## A COMPARTMENTAL MODEL FOR COVID-19 TO ASSESS EFFECTS OF NON-PHARMACEUTICAL INTERVENTIONS WITH EMPHASIS ON CONTACT-BASED QUARANTINE

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Relative to the number of casualties, COVID-19 ranks among the ten most devastating plagues in history. The pandemic hit the South Asian nation of Bangladesh during the early March, 2020, and has greatly impacted the socio-economic status of the country [1]. We propose a compartmental model for COVID-19 dynamics, introducing a separate class for quarantined susceptibles, synonymous to isolation of individuals who have been exposed and are suspected of being infected. Following [2] the current model assumes a perfect quarantine based on contacts with infectious individuals and concentrating on the non-pharmaceutic interventions applicable at the beginning of a new pandemic, includes some features which make it different from the great majority of COVID models. Numerical simulation is conducted to investigate the efficiency of disease control by segregating suspected individuals and other non-pharmaceutical interventions. In addition, we assort quantitatively the importance of parameters that influence the dynamics of the system. Fitting the system to the early phase of COVID-19 outbreaks in Bangladesh, by taking into account the cumulative number of cases with the data of the first 17-week period, the basic reproduction number is estimated as 1.69.

- [1] https://covid19.who.int/region/searo/country/bd
- [2] M. LIPSITCH, T. COHEN, B. COOPER, J. M. ROBINS, S. MA, L. JAMES, G. GOPALAKRISHNA, S. K. CHEW, C. C. TAN, M. H. SAMORE, ET AL., Transmission dynamics and control of severe acute respiratory syndrome, *Science* **300** (5627) (2003) 1966–1970.