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Letter to the editor

**Long-term trends in the epidemiology of human enteropathogens in Malaysia**

Dear Editor,

Infection by enteropathogens causes diarrhea and enteric fever, and leads to high morbidity and mortality in developing countries, including Malaysia. The purpose of this study was to determine the prevalence of enteropathogens in patients at the Hospital Universiti Sains Malaysia (HUSM). Since this remains a major health problem, information about the circulation of enteropathogens can be very useful to educate and to create public awareness about the prevalence of the enteropathogens circulating in the society.

Isolation of enteropathogens was performed using standard culture techniques. A total of 1,225 (7.7%) enteropathogens were isolated from a total of 15,941 stool samples throughout the ten-year study period. *Salmonella* spp. (54.2%) was the predominant species, followed by *Salmonella typhi* (23.3%), *Shigella* spp. (12.3%, with *S. flexneri* of 6.1%, *S.*

*sonnei* of 6.1%, and *S. boydii* of 0.1%), diarrheagenic *E. coli* (8.9%), and *Salmonella paratyphi B* (1.2%).

The isolation rates of enteropathogens reported in different countries are related to socioeconomic, health, and weather conditions. Based on this study, *Salmonella* spp. and *Salmonella typhi* were the most predominant species present at HUSM. In Malaysia, a study reported that non-typhoidal *Salmonella* were the most common bacterial enteropathogens.<sup>1</sup> EPEC were less frequently isolated (4.3%) in this region, whereas in Iran it has been reported that EPEC strains were an important cause of acute gastroenteritis, accounting for 36.4% of diarrhea cases.<sup>2</sup> In Gaborone, Botswana the most predominant enteropathogen was *Shigella* spp., followed by *Salmonella* spp., which were mostly isolated in HIV-endemic regions.<sup>3</sup> A previous study conducted in Malaysia between 1991 and 2000 reported that the isolation rates of *Shigella flexneri*, *Salmonella* spp. and *Salmonella typhi* were 2.28%, 2.37% and 0.18%,

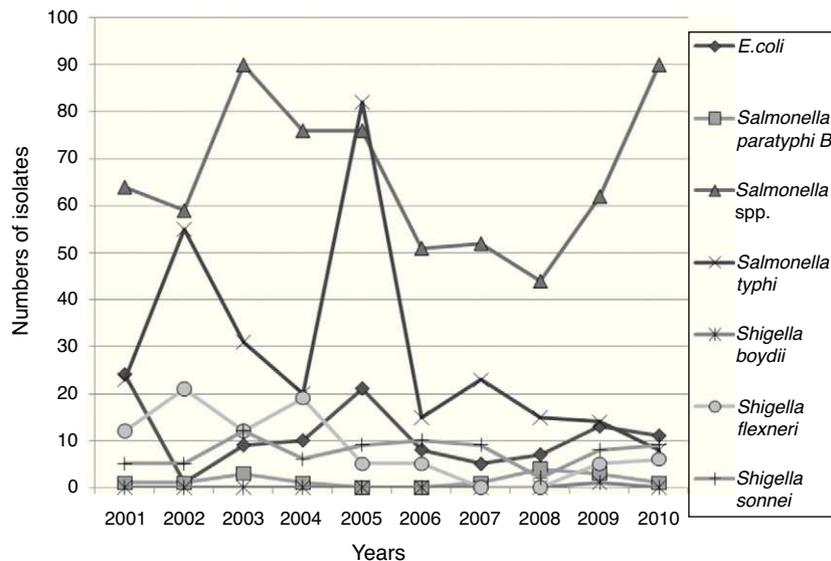


Fig. 1 - Isolation trends of enteropathogens from 2001 to 2010.

respectively, out of 1,097 stool samples;<sup>4</sup> in the current study, we recorded rates of 0.47%, 4.16%, and 1.8%, respectively, out of 15,941 stool samples. Regarding *Shigella* spp., *S. flexneri* was the predominant species from 2001 to 2004, but it was superseded by *S. sonnei* from 2005 onwards. The same phenomenon was reported in Kuala Lumpur, Malaysia.<sup>1</sup> In a 20-year study of enteropathogens-associated childhood diarrhea in Kuala Lumpur, *S. flexneri* was replaced by *S. sonnei* as the dominant species. During the early years of their study, the isolation rate of *S. flexneri* was 74%, but it decreased to 19% during the last period of the study, and *S. sonnei* became the dominant species. Our study also showed that the prevalence of *Salmonella* spp. increased from the year 2008 onwards (Fig. 1). The high prevalence may be due to changes in eating habits over time, with higher consumption of poultry-based foods, which are convenient and fast. Studies have reported that *Salmonella* spp. are transmitted not only through the fecal-oral route, but also through contaminated poultry foods.<sup>5</sup>

In summary, the great majority of samples evaluated in this study were negative for enteropathogens. However, *Salmonella* spp. and *Salmonella typhi* were the most commonly isolated species.

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### Conflict of interest

All authors declare to have no conflict of interest.

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