



# The impact of attention on mobility for adults under 65 years with posterior circulation stroke



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## Introduction

Clinical studies have long confirmed the role of various cerebral lobes in supporting cognitive attention function in adults. Attention is a complex neuro-behavioural system relying on multiple neural networks and encompassing various cognitive sub-domains. Historically, posterior lobes have not been recognised in having a role in attention<sup>2,3</sup> other than visual processing. Recent studies have postulated a Cerebellar Cognitive Affective Syndrome impacting executive function and visuospatial cognition.<sup>1</sup>

Whilst the majority of stroke patients recover focused attention skills, higher attention functions such as selective, alternating and working memory, can remain affected. Previous studies have confirmed that rehabilitation outcomes are poorer and adults are less likely to successfully return to occupational roles when attention function is affected post stroke. Furthermore, the impact of mood and fatigue on attention post stroke is well documented.<sup>5</sup>

## Aim

The aims of this study were to identify the incidence of high-level attention deficits in adults under 65 years of age who have had a posterior circulation stroke, and to identify if mobility scores are affected in those individuals when cognitive attention is further challenged. This study hypothesised that 30% of participants would demonstrate attention scores below age norms in one or more subtests of the Test of Everyday Attention (TEA), and that mobility scores would indicate significant change when attention was challenged.



## Methods

This was a single site, multidisciplinary, prospective cross-sectional observational study conducted in the Stroke outpatient clinic at JHC between February 2021 and February 2023.

TABLE 1

INCLUSION CRITERIA	EXCLUSION CRITERIA
<ul style="list-style-type: none"> <li>Under 65 years</li> <li>Posterior circulation stroke</li> <li>Within six months post stroke</li> <li>Montreal Cognitive Assessment Screen score of 25 or more</li> </ul>	<ul style="list-style-type: none"> <li>Nil previous strokes outside of the posterior circulation</li> <li>Nil other vascular changes on MRI</li> <li>Patient Health Questionnaire 9 (PHQ9) score indicating moderate to severe depression</li> <li>Modified Fatigue Impact Scale cognitive score of 30 or above</li> </ul>

Recruitment was significantly affected by COVID-19 restrictions over 2022 limiting the total number of participants. Ethics approval was obtained via the Ramsay Health Care WA|SA Human Research Ethics Committee.

Data collected: included participant demographics, PHQ-9 score, Modified Fatigue Impact Scale scores, assessment in the TEA, Timed Up and Go<sup>7</sup>, Timed Up and Go Cognitive, 10m Walk Test<sup>6</sup> and 10m Walk Test Cognitive.

## Results

Ten participants met inclusion criteria and were approached to participate in this study. Three participants declined or were not eligible. One participant did not complete the mobility measures. Demographic data is displayed below.

CHART 1 AND 2

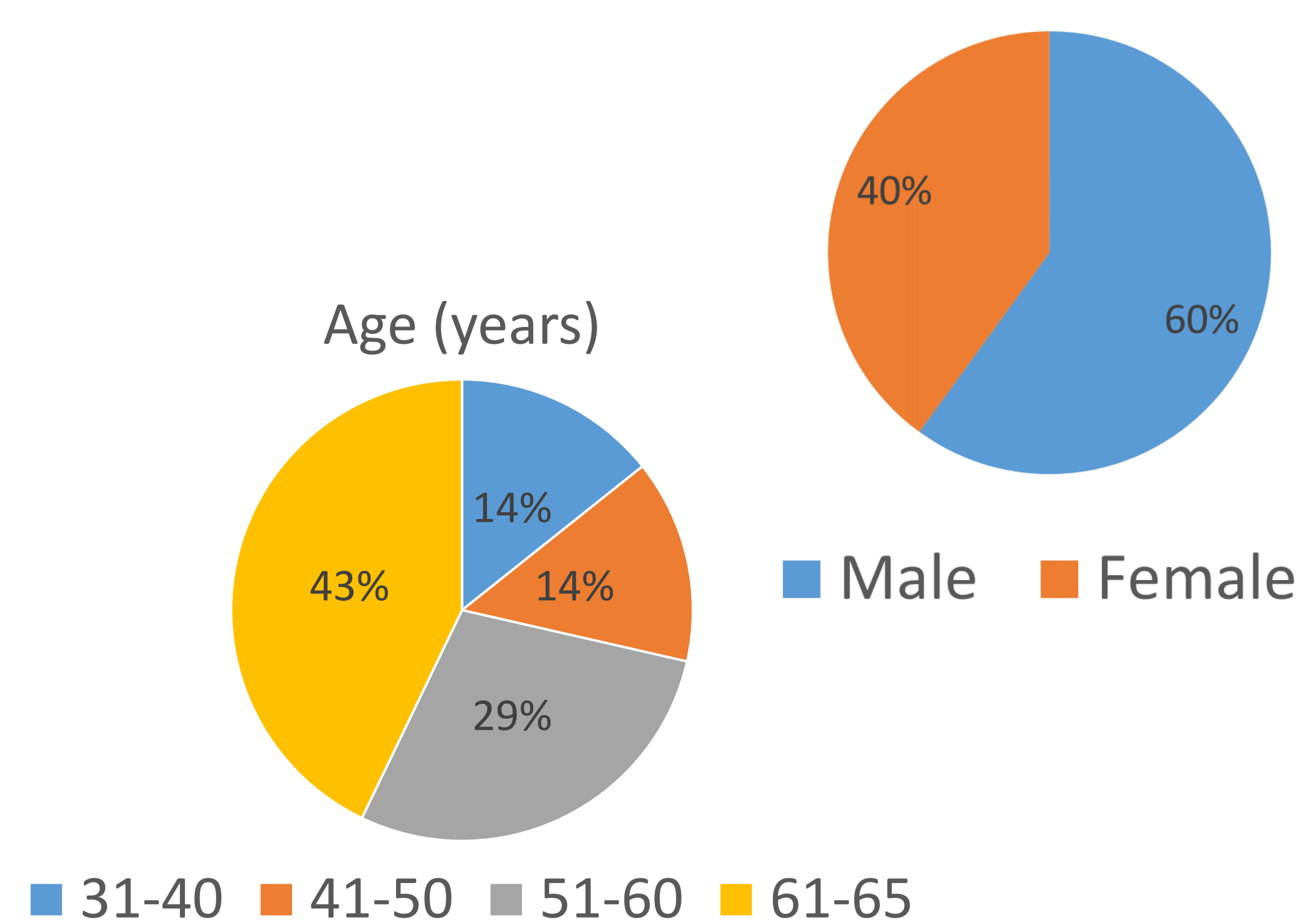
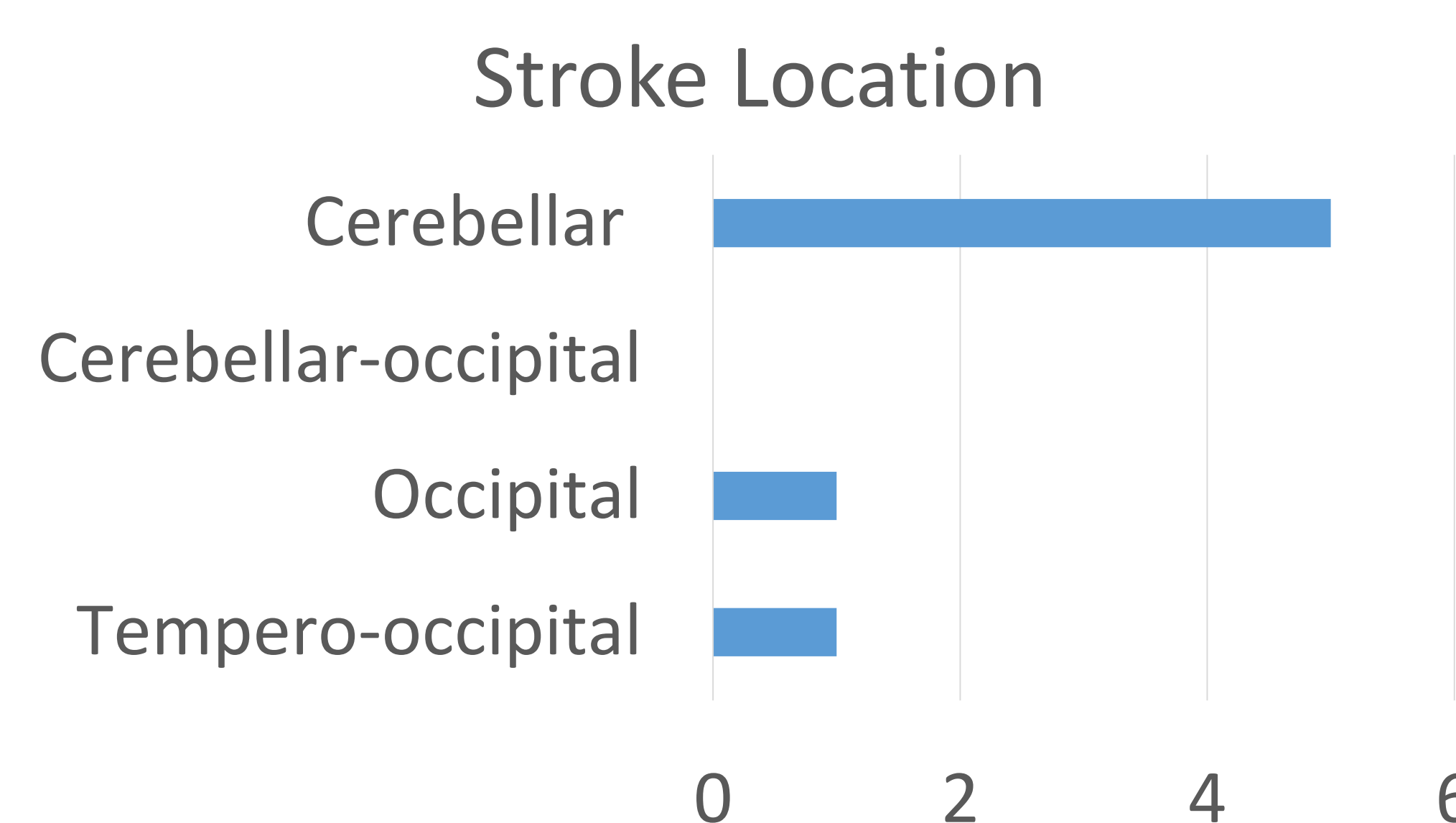


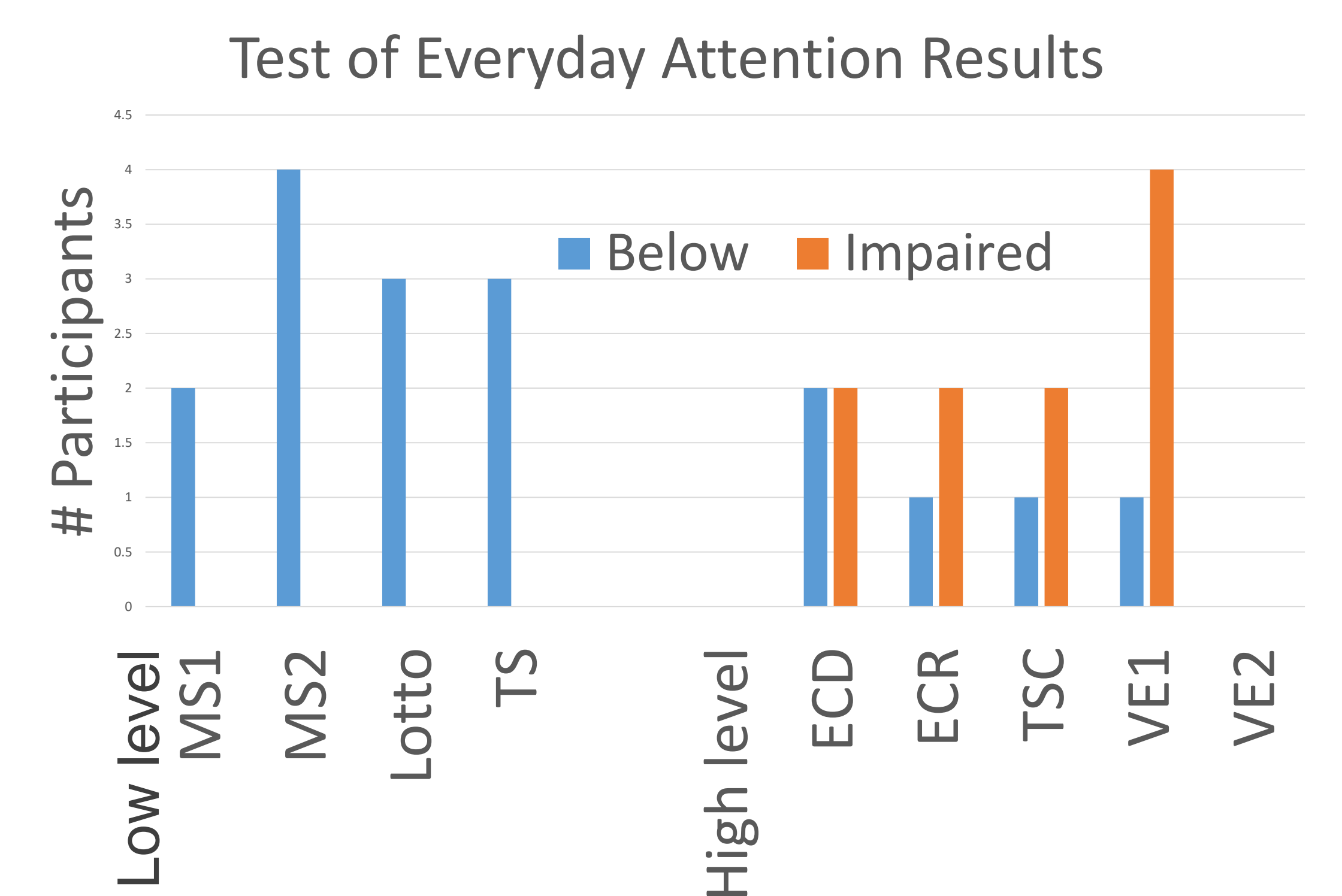
TABLE 2



30% of participants had PHQ-9 scores indicating mild to moderate depression. 50% of participants MFIS indicated the presence of cognitive fatigue, however scores were not significant enough to preclude participation.

In three of the four low level TEA subtests, over 30% of participants produced scores below age norms. In the high level TEA subtests up to 30% of participants produced scores indicating impairment.

In a high level subtest of visual selective attention, 57% of scores indicated impairment.



Six participants demonstrated high-level attention difficulties, however, no significant relationships were identified to support a change in the Timed Up and Go with cognitive challenge. Changes in the 10m walk test with cognitive challenge were inconsistent, with two of the five participants demonstrating a meaningful negative impact of cognitive challenge and one participant demonstrating a meaningful positive impact of cognitive challenge.

## Conclusion

The results of this study suggest that adults with posterior circulation stroke may present with cognitive attention below age norms, and in some cases, impaired.<sup>4</sup> However, our results do not support a consistent relationship between high level attention deficits and negatively impacted mobility scores. Mobility measures inclusive of a higher degree of cognitive challenge may have allowed for more conclusive findings. High level attention changes should be considered in post stroke assessment and rehabilitation of patients under 65 years with posterior circulation involvement when clinically indicated.

Limitations in this study included participant numbers. Recruitment was significantly impacted by COVID 19 due to both staff pressures and changes to the delivery of patient care. The older adult demographic of the catchment area was also likely a factor. Additionally, specific inclusion criteria was required to identify cognitive attention impairment outside of the impact of mood and fatigue. Future studies may benefit from a longer recruitment phase or multi-site approach.

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