The effect of the COVID-19 pandemic on heart failure unplanned admission: a single center study

N.A. Yusoff[1], H.S.R. Ong[2], Y. Cao[1], Y.H. Huang[1], T.B. Ang[1], H.F.D. Loh[1], M.M. Foong[1], W.L. Huang[3], Y.Z. Oh[3], Z.W. Teo[3], S.G.S. Lee[3]

[1]Changi General Hospital, Case Management, Singapore, Singapore; [2]Changi General Hospital, Health Research Services, Singapore, Singapore; [3]Changi General Hospital, Cardiology, Singapore, Singapore

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Background: Acute heart failure (AHF) is a leading cause of admissions among adults. The COVID-19 pandemic has placed a high burden on healthcare systems globally. Many countries announced lockdowns which restricted residents' movement. There is a reported reduction in AHF admissions during the pandemic in several countries, potentially leading to adverse outcomes such as increased morbidity and mortality. To date, little is known on whether similar trends are observed in Southeast Asian (SEA) countries.

Purpose: We aim to evaluate whether AHF admissions have been affected by the pandemic and the lockdown restrictions in a multi-ethnic, urban SEA country. We hypothesized that the pandemic and lockdown restrictions (called a "circuit breaker (CB)") will influence heart failure (HF) admission rates.

Methods: We conducted a retrospective analysis of patients who were admitted with a principal diagnosis of HF to a tertiary hospital in a SEA country. The study period was from the first confirmed case of COVID-19 (January 23, 2020) to July 31, 2020 (n=378). This was further divided into 3 sub-periods for inter-year and intra-year subgroup analysis. Pre-CB: January 23, 2020 to April 6, 2020, CB: April 7, 2020 to June 1, 2020, and Post-CB reopening (Phase 1 & 2): June 2, 2020 to July 31, 2020. The control period was the same timeframe in the preceding year (January 23, 2019 to July 31, 2019) (n=398) and was similarly divided into 3 subgroups. The primary outcome was the overall HF admission rate. Where appropriate, Poisson regression or Negative Binomial regression was utilised to compare the incidence rate ratios of the HF admissions between the periods. Mann-Whitney test or student's t-test was used to compare the length of stay (LOS) and Charlson Comorbidity Index (CCI) scores.

Results: Details on the study cohort can be found in Table 1. The study period's overall mean admission rate was 2.08 per day, which was not significantly different from the control (2.00 per day). Subgroup analysis showed that the CB admission rates were significantly lower compared to (i) the control (1.39 per day vs. 2.02 per day) and (ii) pre-CB period in the same year (1.39 per day vs. 2.44 per day) (Fig. 1). Phase 1 & 2 admission rates were significantly higher compared to the control (2.28 per day vs. 1.68 per day), and CB admission rates (2.28 per day vs. 1.39 per day). There were no inter-year or intra-year differences for LOS. There was a significant inter-year difference in CCI scores during the CB period (CB: 2.88 vs. control: 1.97).

Conclusions: Our study showed significant decreases in AHF admissions during the CB period, and a significant increase in AHF admissions from CB to Post-CB reopening. These suggest that the lockdown restrictions had an influence on patients' health seeking behaviour. We also recognise the need to raise public awareness to encourage HF patients to seek timely treatment, prevent complications and adverse events.

	2020 Study Period (*n* = 378)	2019 Control (*n* = 398)
Age, mean (SD)	71.0 (13.8)	68.6 (12.7)
Sex, *n* (%)		
Male	228 (60.3)	241 (60.6)
Female	150 (39.7)	157 (39.4)
Ethnicity, *n* (%)		
Chinese	218 (57.7)	208 (52.3)
Malay	83 (22.0)	90 (22.6)
Indian	30 (7.9)	42 (10.6)
Others	47 (12.4)	58 (14.6)

Table 1. Study cohorts demographics

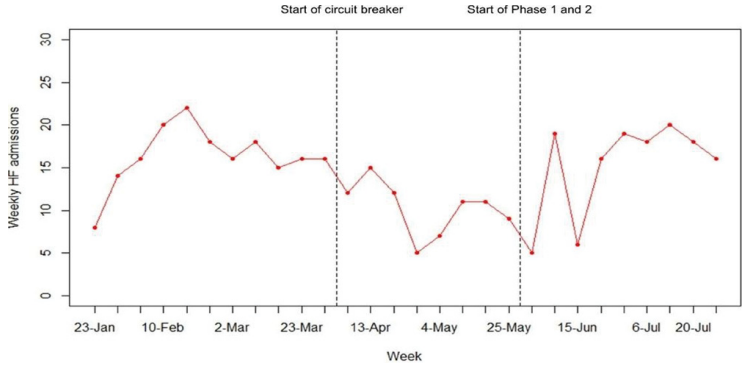

Figure 1. Weekly HF admissions to hospital in 2020