Heuristics to Solve Appointment Scheduling Problem in Chemotherapy

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Abstract: In healthcare service, manual appointment schedules usually waste the time of both patients and medical staff with long waiting time and huge idle time. Hence, there is a demand to improve the quality of the appointment schedule by using the computer. The paper studies appointment scheduling problem in chemotherapy of a hospital in Canada using meta-heuristics. This problem is considered as an NP-complete problem. We focus on 3 main objectives: maximize the number of patients scheduled over a planning horizon, minimize the overtime and provide a more balanced workload between nurses. The paper presents the mathematical model to reflect constraints and objectives of this problem. Then, our algorithm is composed of 2 steps: creating an initial solution by Greedy Algorithm with many strategies, then choosing the best strategy and improving by using Tabu Search with a sequence of 4 neighborhoods. The algorithm provides better performance than manual scheduling in most of measurements: more number of patients over a planning horizon, no overtime, and smaller difference in number of patients between nurses, days and weeks. The algorithm can also be modified to apply to other NP-hard scheduling problems.

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