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# An integrated planning approach towards home health care, telehealth and patients group based care

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## Abstract

The availability of patient-centered, cost effective, and quality oriented health care is a huge task for the health care planners in every country. In this study, a Home Health Care (HHC) planning problem is introduced to integrate the resource dimensioning issues and assignment aspects with the telehealth based care and patients' group-based care services. An integer linear programming model is developed and solved through CPLEX. The main aims of the proposed model are: (i) to provide an optimal selection of locations for HHC offices, health care workers, and patients' cluster centres besides their specific assignment; (ii) to schedule the health care session for each patient or patients' group by creating a pair of HHC nurse and telehealth staff against a specific time window; and (iii) to seek the enhancement of patient satisfaction and quality of service considering the penalties for violation of patients' preferences and inappropriate experience gap between the pair of nurses. Subsequently, in order to validate the effectiveness of the proposed integration approach, we employ the Fuzzy c-means to describe the appropriate organization of the HHC offices, health care workers, and patient's data. Finally, a sensitivity analysis is performed to explore the model behavior against the variation in parameter values. The detailed analysis of the results shows the effectiveness of the proposed model and its behavior with respect to different types of cost.

*Keywords:* Home health care, Patient satisfaction, Resource dimensioning, Staff selection, Telehealth

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