INTISARI

MODEL MATEMATIKA DINAMIKA TRANSMISI TUBERKULOSIS DAN COVID-19

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Tuberkulosis merupakan penyakit yang mengancam jiwa terutama menyerang daerah paru-paru. Tuberkulosis (TB) disebabkan oleh bakteri *mycobacterium tuberculosis* yang menular dan menyebar melalui udara setelah batuk dan bersin. Sejak tahun 2020, Covid-19 menjadi ancaman bagi semua manusia di seluruh negara bahkan di Indonesia. Adanya wabah Covid-19 ini menyebabkan sebagian besar sumber daya yang ada di masyarakat ditujukan untuk mengatasi penyakit tersebut. Akibatnya, penanggulangan penyakit lainnya menjadi terabaikan, termasuk TB. Dalam skrip-si ini, akan dibahas pengembangan model matematika tuberkulosis dengan adanya penularan Covid-19. Dalam model tersebut, selanjutnya dapat dianalisis titik ekuilibrium bebas penyakit dan titik ekuilibrium endemik beserta kestabilan kedua titik ekuilibrium tersebut. Selain itu, akan ditentukan bilangan reproduksi dasar dari model tersebut beserta analisis sensitivitasnya. Kemudian, dilakukan simulasi numerik untuk memberikan gambaran mengenai kestabilan titik ekuilibrium, pengaruh laju kontak dan proporsi terpapar Covid-19 terhadap subpopulasi terinfeksi, dan analisis sensitivitas bilangan reproduksi dasar. Hasil dari penelitian ini menunjukkan bahwa kestabilan titik ekuilibrium bebas penyakit dan endemik stabil asimtotik baik lokal maupun global. Analisis sensitivitas memperlihatkan bahwa parameter laju kontak infeksi dan laju pulih merupakan faktor yang paling berpengaruh terhadap perubahan nilai bilangan reproduksi dasar. Simulasi numerik juga menunjukkan bahwa peningkatan laju kontak dan proporsi terpapar Covid-19 berdampak signifikan terhadap peningkatan jumlah kasus infeksi TB.

ABSTRACT

MATHEMATICAL MODEL OF THE DYNAMICS OF TUBERCULOSIS AND COVID-19 TRANSMISSION

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Tuberculosis is a life-threatening disease that mainly affects the lungs. lung region. Tuberculosis (TB) is caused by the bacteria mycobacterium tuberculosis which is contagious and spreads through the air after coughing and sneezing. Since 2020, Covid-19 has become a threat to all humans in all countries, even in Indonesia. even in Indonesia. The existence of the Covid-19 outbreak has caused most of the resources in the community are aimed at overcoming the disease. As a result, other diseases have been neglected, including TB. By- this script, we will discuss the development of a mathematical model of tuberculosis in the presence of Covid-19 transmission. with the presence of Covid-19 transmission. In the model, the disease-free equilibrium point can be analyzed sis the disease-free equilibrium point and the endemic equilibrium point along with the stability of both equilibrium points. stability of both equilibrium points. In addition, the reproduction number will be determined and the reproduction number of the model and its sensitivity analysis. Then, numerical simu- numerical simulations are conducted to illustrate the stability of the equilibrium points, the effect of contact rate and proportion exposed to Covid-19 on the infected subpopulation, and sensitivity analysis of the reproduction number. fected subpopulations, and sensitivity analysis of the basic reproduction number. The results of this study show that the stability of the disease-free and endemic equilibrium points are asymptotic both locally and bil asymptotically both locally and globally. Sensitivity analysis shows that parameters of infection contact rate and recovery rate are the most influential factors to changes in the value of reproductive number d affecting the change in the value of the base reproduction number.