

Course	International Health Development	Name	Ndzeshang Dympna Siysila
Thesis title	Mobility changes and COVID-19 infections in Nagasaki Prefecture, Japan		
	<p>Background</p> <p>Movement restriction measures have been widely adopted to control the spread of the COVID-19 virus. Several studies were found documenting the association between human mobility and COVID-19 in Japan, but none specifically in Nagasaki Prefecture.</p> <p>Objectives</p> <p>The specific objectives of this study were: I) To describe the patterns of mobility changes Nagasaki Prefecture since the beginning of the COVID-19 pandemic, II) To determine the correlation between population flow and the number of reported COVID-19 infections in Nagasaki prefecture and III) To determine the correlation between the inflow risk and number of reported COVID-19 infections in Nagasaki Prefecture</p> <p>Methods</p> <p>This was a descriptive study using mobility and COVID-19 case counts data for the period between February 2020 to April 2021. Changes in mobility were calculated as percentage changes in mobility relative to the period before movement restrictions (February-March 2020). The inflow risk, defined as the estimated number of infectious people moving into a given area, was calculated as a product of the COVID-19 population risk in origin areas and the total population flow from that area into Nagasaki Prefecture. Associations between the independent variables (population flow, inflow risk) and dependent variable (daily reported new cases) were done using the Spearman rank correlation. Statistical significance and</p>		

Confidence Interval (CI) were set at 0.05 and 95% respectively.

Results

Four COVID-19 waves were recorded in Japan, with each wave stronger than the previous. At nationwide level, mobility reductions were higher for movement between prefectures (-53%) compared to movement within prefectures (-29%). Overall mobility in Nagasaki Prefecture reduced by 25%, slightly lower than the 29% at national level during the first State of Emergency (SoE). Degree of movement reduction during the SoEs reduced as the pandemic progressed. Population flow into Nagasaki was positively correlated (Spearman $\rho=0.30$, $P\text{-value}<0.05$) with the number of new infections reported in the prefecture. The highest correlations between population inflow and the new cases was recorded between the first and second SoE. The inflow risk had a strong correlation with new cases (spearman $\rho=0.70$, $P\text{-value}<0.05$). Fukuoka and Saga accounted for the majority (87%) of infectious cases moving into Nagasaki Prefecture. The delay period between infection and reporting of a case was also identified as 11 days (10-13days).

Conclusion

Nagasaki population showed slightly lower compliance towards interventions aimed at reducing movement compared to the nationwide. Increasing reluctance to travel restrictions was also noted as the pandemic progressed, raising concerns about their potential in controlling future waves or outbreaks. Population flow into Nagasaki Prefecture increases the number of reported COVID-19 infections. The high number of infectious populations from Saga and Fukuoka, largely due to mobility between regions, warrants close monitoring of the evolution of the pandemic in these areas and a timely response to limit the risk of influx into Nagasaki. Future studies controlling for the influence of other factors such as temperature, humidity and

testing capacity are recommended to quantify the associations between mobility and number of cases while comparing with other contexts.

Key words: Mobility change, COVID-19 new cases, Inflow risk, Correlation

Word count = 500