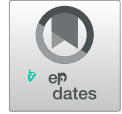# Factors associated with motoric cognitive risk syndrome among low-income older adults in Malaysia

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Bac g d: Motoric cognitive risk (MCR) syndrome is characterized by slow gait and memory complaints that could be used to predict an increased risk of dementia. This study aims to determine the MCR syndrome and its risk factors among low-income (B40) older adults in Malaysia.

Me d : Data from TUA cohort study involving 1366 older adults (aged 60 years and above) categorized as low-income were analysed, for risk of MCR syndrome based on defined criteria. Chi-square analysis and independent

of older population. Abu Bakar et al. [5] found that elderly women were more marginalized and at a disadvantage in socioeconomic aspects of their lives. Therefore, it is essential to increase the accessibility of simple and cost effective dementia risk assessments in order to curtail health care costs.

Gait speed has been accepted as a simple, reliable and valid functional measurement of motor control, strength and gait pattern [6]. Studies suggest that coexistence of cognitive complaints with reduced gait speed may indicate an increased risk of dementia [7–10]. Motoric cognitive risk (MCR) syndrome is a newly defined pre-dementia syndrome characterized by slow gait speed with preserved physical functioning and cognitive complaints without dementia [11]. It can be detected without complex cognitive assessments and is accessible in various clinical settings [12].

A multi-country study reported that the pooled prevalence of MCR syndrome among older adults aged 60 and above was 9.7% [12]. A recent large-scale population study in Japan established the modifiable risk factors associated with MCR [13]. The findings reported that risk factors such as diabetes, depressive symptoms, falls and obesity were associated with increased risk of MCR syndrome.

As yet little is known about the occurrence of MCR syndrome and its risk factors among low-income populations. In Malaysia, the low income or B40 group is the bottom 40% of households with an income of less than RM3, 900 per month. The median and mean household income for this group is RM3, 000 per month and RM2, 848 per month, respectively [14]. The present study aims to determine the prevalence of MCR syndrome and its risk factors among

symptoms if they scored five and above on a 15-items Geriatric Depressive Scale (GDS).

Statistical analysis

All data were analysed using IBM Statistical Package for Social Science (SPSS) version 22 (IBM Corp., Chicago, IL). Significant value was set at $p < 0.05$. Comparison of characteristics between MCR and non-MCR groups were analysed using chi-squared (χ^2) tests for categorical variables and independent t-test for continuous variables. Hierarchical binary logistic regression was employed to determine the risk factors of MCR syndrome, adjusted for age, gender and educational years. Results were reported as adjusted odd ratio and 95%

2 Comparison of baseline characteristics

Variables	MCR (= 47) (%) / Mean ± SD	NON-MCR (= 1319) (%) / Mean ± SD	value
Cancer			
Yes	2 (4.3)	10 (0.8)	0.063
No	45 (95.7)	1287 (99.2)	

30]. Additionally, microvascular change such as diabetic retinopathy was also associated with lower verbal fluency, mental flexibility and processing speed [31]. Previous studies that have examined the association between arthritis and cognition suggested that arthritis might increase the risk for cognitive impairment [32–34]. Arthritis and cognitive impairment are both associated with factors such as fatigue, pain, depression and increased risk of physical inactivity. However, arthritis was not significantly associated with risk of MCR in the present study.

Previous studies also reported that participants with MCR were more depressed compared to non-MCR group [11, 13]. Our colleagues from the same large-scale population study showed that functional status is one of the predictors that significantly associated with geriatric depressive disorders among Malaysian older adults [35]. Depressive symptoms were also reported highest in Mild Cognitive Impairment (MCI) group [36]. Nevertheless, depressive symptom was not associated with the risk of MCR in the present study. Both MCR and non-MCR groups reported not having any depressive symptom as measured using GDS. This might explain the lack of association of depressive syndrome with MCR.

The strength of this study is that it is one of very few studies investigating MCR among low-income populations in Asia. The limitation of the present study is that the true causal relationships could not be derived as this was a cross sectional study. Nevertheless, the multiple factors associated with MCR syndrome in the present study were in agreement with the risk factors of cognitive impairment and dementia [37]. Future validation studies are needed so that this simple clinical approach can be used to improve dementia risk assessments, develop interventions and preventive measures to optimize cognitive performance of Malaysian elderly.

In conclusion, Malaysian older adults from the low-income (B40) group, especially women living in rural areas, with obesity, diabetes, heart disease and cancer were at a higher risk of MCR syndrome. The cost effective MCR concept can be easily applied in various settings, particularly in rural areas that lack of healthcare facilities, to identify high-risk individuals. Further investigation on MCR as a predementia syndrome will help in development of preventive strategies and interventions to reduce the growing burden of dementia, especially among individuals with low socioeconomic status.

3 Factors that significantly associated with MCR syndrome

Independent variables	Adjusted OR	95% CI Lower	95% CI Upper	value*
Age	1.13	1.074	1.197	< 0.001
Gender				
Male				
Female	3.67	1.485	9.070	0.005
Strata Status				
Urban				
Rural	2.19	1.098	4.348	0.026
Obesity				
No				
Yes	3.82	1.699	8.570	0.001
Diabetes				
No				
Yes	2.04	1.013	4.109	0.046
Cardiovascular disease				
No	2.50	1.004	6.203	0.049
Yes				
Cancer				
No				
Yes	6.57	1.177	36.650	0.032

Hierarchical binary logistic regression, Adjusted for age, Gender and educational years, *Significiant at p < 0.05

members, community leaders and the local authorities for their cooperation throughout recruitment and data collection processes.

Availability of data and materials

All relevant data can be found within the paper.

Authors' contributions

HL was responsible for responsible for conceptualisation, acquisition of data, analysis of data, initial and final draft. AFML and SS were responsible for conceptualisation, initial draft and revising draft for content. MB was responsible for acquisition of data and analysis of data. BCC was responsible for conceptualisation and revising draft for content. All the authors have read and approved the final manuscript.

Ethics approval and consent to participate

This study was approved by Medical Research and Ethics Committee of the Universiti Kebangsaan Malaysia (UKM). Informed consent was also obtained from all participants prior the data collection.

Consent for publication

Not applicable.

Competing interests

The authors report no conflict of interest related to the work.

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