Physical health and lifestyle predictors for significant cognitive impairment in community-dwelling Chinese older adults in Hong Kong

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KEY MESSAGES

1. The 6-year incidence of significant cognitive impairment (SCI) in community-living Chinese older people in Hong Kong is 8.6%.

2. Old age, female gender, and low educational level are risk factors for SCI.

3. Physical illnesses such as hypertension, diabetes mellitus, heart disease, and atherosclerosis are risk factors for SCI; early detection and adequate treatment of these illnesses might help reduce the risk of SCI development in older people.

4. Depression is also a risk factor for SCI.

5. Endurance exercises, stretching exercises, and mental activities are protective against development of SCI.

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Background

Dementia is characterised by global cognitive decline and functional impairment in older people and is a growing problem in Hong Kong because of its ageing population.[1] No effective drug treatment is available to prevent the development or reverse the progression of dementia.[2] It is important to identify factors associated with its development. Minimising the detrimental effect of risk factors and optimising resilience factors may help prevent or postpone the onset of dementia and thus reduce functional impairment of older people as well as associated healthcare costs.

The Elderly Health Centres (EHCs) of the Department of Health provide annual physical check-up and cognitive assessment for enrolled Hong Kong residents aged ≥65 years. Data collected by these EHCs can help identify factors that may be associated with the development of significant cognitive impairment (SCI). The present study aimed to assess the association of basic physical health and lifestyle factors with the development of SCI in community-living active Chinese older people in Hong Kong.

Methods

This study was conducted from October 2011 to March 2013. Participants were those aged ≥65 years who attended an EHC from January to June 2005 for their annual health assessment. Those with SCI at baseline were excluded. The outcome measure was development of SCI in the following 6 years. SCI was defined by the presence of clinical dementia, scoring below the education-matched cut-off on the Cantonese version of the Mini-Mental State Examination,[3] or a global Clinical Dementia Rating score of 1 to 3.[4] Data were retrieved for analysis to determine which physical health and lifestyle factors at baseline were associated with development of SCI.

Results

A total of 18 298 older people attended the EHCs from January to June 2005, of whom 1604 were excluded because they had SCI at baseline. Of the 16 694 included, 13 626 had at least one re-assessment since 2008 (Fig). Overall, 1437 older people developed SCI within 6 years; the 6-year incidence of SCI was 8.6%. The incidence of SCI increased with advancing age.

Compared with those who remained cognitively stable, people with SCI were older (76 vs 73 years, P<0.001), more predominantly female (72.8% vs 62.8%, P<0.001), and had a lower educational level (37.5% vs 25.5% illiterate, P<0.001). Logistic regression analysis suggested that old age (OR=1.08, P<0.001), female gender (OR=1.44, P<0.001), and low educational attainment (OR=1.42, P<0.001) were independent risk factors for SCI (Table).

A higher proportion of people who developed SCI had pre-existing hypertension (69.0% vs 63.9%, P<0.001), diabetes mellitus (18.1% vs 14.8%, P=0.001), and heart disease (14.0% vs 11.2%, P=0.001) at

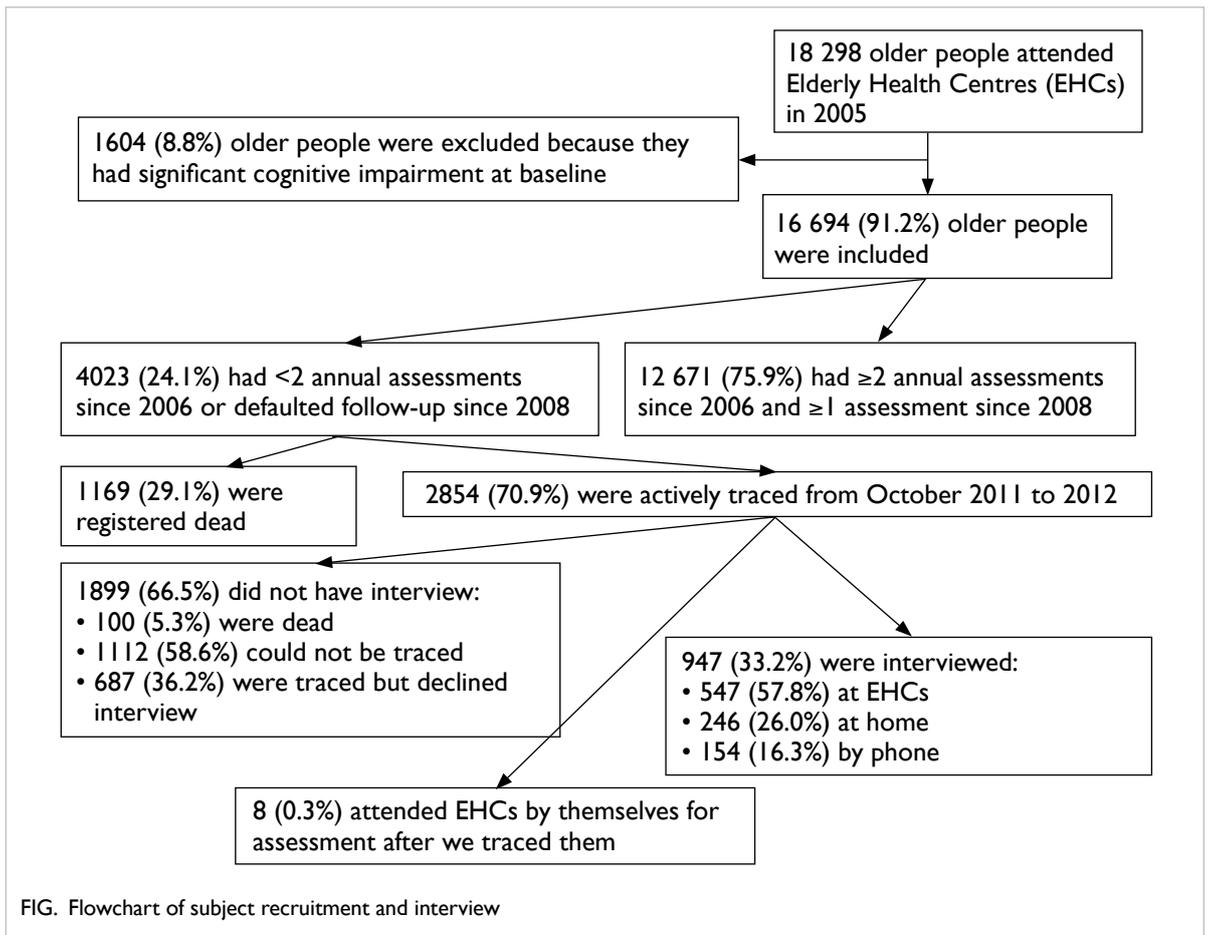FIG. Flowchart of subject recruitment and interview

TABLE. Logistic regression analysis for risk estimate of potential factors for significant cognitive impairment

Factor	Coefficient	Standard Error	OR (95% CI)	P value
Age	0.07	0.006	1.07 (1.06-1.08)	<0.001
Female	0.23	0.07	1.26 (1.09-1.44)	0.001
Illiteracy	0.19	0.07	1.21 (1.06-1.39)	0.004
Hypertension	0.15	0.06	1.16 (1.03-1.32)	0.02
Diabetes mellitus	0.18	0.08	1.20 (1.03-1.39)	0.02
Heart diseases	0.18	0.09	1.20 (1.02-1.42)	0.03
Depression	0.13	0.14	1.14 (0.86-1.51)	0.36
15-item Geriatric Depression Scale	0.03	0.01	1.03 (1.01-1.05)	0.01
Stretching exercise	-0.28	0.11	0.75 (0.61-0.93)	0.007
Endurance exercise	-0.18	0.07	0.83 (0.73-0.95)	0.006
Adequate fruit intake	-0.09	0.06	0.91 (0.81-1.02)	0.12
Mental activities	-0.42	0.07	0.66 (0.58-0.74)	<0.001

baseline. Hypertension (OR=1.14, P=0.04), diastolic hypotension (OR=1.19, P=0.03), diabetes mellitus (OR=1.25, P=0.003), and heart disease (OR=1.24, P=0.01) were independent risk factors for SCI even after adjusting for old age, female gender, and lower educational level (Table). Optimal blood pressure control is important in reducing the risk of cognitive impairment.

People with SCI also had higher systolic blood pressure (142 vs 140 mm Hg, P=0.02), lower diastolic blood pressure (70 vs 71 mm Hg, P=0.003), and higher pulse pressure (72 vs 70 mmHg, P<0.001)

at baseline. Logistic regression analysis suggested that these were potential risk factors for SCI. As pulse pressure is an indicator of arterial stiffness, atherosclerosis might be a risk factor for SCI.

Depression was more prevalent among people with SCI (6.1% vs 3.9%, P<0.001), and logistic regression analysis suggested it to be a risk factor for SCI (OR=1.49, P=0.001, Table). Early detection and treatment of depression may help lower the risk.

Compared with those who developed SCI, a higher proportion of people who remained cognitively stable performed aerobic exercises (34.6% vs 25.4%, P<0.001), stretching exercises (11.4% vs 8.0%, P<0.001), and mental exercises such as playing Mahjong or chess (66.9% vs 50.2%, P<0.001), and had adequate fruit intake every day (ie at least two servings per day) at baseline (55.5% vs 50.4%, P<0.001). Logistic regression analysis suggested that aerobic exercises (OR=0.83, P=0.007), stretching exercises (OR=0.72, P=0.002), mental exercises (OR=0.61, P<0.001), and adequate daily fruit consumption (OR=0.86, P=0.008) were protective against the development of SCI (Table).

Conclusion

Old age, female gender, illiteracy, hypertension, diabetes mellitus, heart disease, and depressive symptoms were associated with a higher risk of SCI. Active stretching and endurance exercises and mental leisure activities were associated with a lower risk of SCI. Further studies are required to determine the underlying mechanisms of how these factors affect cognitive function and whether early detection and modulation of risk factors can improve the cognitive function of older people in Hong Kong.

Acknowledgements

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