COVID-19 Pandemic Control Measures: Impact on Social Frailty and Health Outcomes in Non-Frail Community-Dwelling Older Adults

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Dear Editor,

More than one year on, countries continue to impose varying intensities of public health measures to curb the COVID-19 pandemic, running the gamut from encouragement to stay home to the other spectrum of stringent lockdown measures. Older adults remain most vulnerable to both direct and indirect impact of COVID-19; specifically, secondary effects of pandemic control measures such as access to health services and social isolation remain to be determined (1). For instance, an audit study highlighted the disruption of essential community support services for older adults with dementia, leading to behavioral changes that necessitated titration of psychotropic medications and increased caregiver stress (2).

Since the first case detected on January 23, 2020, the Singapore government has responded with calibrated COVID-19 measures to mitigate the virus transmission. This included raising the Disease Outbreak Response System Condition (DORSCON) level to Orange (moderate) since February 7, 2020 (3), and implementing an 8-week circuit breaker (CB) from April 7 to June 1, 2020, where only essential services remained available with severe reduction of eldercare services (4). Beyond the CB, a three-phased approach ensured activities were resumed progressively, including support and activities for older adults, from June 2, 2020 onwards.

While recent studies highlighted the buffering effect of social relationships against negative changes in older adults' psychological well-being due to COVID-19 measures (5), the impact on social frailty is less well understood, possibly due to challenges of conducting such studies in a time-sensitive manner. This provided the impetus for the current study, which involves secondary analysis of an ongoing longitudinal cohort study to ascertain the impact of pandemic control measures on social frailty and health outcomes among healthy community-dwelling older adults. The accrued understanding can help guide policy planning in mitigating secondary effects of pandemic control measures on older adults.

We studied 203 participants from the "Longitudinal Assessment of Biomarkers for characterization of early Sarcopenia and Osteosarcopenic Obesity in predicting frailty and functional decline in community-dwelling Asian older adults study" (GeriLABS-2) (6) who completed one-year follow-up visit. One hundred and fifty-one (74.3%) completed face-to-face assessment prior to DORSCON Orange enhanced

pandemic control measures (termed 'pre-circuit breaker' group), while fifty-two (25.6%) were assessed remotely between July to August 2020 ('post-circuit breaker' group) after control measures were gradually lifted. Ethics amendment approval was obtained for remote assessment using modified data collection that cohered with control measures.

The primary outcome measure was social frailty, measured using the validated 8-item social frailty scale (SFS-8, range: 0-8) with higher scores indicating increased social frailty (7). The SFS-8 has a three-factor structure comprising 'social resources' (Factor-1), 'social activities and financial resource' (Factor-2), and 'social need fulfilment' (Factor-3). Secondary outcomes included Chinese Mini-Mental State Examination (CMMSE); 15-item Geriatric Depression Scale (GDS); basic and instrumental activities of daily living (ADLs); FRAIL scale; lifestyle activity (Frenchay Activities Index, FAI); and physical activity (International Physical Activity Questionnaire, IPAQ).

We performed intra-group comparison between baseline and one-year assessment for both pre- and post-CB groups using paired T-test. To account for baseline difference in age between pre- and post-CB groups (68.07±7.37 vs 63.62±6.39years, p<.001), we performed linear regression adjusting for age and gender for inter-group comparison of one-year outcomes, with significance set at 5%.

Participants were predominantly Chinese and female. They were cognitively intact, non-frail by FRAIL (<3) criteria and independent in basic and instrumental ADLs (Table 1), attesting to their relatively good health. In the pre-CB intra-group comparison, social frailty total and factor scores were significantly improved at one-year, while other outcomes did not differ. The post-CB intra-group comparison showed significant increase in social frailty total score (0.73±0.95 vs 1.85±1.16, p<.001). Underpinned by increase in factors 1 and 2, the total score approached the cutoff(≥2) for social pre-frailty, which previously was reported to be highly associated with lower physical activity and poorer physical performance (7). Both GDS and FAI scores were significantly poorer at one-year, although CMMSE, ADLs and IPAQ did not differ. Inter-group comparison at one-year revealed post-CB group being significantly worse in social frailty total as well as factor 1 and 2 scores, whereas factor 3 was paradoxically better. For secondary outcomes, GDS and FAI were significantly worse in post-CB group, but not different in CMMSE, ADLs and IPAQ.

In summary, our study shed light on the deleterious impact

Table 1. Inter- and intra-group comparisons for pre- and post-circuit breaker assessments

	Pre-Circuit Breaker (n=151)		Post-Circuit Breaker (n=52)	
	Baseline	1-year	Baseline	1-year
Demographics				
Age, years	68.07±7.37		63.62±6.39	
Gender, female, n (%)	110 (72.8)		40 (76.9)	
Race, Chinese, n (%)	140 (92.7)		50 (96.2)	
Cognitive performance				
CMMSE, max 28	26.21±1.66	26.43±1.63	26.44±1.63	26.58±1.19
Mood				
GDS, max 15	1.03±1.44	1.05±1.33	1.19±1.78	1.92±1.73[a,b]
Frailty status				
FRAIL score, max 5	0.19±0.44	0.27±0.59	0.12±0.32	0.08±0.27
Functional status				
BADL, max 100	98.01±3.37	97.62±3.64	98.08±3.45	98.56±2.49
IADL, max 23	22.70±0.53	22.59±1.05	22.79±0.41	22.87±0.35
Activity				
FAI, max 40	32.16±5.31	32.27±5.28	33.37±3.96	30.04±5.47[a,b]
IPAQ, METs	5199.25±2384.81	5125.06±2131.19	4594.81±2254.75	4849.58±2603.80
Social frailty, SFS-8#				
Total score, max 8	1.39±1.42	0.89±1.15[a]	0.73±0.95	1.85±1.16[a,b]
Factor 1: Social resources, max 3	0.46±0.77	0.22±0.58[a]	0.19±0.60	0.67±0.73[a,b]
Factor 2: Social activities & financial resource, max 3	0.51±0.76	0.36±0.58[a]	0.35±0.59	1.10±0.63[a,b]
Factor 3: Social need fulfilment, max 2	0.42±0.59	0.31±0.57[a]	0.19±0.49	0.10±0.30[b]

Mean±SD unless otherwise indicated; BADL: Basic activities of daily living; CMMSE: Chinese Mini-Mental State Examination; FAI: Frenchay Activities Index; GDS: Geriatric Depression Scale; IADL: Instrumental activities of daily living; IPAQ: International Physical Activity Questionnaire; SFS-8: Social Frailty Scale (8-item); # The items for SFS-8 are: Factor 1: visit friends, turn to others for advice, someone to confide in; Factor 2: go out less, eat alone, limited by financial resources; Factor 3: live alone, talk to someone every day; a. p<0.05 comparing 1-year and baseline (intra-group); b. p<0.05 regression analysis adjusted for age and gender; comparing 1-year outcomes for pre- versus post-circuit breaker (inter-group).

of COVID-19 pandemic control measures on social frailty and attendant health outcomes in non-frail community-dwelling older adults. Even though post-CB participants were less socially frail at baseline compared to pre-CB counterparts, they endorsed significantly increased social frailty which was driven by impact on social resources, social activities and financial resource. Further studies are warranted to evaluate if the observed improvement in social need fulfilment at one-year can be attributable to other factors such as work-from-home arrangements, home-based learning, or differences in digital literacy. Notably, even though cognition, ADLs and physical activity were relatively preserved in our cohort of non-frail older adults, the impact on social frailty was associated with poorer mood and decreased lifestyle activity. The greater depressive symptoms observed in the post-CB group echoed previous findings (8), whereas decreased lifestyle activity as a result of pandemic control measures was unsurprising, given that FAI measured higher order ADLs that included more complex social activities beyond physical activity (9). Enabling social engagement and connectedness for older adults is therefore an imperative that cannot be compromised (10).

One study limitation was the opportunistic nature of our data from an ongoing study, as opposed to a pre-planned study examining the impact of COVID-19 control measures.

Furthermore, being conducted in a non-frail Asian cohort that is predominantly Chinese, these results may not be generalizable to frail older adults and other ethnicities. Taken together, nonetheless, our study highlights that the impact of COVID-19 control measures on social frailty, mood and lifestyle activity extends even to relatively healthy older adults with implications for planning and implementation of future pandemic control policies. While COVID-19 has aggressively compelled us to change the way we live and connect socially, it also presents "a unique opportunity for improvement" (11) to enhance social support for our older adults and maintain preparedness for the post-pandemic epoch.

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