Mathematical modeling of COVID-19 epidemic in Korea and Italy considering behavior changes: comparative analysis of the early stage of epidemic

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ABSTRACT

It is obvious that social distancing is effective control measure and can curb down the epidemic. In this study, we focus on the behavior changes of population after disease starts to spread. Using mathematical model, we compare the early stage of COVID-19 epidemics in Korea and Italy. As a result, we found that estimated $\beta_F$, behavior change rate, in Korea is 95 folds of Italy. Behavior changes of population affects the reproductive number to decrease. In Korea and Italia, it takes 13 and 42 days to reproductive number to reach threshold value 1, respectively. Numerical simulation shows that if the behavior change rate in Italy is set as same as Korea, the number of confirmed cases decreases 152600 to 22300. Our research emphasizes how important the rapid rate of behavior changes is in controlling the early COVID-19 outbreak.

REFERENCES