Preliminary Substudy Analysis of the Characterization of Health by OHDSI Asia-Pacific chapter to identify Temporal Effect of the Pandemic (CHAPTER) study focusing on hematologic diseases

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Background

- A global pandemic of coronavirus disease of 2019 (COVID-19) has affected more than millions of lives worldwide since the first report of the sever acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in December, 2019.
- The rapidly changing nature of the disease including the different types of virus strain causing the pandemic, the symptoms and infectious rate, as well as change in governmental policies, it has been difficult to recapitulate the full impact of SARS-CoV-2 infection to date.
- Especially, its effect on healthcare resource utilization not limited to the treatment of COVID-19 but also its impact on non-communicable diseases has not been well elucidated[1].
- Recently, studies performed on a federated network have been shown to provide a broader picture on how the healthcare systems across different regions and countries have been utilized during this pandemic.
- Previous studies have shown that data assets mapped to the Observational Medical Outcomes Partnership (OMOP) common data model (CDM) provide a unique opportunity to make a difference in the current crisis, allowing for robust analyses to be performed in a timely across a network of sites[2].
- The OHDSI Asian Pacific regional chapter has launched the Characterization of Health by OHDSI Asia-Pacific chapter to identify Temporal Effect of the Pandemic (CHAPTER) study to describe the temporal change in the incidence of diseases and healthcare patterns before and after the emergence of COVID-19.
- Multiple myeloma (MM) is one of the most common hematologic malignancies, with a reported annual incidence of 114,252 new cases and 80,119 deaths worldwide in 2012, comprising 0.8% and 1% of all cancers, respectively.
- Its incidence is known to vary by ethnicity, with Asians showing a relatively lower incidence than Caucasians, however, recently, several reports have shown that the incidence of MM is increasing in Asian countries, including Korea, Taiwan, and Thailand.
- It has a unique clinical course of starting from a preceding pre-malignant state called monoclonal gammopathy of undetermined significance (MGUS) to an indolent disease state with no symptoms to a more aggressive disease requiring long-term treatment with chemotherapeutic agents.
- In this study, we assessed the impact of COVID-19 on the diagnostic pattern of this disease in the Asia-Pacific Region.

Methods

- Databases from the Australia LPD and Japan Claims converted to the OMOP-CDM were adapted as our data source in this retrospective study.
- For the definition of MM, we leveraged the digital phenotype definition from the previous Phenotype Phebruary project initiated by the Observational Health Data Science and Informatics (OHDSI) community[3].
- We employed interrupted time series analysis to describe the incidence trend of MM before and after the COVID-19 pandemic.

Results

- In this preliminary analysis, both the Australia LPD (Fig 1A) and Japan Claims (Fig 1B) showed a decrease in the incidence of MM in 2020, compared to both the incidence in the previous year as well as what could be expected from the trend in previous years.
- MM is a malignant disease that can be slowly progressive, starting from a smoldering disease that does not require treatment to symptomatic disease with possible bone fracture, renal dysfunction, hypercalcemia, or increased susceptibility to infectious diseases. _Our current result may reflect the reduced number of diagnoses due to asymptomatic patients avoiding hospital visits during the COVID-19 pandemic._
- In terms of treatment, once treatment is required, many patients would require continuous treatment that could also increase the patients' susceptibility to infection. While our current phenotypic description of MM only uses diagnostic code for MM definition, other types of cohort definition established during the Phenotype Phebruary project include MM-specific treatments. Therefore, it will be of interest to compare the change in the incidence rate based on different cohort definitions to figure out whether the decrease of multiple myeloma incidence is purely due to decreased number of newly diagnosed cases versus whether there had been any delayed treatment under the concern of COVID-19 infection as well.
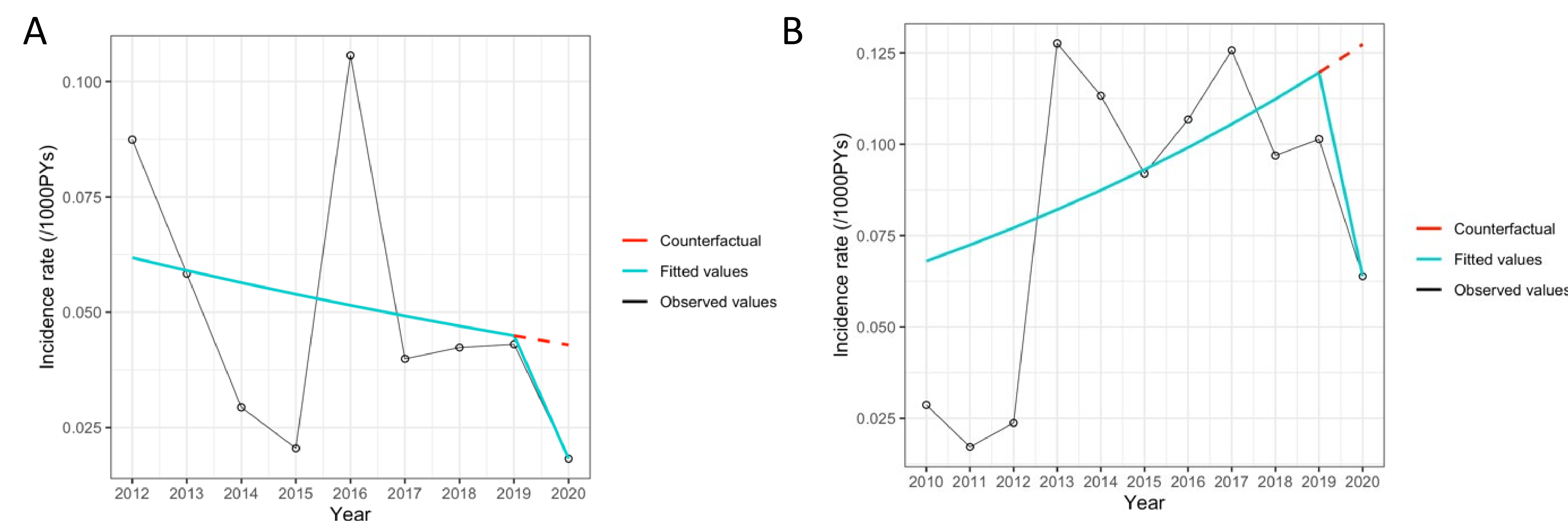

Figure 1. Change in the incidence rate before and after COVID-19 pandemic. The red dotted line of counterfactual shows the expected incidence rate derived from the data in pre-pandemic era. The fitted values shown in green solid line are estimated based on the Poisson regression model with adjusting time vector (years).

Conclusions

Our current result suggests that the incidence of MM in the Asia-Pacific region changed with the COVID-19 pandemic. Further investigation of the CHAPTER study group will provide more concrete evidence of the true incidence of MM and other hematologic diseases and provide more scientific relevant and detailed information across the OHDSI network. Efforts to refine the cohort definition of different hematologic diseases and recruit data partners to join this study are ongoing.

References

1. Patti KG, Kohli P. COVID's impact on non-communicable diseases: What we do not know may hurt us. Curr Cardiol Rep. 2022 May 7, Online ahead of print.
2. Burn E, You SC, Sena AG, Kostka K, Abedtash H, Abrahão MTF, et al. Deep phenotyping of 34,128 adult patients hospitalised with COVID-19 in an international network study. Nat Commun. 2020 Oct 6;11(1):5009.
3. Patrick Ryan, et al. "Phenotype Phebruary Day 4 – Multiple Myeloma." OHDSI Forums, 5 Feb. 2022, https://forums.ohdsi.org/t/phenotype-phebruary-day-4-multiple-myeloma/15801.
4. Greene G, Griffiths R, Han J, Akbari A, Jones M, Lyons J, et al. Impact of the SARS-CoV-2 pandemic on female breast, colorectal and non-small cell lug cancer incidence, stage and healthcare pathway to diagnosis during 2020 in Wales, UK, using a national cancer clinical record system. Br J Cancer. 2022 May 2, Online ahead of print.