Seasonal Dynamics of Typhoid and Paratyphoid Fever

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Background: Typhoid and paratyphoid fever are seasonal infectious diseases, but these seasonal dynamics are not fully understood. Therefore, we conducted a systematic review to characterise and quantify the seasonal variation of typhoid and paratyphoid fever studies worldwide.

Methods: We reviewed the scientific literature (EMBASE, MEDLINE, Global Health and Web of Science) for studies, published before May 2016, which described the seasonal dynamics of typhoid or paratyphoid fever. We assessed the seasonal variation by plotting the average monthly proportion of cases by region, latitude, spatial scale and temporality. We also determined the mean timing of the peak and the seasonal variability and, finally, compared the seasonal dynamics and metrics for typhoid and paratyphoid fever.

Results: We obtained 68 articles, which contained 104 datasets. The majority of datasets were historical studies (<1990) from Europe (62%), while 19 (18%) and 14 (13%) were mostly recent studies from Asia and Africa, respectively. Typhoid fever was more likely to be seasonal further from the equator, with a pronounced peak in August between 70-36° N (mostly European countries) and a peak period from May-October between 35-11°N (mostly Asian countries). These dynamics were not influenced by spatial scale or temporality. There was a clear trend in the mean timing of the peak, which shifted from August to January when ordered by latitude, from north to south. However, there was no pattern in the seasonal variability of typhoid fever by geographic region, latitude, spatial scale or temporality. Finally, the seasonal dynamics of typhoid and paratyphoid fever were not congruent in recent studies.

Conclusions: Our analysis found distinct seasonal patterns for typhoid fever, which were not compatible with those of paratyphoid fever. However, there was no clear trend in the seasonal variability. A better understanding of the seasonal dynamics and underlying drivers could aid preventative and control efforts.