1.21)	< 0.001
Unmarried			1.09 (1.05–1.14)	< 0.001
Hypertension	1.06 (1.01–1.11)	0.010		
Type 2 diabetes	1.14 (1.08–1.21)	< 0.001		
Stressful life	1.76 (1.67–1.85)	< 0.001	1.63 (1.57–1.70)	< 0.001
Depressive mood	3.37 (3.11–3.65)	< 0.001	2.73 (2.59–2.89)	< 0.001
Less social contact	1.12 (1.06–1.19)	< 0.001	1.13 (1.07–1.19)	< 0.001
Family history of dementia	1.25 (1.14–1.37)	< 0.001	1.25 (1.16–1.35)	< 0.001
R^2		*0.0747*		*0.0622*

CI, confidence interval; OR, odds ratio. The variables which remained statistically significant are only presented.
[a] Determined by backward stepwise multivariate regression models adjusted for age, height, menopause, body mass index, hypertension, type 2 diabetes, educational attainment, marital status, smoking status, frequent alcohol drinking, regular physical activity, stressful life, depressive mood, social contact, and family history of dementia.

significantly and independently associated with SCD in men (odds ratio for SCD per 1-cm increase in height = 0.99, p < 0.001).

4. Discussion

There is an increasing need to improve our understanding of the correlates of cognitive decline. This large-scale community-based study shows that shorter height was independently associated with SCD only in male. The association between adult attained height and cognitive health can be explained in several ways. Both are adversely affected by early-life events such as nutritional, educational, or social deprivation. Brain reserve is thought to develop in childhood and adolescence and importantly determines the onset of cognitive impairment,[10] whereas greater adult height is associated with educational attainment and socioeconomic advantages, which potentially contribute to cognition and protect against aging-related cognitive decline.[11]

Notably, our subgroup analyses revealed that the association between height and SCD was gender dependent. A Korean study of 505 community dwelling older adults[12] also reported a significant relationship between height and SCD among men, but the generalizability of this study was limited. This gender-associated difference may be explained by the relatively wider range of height in males; a similar phenomenon has been reported in prior studies of cardiovascular diseases.[13] Another possible explanation for the gender difference is the protective effect of estrogen on cognition.[14]

The present study has several limitations. First, because cross-sectional data was used, we could not establish a clear causal relationship between height and SCD. Second, we could not establish whether measure heights had been affected by vertebral or hip joint disorders. Third, unmeasured confounders such as dietary patterns, childhood events, and parental factors were not considered. Further work is needed to investigate relations between cognitive function and interactions of height and other potential risk factors.

Despite the limitations, this is the largest study conducted to date on the relation of adult height and SCD. Our results suggest that short subjects that present with early signs and symptoms of cognitive decline be afforded particular attention.

Acknowledgements

This work was supported by the Gachon University Gil Medical Center (Grant number: FRD2021-14).

Conflict of interest

The authors have no conflict of interest to declare.

Supplementary materials

Supplementary materials for this article can be found at http://www.sgecm.org.tw/ijge/journal/view.asp?id=22.

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