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TECHNICAL NOTES

Utility of Epidemic Curve in Public Health: An Epidemiologist Perspective

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ABSTRACT

Globally, the primary concern of the epidemiologist in the public health arena is to assess the disease occurrence in a specified population, who has been exposed to a wide range of potential determinants, some of which may cast a significant role in the causation of a disease. An epidemic curve is a plot to depict the occurrence of a disease or other health-associated incident in a defined population over a specific time interval. In infectious disease epidemiology, the epidemic curve has been extensively employed to estimate the magnitude and duration of an epidemic; in ascertaining the source of the infection; probable modes of transmission or exposure; and the incubation period of the disease. To conclude, the tool of the epidemic curve, by virtue of its attributed characteristics, can assist the epidemiologist in timely implementation of the containment measures and thus reduction in the magnitude of the disease

Globally, the primary concern of the epidemiologist in the public health arena is to assess the disease occurrence in a specified population, who have been exposed to a wide range of potential determinants / risk factors, some of which may cast a significant role in the causation of a disease (1). Among the different approaches employed, description of an outbreak / epidemic in terms of an epidemiological triad (viz. agent-host-environment) or in the domains of time–place–person has been extensively utilized in the preliminary stages (1).

An epidemic curve is a plot to depict the occurrence of a disease or other health-associated incident in a defined population over a specific time interval (2). This curve is a kind of histogram (viz. to represent quantitative type of data), developed by plotting the attack rate (or the frequency of disease) along the vertical (Y) axis and measure of time (viz. hours – food poisoning, days – cholera, weeks - hepatitis E) along the horizontal (X) axis (1). In infectious disease epidemiology, the epidemic curve has been extensively employed to estimate the magnitude and duration of an epidemic; in ascertaining the source of the infection; probable modes of transmission or exposure; and the incubation period of the disease (3,4). Similarly, in other settings, including behavioral and chronic disease epidemiology, epidemic curves are utilized to document the scope of public health problems (1,3).

Till the last decade, epidemic curves were being constructed only after the disease outbreak is over and thus was not of extensive utility to the health care professionals (1,2). However, models have been developed to ensure an early, real-time prediction of an

epidemic curve during the disease outbreak itself, so that public health specialists can plan and implement prevention & control measures at the earliest, and thus reduce the aftermaths of the disease (2,5).

Furthermore, different types of shapes of the epidemic curve have been obtained based on the type of epidemic. In case of a common-source single exposure epidemics (viz. food poisoning or contamination of the environment by chemicals), the epidemic curve has a sharp onset and an equally abrupt decline, with no secondary waves; the epidemic tends to be explosive; the peak of the epidemic curve coincides with the median incubation period of the disease; there is clustering of cases within a narrow interval of time; and all the cases occur within one incubation period of disease (1). However, in a common-source, continued exposure (viz. when the infectious agent persists for some amount of time) epidemic, the epidemic curve rises slowly, and also falls gradually; the peak is not sharp but rather plateau - like and the duration of epidemic is stretched out, depending on the duration that agent had persisted in the vehicle (4). In addition, in an epidemic occurring because of a propagated source of infection (viz. diphtheria / mumps / malaria, etc.), the epidemic curve is in the form of serial waves, that rises slowly, reaches a flat plateau, and then declines slowly (1).

To conclude, the tool of the epidemic curve, by virtue of its attributed characteristics, can assist the epidemiologist in timely implementation of the containment measures and thus reduction in the magnitude of the disease.

REFERENCES

1. Park K. Principles of epidemiology and epidemiologic methods. In: Park K, editor. Textbook of Preventive and Social Medicine. 20th ed. Jabalpur: Banarsidas Bhanot Publishers; 2009. p. 59-62.
2. Jiang X, Wallstrom G, Cooper GF, Wagner MM. Bayesian prediction of an epidemic curve. J Biomed Inform. 2009; 42(1): 90-9.
3. Nsoesie EO, Beckman R, Marathe M, Lewis B. Prediction of an epidemic curve: A supervised classification approach. Stat Commun Infect Dis. 2011; 3(1): 5.
4. Okada M, Kawano K, Kura F, Amemura-Maekawa J, Watanabe H, Yagita K, et al. The largest outbreak of legionellosis in Japan associated with spa baths: epidemic curve and environmental investigation. Kansenshogaku Zasshi. 2005; 79(6): 365-74.
5. Nishiura H. Real-time forecasting of an epidemic using a discrete time stochastic model: a case study of pandemic influenza (H1N1-2009). Biomed Eng Online. 2011; 10: 15.