

## 1. INTRODUCTION

- CRCI or “chemobrain” or “chemofog” is common among breast cancer survivors treated with chemotherapy (Collins et al., 2013; Menning et al., 2016).
- Attention, verbal and visual memory, processing speed, and executive function are among the domains impaired due to the toxicity of chemotherapy (Collins et al., 2013; Collins et al., 2014; Menning et al. 2016).

## 2. OBJECTIVE

- To examine the prevalence of cognitive impairment among Malaysian multi-ethnic early-stage breast cancer survivors one to three years following chemotherapy.

## 3. METHODS

A cross-sectional study conducted at the University Malaya Medical Centre (UMMC) between August 2018 and December 2019.

Medical Research Ethics Committee, UMMC approvals (MREC ID Number: 201838-6095)

- 160 participants underwent the following cognitive assessment:**
- Montreal Cognitive Assessment (MoCA)
  - Working Memory Index (WMI) of Wechsler Adult Intelligence Scale-IV (WAIS-IV)
  - Trail Making Test (TMT)
  - Rey Auditory and Verbal Learning Test (RAVLT)

Figure 1: Study Protocol

- Inclusion criteria:**
- Female
  - 18 to 65 years of age
  - Stage I, II or IIIA
  - One to three years post-chemotherapy
  - No previous history of central nervous system disease

- Rates of cognitive impairment:**
- International Cognition and Cancer Task Force (ICCTF) guidelines utilized.
  - A z score of  $\leq -1.5$  for two or more tests and a z score of  $\leq -2.0$  for an individual test were defined as the cut-off for overall and domain-specific cognitive impairment, respectively (Wefel et al., 2011).

## 4. RESULTS

Table 1. Sociodemographic and clinical characteristics of participants (N=160).

Variables	n	Percentage (%)	M (SD)
<b>Age (years)</b>			51.51 (8.13)
26-35	4	2.5	
36-45	40	25.0	
46-55	60	37.5	
56-65	56	35.0	
<b>Ethnicity</b>			
Malay	65	40.6	
Chinese	68	42.5	
Indian	27	16.9	
<b>Education level</b>			
Primary	13	8.1	
Secondary	99	61.9	
Tertiary	48	30.0	
<b>Household income</b>			
Low (<1148USD)	107	66.9	
Middle (1148USD to 2595USD)	53	33.1	
<b>Cancer stage</b>			
I	21	13.1	
II	104	65.0	
III (A)	35	21.9	
<b>Chemotherapy</b>			
Adjuvant	107	66.9	
Neoadjuvant	53	33.1	
Months after completion			23.55(9.79)

Table 2. Mean, standard deviation, and rate for domain-specific and overall cognitive impairment.

Measure	M (SD)	Rate of cognitive impairment n(%)
<b>Attention, concentration, and working memory</b>		
Digit span, WAIS-IV	21.18(5.87)	
Arithmetic, WAIS-IV	9.52(3.65)	
Working Memory Index (WMI)	80.03(15.48)	46(28.8)
<b>Processing speed</b>		
Trail Making Test, Part A (seconds)	47.30(11.80)	0(0)
<b>Cognitive flexibility</b>		
Trail Making Test, Part B (seconds)	77.69(21.07)	0(0)
<b>Verbal memory (RAVLT)</b>		
Immediate recall	35.90(13.06)	60(37.5)
Delayed recall	6.14(3.52)	30(18.8)
<b>OVERALL IMPAIRMENT</b>		86(53.8)

## 5. CONCLUSION

- 53.8% of our breast cancer survivors demonstrated overall cognitive impairment.
- Attention, concentration, working memory, and immediate and delayed recall were affected.

## 6. CLINICAL IMPLICATION

- Routine cognitive screening has to be provided by our cancer care management to tackle the issue of cognitive impairment.
- Cognitive rehabilitation programs tailored for our breast cancer survivors are required to improve their cognitive performance, well-being, and overall quality of life.

## 7. REFERENCES

• Collins, B. et al. (2013). Study of the cognitive effects of chemotherapy: Considerations in selection of a control group. *Journal of Clinical and Experimental Neuropsychology*, 35(4), 435-444.

• Collins, B. et al. (2014). Persistent cognitive changes in breast cancer patients 1 year following completion of chemotherapy. *Journal of the International Neuropsychological Society*, 20(4), 370-379.

• Menning, S. et al. (2016). Cognitive impairment in a subset of breast cancer patients after systemic therapy- Results from a longitudinal study. *Journal of Pain and Symptom Management*, 52(4), 560-569.

• Wefel, J.S. et al. (2011). International Cognition and Cancer Task Force recommendations to harmonise studies of cognitive function in patients with cancer. *The Lancet Oncology*, 12(7), 703-708.

