

博士論文（要約）

Cost-Effectiveness of Public Access Defibrillation in Osaka City

（大阪市における市民による除細動に関する費用対効果分析）

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ABSTRACT

Background: The effectiveness of public-access defibrillation (PAD) has been demonstrated in that it reduces mortality rates in out-of-hospital cardiac arrest cases. However, the recent rise in the installation of automated external defibrillators (AEDs) in public spaces has not been fully studied in terms of their costs and benefits, especially in Japan. This study conducts an economic evaluation of installed AEDs and suggests policy implications for improving the control of PAD systems and their overall societal value.

Methods: Cost-effectiveness analysis (CEA) was used to examine the effects of installed AEDs at various locations in Osaka City. Outcome data (prognoses of cardiac arrest cases) were derived from the Utstein Osaka Project database, and cost data were collected from a tertiary emergency unit of a university-affiliated hospital. The outcome of the CEA was expressed in terms of the incremental cost-effectiveness ratio (ICER), which represents the additional cost per quality-adjusted life-year (QALY). The ICER was calculated by dividing the incremental cost by incremental QALY for the AED and non-AED groups using a Markov model. An analysis of location-specific AEDs was conducted by scaling down the number of patients, AEDs, and life expectancies in each location. The robustness of the results was confirmed by probabilistic sensitivity analysis.

Results: The ICER of deploying AEDs was JPY 6,763,137 in the base case. Schools, hospitals, and offices were the most cost-effective locations. On the contrary, the installation of AEDs in public facilities was not a cost-effective approach to improving the survival rate and quality of life of patients after an out-of-hospital cardiac arrest.

Conclusion: The results suggested that the deployment of AEDs in all public facilities is not efficient to improve survival and quality of life after a cardiac arrest and thus that a selective AED installation strategy is desirable. The most cost-effective locations in Japan in which to install AEDs were shown to be schools, hospitals, and offices. However, future research is needed to provide evidence of the properties or relationships of an actual phenomenon reoccurring in a similar model.