

E-Nightingale - Analysis of Nurses' Action Rules

Nursing is characterized as a cycle management of patient conditions within the PDCA (Plan Do Check Action) conceptual framework. Due to (i) shortage of nurses and (ii) improving complexity of cares for the old, nursing is regarded as the most challenging profession in Japan. Therefore, an effective nursing induction system for high quality cares is practically mandatory. As we know, the nurses with lower staffing levels tend to have higher rates of poor patient outcomes, which is partially resulted from their action rules to provide nursing cares. Consequently, we proposed a new analysis method to quantitatively elucidate nurses' action rules on their provision of nursing cares ¹⁾. Different with the traditional analysis method mainly based on the dialogues, we hypothetically modeling the nurses' action rules in the abstract nursing flow model (Fig. 1) as a set of candidate dispatching rules; and then, by evaluating the similarities of the planned nursing cares with observed ones, we quantitatively elucidate nurses' action rules from the most similar rules.

As shown in the results of the similarity on time (a measure representing the proportion of the difference of execution times in planned cares and actual ones to total working time) in Fig. 2, we find that nurses generally define the processing orders of the nursing activities based on a rule similar to the dispatching rule of EDD, which mainly references the information of evaluated processing time of the preparation tasks and the upper bound of the expected execution time in worksheets ¹⁾. Next, we described the nursing care scheduling problem, and modeled it from the viewpoint of the similarity with the job shop scheduling problem. Moreover, based on the simulated annealing algorithm, we propose an effective scheduling method for nursing care scheduling problems ²⁾. Last, through the experiments in simulated nursing conditions, the proposed dynamic scheduling system is verified to be highly applicable to practical nurses' work environments.

Keywords: Nursing care, nurses' action rule, dispatching rule, scheduling.

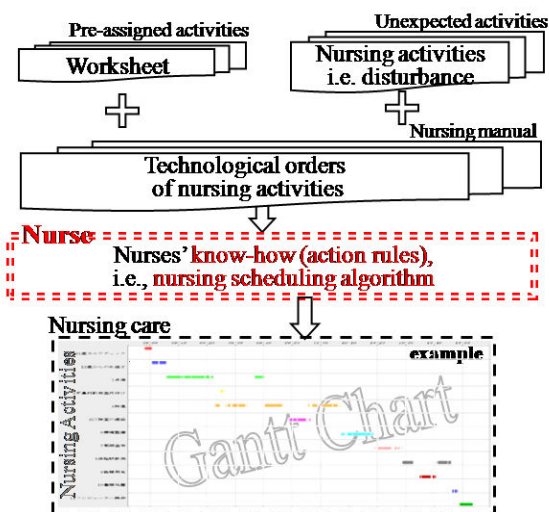


Fig. 1 Abstract nursing flow model

References

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- 2) Mingang Cheng, Hiromi Itoh Ozaku, Noriaki Kuwahara, Kiyoshi Kogure and Jun Ota, Dynamic Scheduling in Inpatient Nursing, Int. J. Automation Technology, 3, 2, 174-184, 2009.

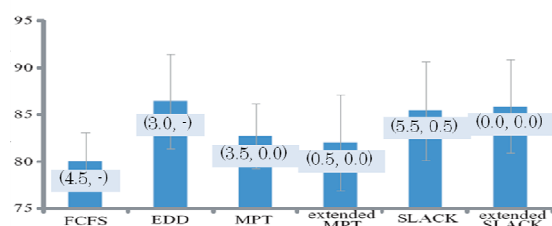


Fig. 2 Similarity on time