

Developing models for the prediction of hospital healthcare waste generation rate

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Abstract

An increase in the number of health institutions, along with frequent use of disposable medical products, has contributed to the increase of healthcare waste generation rate. For proper handling of healthcare waste, it is crucial to predict the amount of waste generation beforehand. Predictive models can help to optimise healthcare waste management systems, set guidelines and evaluate the prevailing strategies for healthcare waste handling and disposal. However, there is no mathematical model developed for Ethiopian hospitals to predict healthcare waste generation rate. Therefore, the objective of this research was to develop models for the prediction of a healthcare waste generation rate. A longitudinal study design was used to generate long-term data on solid healthcare waste composition, generation rate and develop predictive models. The results revealed that the healthcare waste generation rate has a strong linear correlation with the number of inpatients ($R^2 = 0.965$), and a weak one with the number of outpatients ($R^2 = 0.424$). Statistical analysis was carried out to develop models for the prediction of the quantity of waste generated at each hospital (public, teaching and private). In these models, the number of inpatients and outpatients were revealed to be significant factors on the quantity of waste generated. The influence of the number of inpatients and outpatients treated varies at different hospitals. Therefore, different models were developed based on the types of hospitals.

Keywords

Healthcare waste, generation rate, hospitals, prediction, models, Ethiopia