

Vaccine Effectiveness in Reducing Incidence of COVID-19 Infection and Death Among Population in Federal Territory of Labuan: A Retrospective Cohort Study

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ABSTRACT:

Introduction: In the middle of June 2021, the healthcare system in the Federal Territory of Labuan (Labuan F.T) was significantly overburdened due to a surge in the number of Covid-19 cases, as well as deaths linked to Covid-19. Labuan F.T. Healthcare Department pushed for the Covid-19 vaccination programme to be at the front, in our combat to prevent severe Covid-19 and to control the spread of the virus. Labuan F.T. started her vaccination programme on the 27th of February 2021 and was significantly ramped up from mid-June 2021. This study was conducted to evaluate the effectiveness of the vaccination programme in reducing the transmission of disease and the number of death cases linked to Covid-19 in Labuan F.T.

Methodology: A retrospective cohort study was carried out to observe for breakthrough infections and the evolution of the vaccination status of the 68,500 eligible participants (aged 18 and above). The information used was obtained from pre-existing data from CPRC Labuan. The evolution of these groups, from unvaccinated (UV) to partially vaccinated (PV), and later to completely vaccinated (FV) were also observed throughout. The outcomes for the different status of vaccinations were evaluated using Crude Incidence Rate Ratio (IRR), Absolute Risk Reduction (ARR) and Vaccine Effectiveness (VE).

Results: The eligible age to join the Covid-19 vaccination programme in Malaysia was initially set to 18 years and above, which meant that 68,500 of the total population in Labuan F.T. was eligible to be a part of this project. This cohort was observed for a total of 155 days from 27th of February 2021 until the 14th of August 2021. The mean age for this study was 38.3 years old (SD=14.2), with males accounting for 55.1% (n=36,596) of the population. Upon the completion of the study, a total of 96.9% (n= 66,418) of Labuan F.T.'s population had received their first dose of vaccination (PV), whereas 79.4% (n= 54,366) had completed both doses (FV). A total of 87.4% (n=58,049) of the respondents represented Malaysian citizens, whilst the rest represented the settlers or undocumented individuals. The total number of cases were UV - 4,249 (78.2%), PV - 841 (15.5%) and FV - 344 (6.3%) respectively. The vaccine effectiveness (VE) against breakthrough infection amongst those fully vaccinated was calculated to be 82.2% (95 % CI: 79.4 -84.3). The Absolute Risk Reduction (ARR) is 845 per million and the Number Needed to be Vaccinated (NNV) is 1183.

Conclusion: The study showed significant reduction of Covid-19 infection in population at risk after being fully vaccinated. Vaccine effectiveness is higher if the vaccination program is being rolling out constantly over time.

KEYWORDS: Unvaccinated, Partial Vaccinated, Fully Vaccinated, Delta Variants, Breakthrough Infections, Covid-19 Death, Vaccine Effectiveness.