Associations of Seasonal Variations and Meteorological Parameters with Incidences of Upper and Lower Gastrointestinal Bleeding in Elderly

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Background

Previous studies have demonstrated the seasonal variations of non-variceal upper gastrointestinal bleeding (UGIB), especially peptic ulcer bleeding, but there is no data on seasonal variations of lower gastrointestinal bleeding (LGIB). Ageing is changing the epidemiology of gastrointestinal bleeding (GIB). There is paucity of data on the association of seasonal variations of GIB in older patients, who are at highest risk of bleeding.

Objective

We aimed to investigate the seasonal variations of UGIB and LGIB, and their associations with various meteorological parameters in different age groups in Hong Kong over a 10-year period.

Methods

We included all patients hospitalized for UGIB and LGIB between 2009 and 2018 in Hong Kong. The monthly age- and sex-standardized GIB incidences were fitted to meteorological data including average temperature (AT), maximum temperature (MaxT), minimum temperature (MinT), temperature range (TR), average precipitation, average atmospheric pressure (AtomP) and average relative humidity after adjusting for prescriptions of aspirin, proton pump inhibitors and Helicobacter pylori eradication therapy using the autoregressive integrated moving average (ARIMA) model.

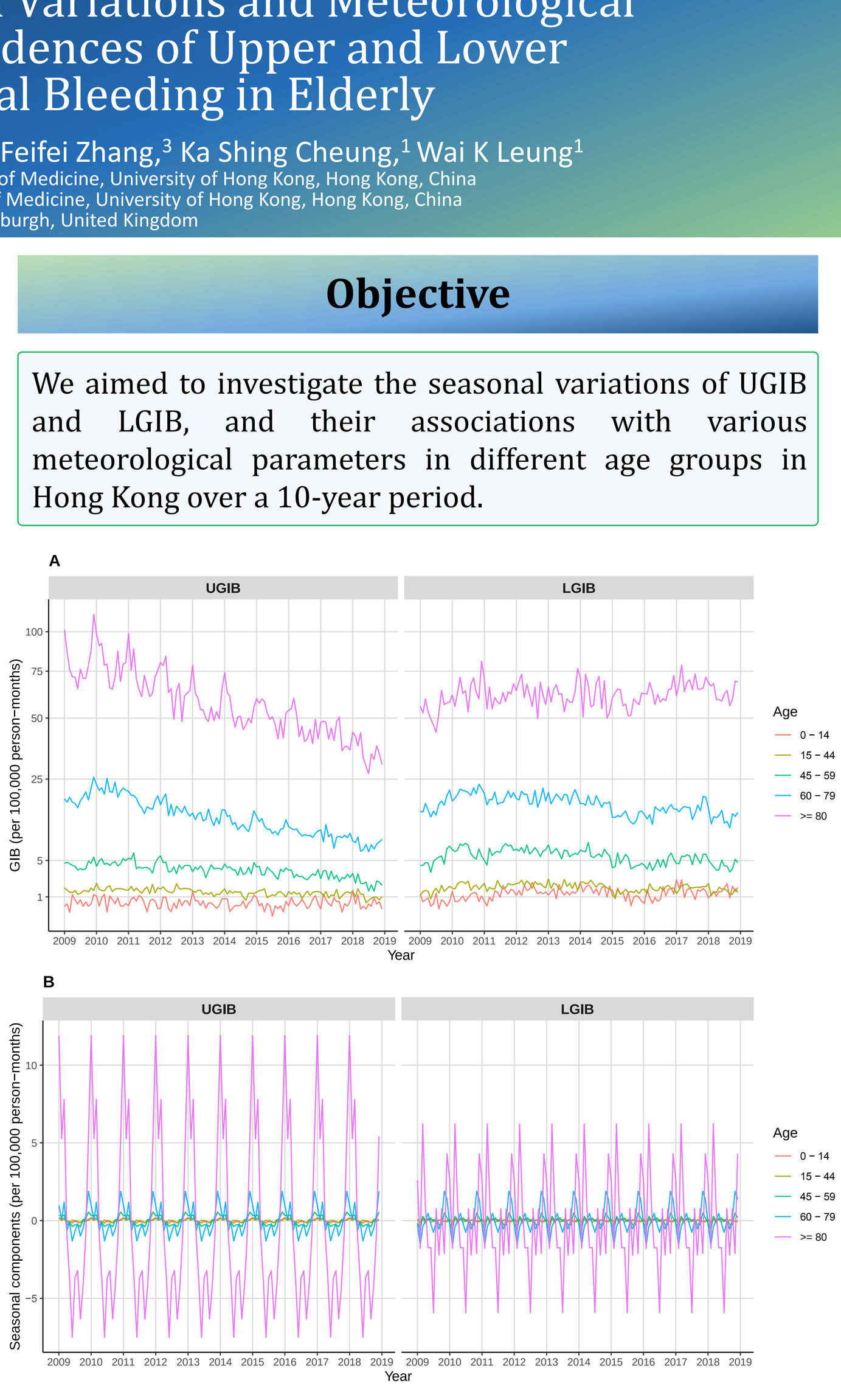

Fig 1 The incidences of UGIB and LGIB (A) and the corresponding seasonal components (B) after stratified by age

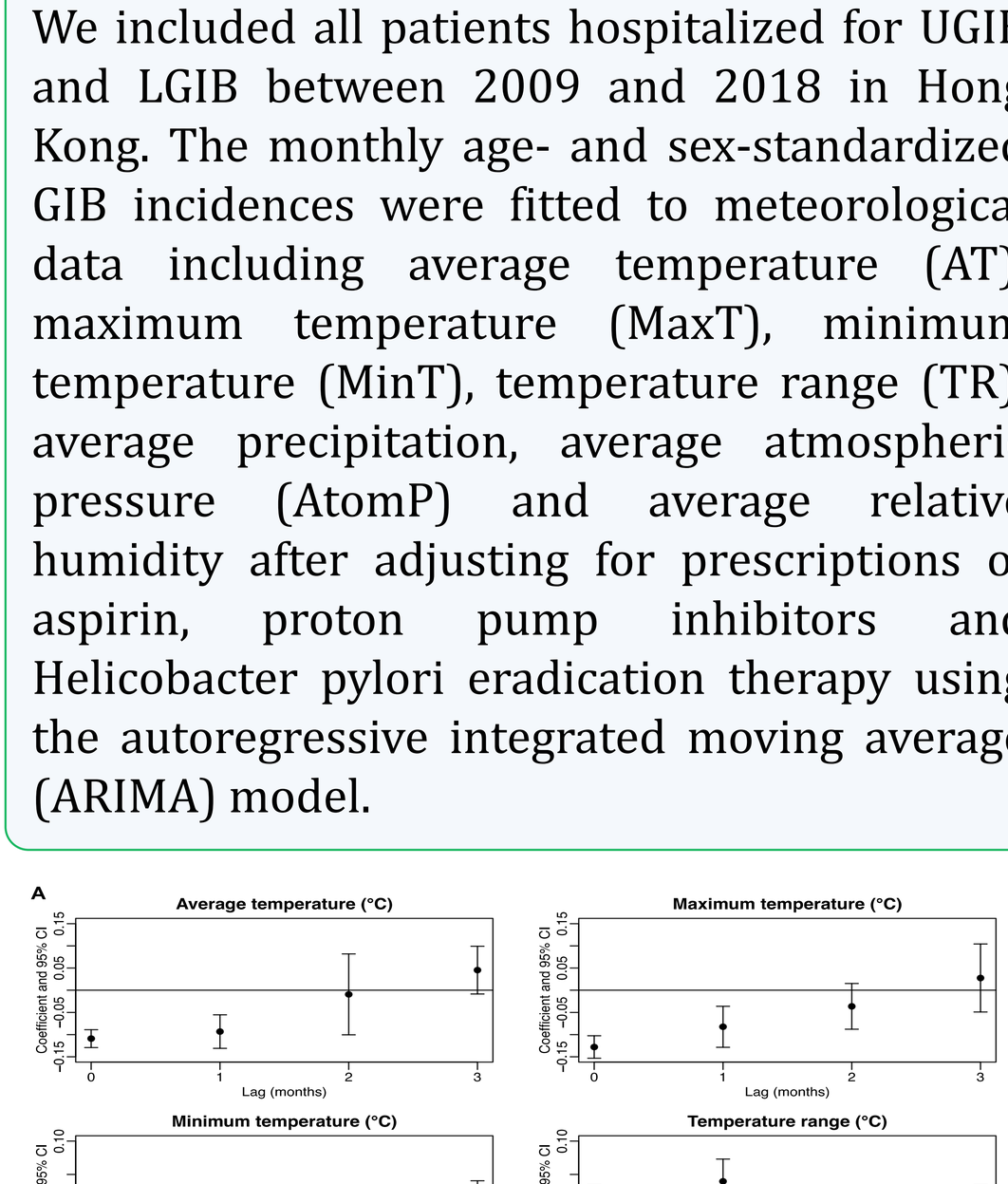

Fig 2 Coefficients of meteorological factors on UGIB (A) and LGIB (B) in ARIMA models for lagged associations

Results

Despite a gradual decline in UGIB incidences, the median incidences of UGIB were still higher in winter months. The incidences of both UGIB and LGIB were higher in the older age groups, especially those ≥80 years. In the ARIMA model, a significant 12-month seasonal pattern was detected when fitted to UGIB, including subgroup of peptic ulcer bleeding, in both unadjusted and adjusted models. However, seasonal component was only observed in unadjusted model in LGIB, but not in model adjusted for aspirin prescription. In addition, the seasonality was only identified in those ≥60 years for UGIB, and only in those ≥80 years for LGIB (Fig 1). We also found that UGIB incidence was inversely associated with AT, MaxT and MinT, but positively associated with TR and AtomP. LGIB was also significantly associated with AT, MaxT, MinT and AtomP (Fig 2).

Conclusion

Despite the change in GIB incidences, the seasonal patterns of GIB were most marked in the elderly. With the ageing population, the impacts of seasonal variations on GIB incidences could be considerable.