# Mild Behavioral Impairment and Cerebrovascular Profiles Are Associated with Early Cognitive Impairment in a Community-Based Southeast Asian Cohort

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## Introduction

With Singapore's rapidly ageing population, dementia is becoming an increasingly prevalent health concern locally[1]. Cognitive impairment is a spectrum that ranges from cognitively normal (CN), subjective cognitive decline (SCD), mild cognitive impairment (MCI) to dementia. Currently, there is little use of behavioural change as an indicator of pre-dementia cognitive impairment, with the focus being placed on biochemical and imaging studies instead. MBI, which presents with various neuropsychiatric symptoms (NPS), has been shown to be positively linked to cognitive impairment and is more easily detected by others around the patient[2]. Hence, this study mainly aims to evaluate if NPS is a potential indicator for cognitive impairment, accounting for cerebrovascular and vascular factors that share links to cognitive impairment.


Figure 1: The spectrum of dementia

## Methods

Participants across a wide range of demographic profiles were recruited from the Biomarkers and Cognition Study, Singapore (BIOCIS). They were subjected to a series of cognitive assessments, neuroimaging studies and tested for vascular biomarkers. Statistical analysis was carried out measuring correlations between CVD, vascular risk factors and MCI.

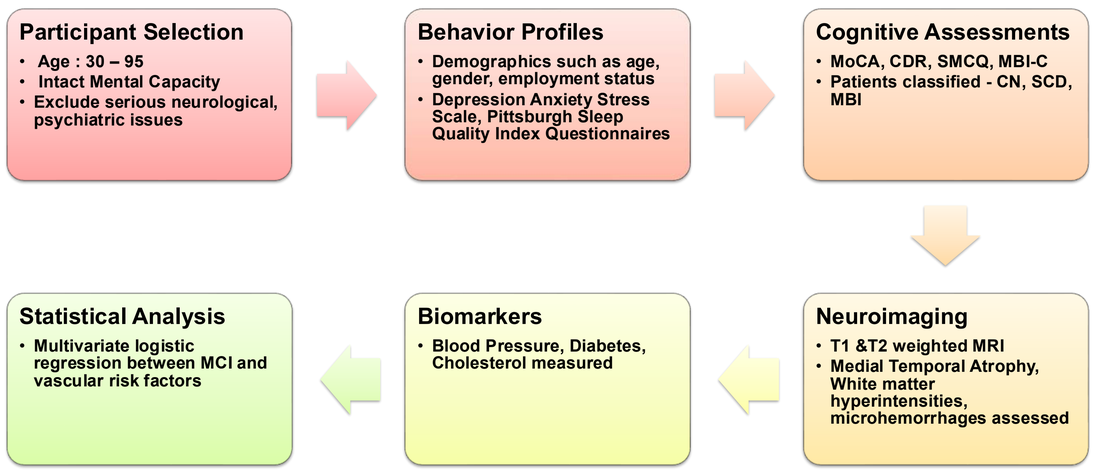


Figure 2: Flowchart highlighting the selection of participants, the assessments they underwent and the data processing that ensued

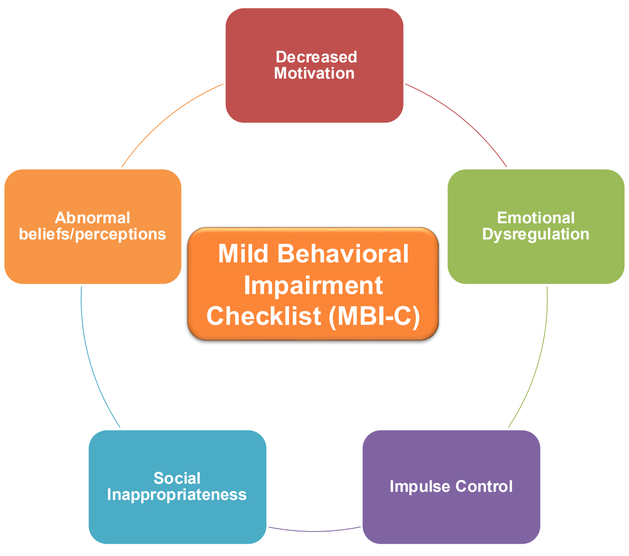


Figure 3: The domains of the Mild Behavioral Impairment Checklist, assessing the initial stages of dementia

## Results

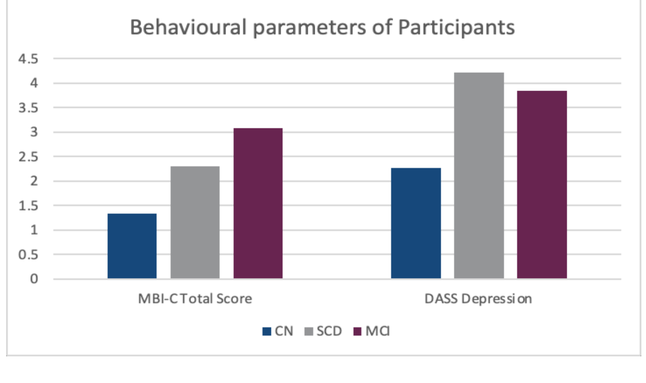


Figure 4: Graph showing the MBI-CT Score and DASS Depression Scores of CN, SCD and MCI participants

## Results

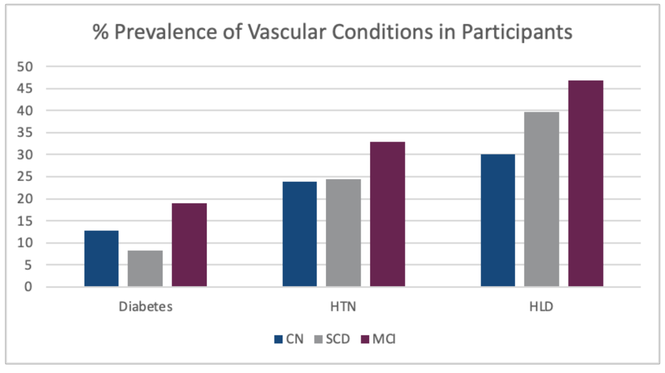


Figure 5: Graph showing the % prevalence of vascular conditions in CN, SCD and MCI participants

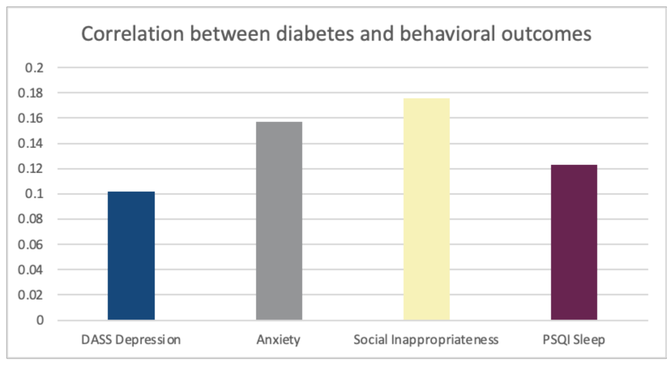


Figure 6: Graph showing the correlation coefficients between diabetes and behavioral outcomes

## Discussion

The main finding is the significant behavioral differences among adults with SCD and MCI compared to CN adults. Firstly, NPS symptoms were significantly worse in participants with MCI than SCD and CN participants.

Secondly, behavioral differences between CN and MCI patients were significant, suggesting behavioral manifestations as a potential marker of the progression along the dementia spectrum. Interestingly, however, the behavioral profiles between SCD and MCI adults did not differ significantly, indicating that these behavioral manifestations could start before the adult begins to experience cognitive decline.

Looking at more quantifiable risk factors, CVD, blood glucose profiles, and systolic blood pressure readings were also found to correlate with cognitive impairment amongst participants. Additionally, raised glucose levels were significantly associated with depression, anxiety, social inappropriateness and poorer sleep quality.

## Clinical Application

Significantly, the findings from this paper have highlighted the potential for the use of behavioral questionnaires in primary healthcare as part of a multimodal approach for the screening of dementia. As the most pertinent behavioral changes reported by the participants manifests between the CN and SCD stages, which is early in the disease progression, picking up these early signs using the questionnaires would enable the early and highly sensitive identification of all patients at risk of dementia. Thereafter, more tests in the form of biomarker testing and imaging would allow for further risk stratification of the identified patients. Healthcare professionals would then have more time to clinically intervene for the patients who are most likely to develop dementia in their later life. For these individuals, lifestyle modifications in the form of cognitive exercises and pharmacological treatment such as cholinesterase inhibitors could slow down disease progression, preserving their mental capacity so as to prevent an immense loss in quality of life due to dementia.

## Conclusion

MBI has been shown to be indicative of early cognitive impairment. There is potential for use of observed behavioral change to categorize risk of further progression to dementia in patients. We believe that future work should focus on developing reliable screening methods, suited to the local context, to evaluate observable behavior changes for early detection of dementia in patients with SCD and MCI.

## References

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