E-Nightingale - Analysis of Nurses' Action Rules
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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. On the other hand, from the value of the preparation coefficient in the results, the nurse experts start their nursing activities considering 3.0 times of the processing times of preparation tasks; while, the nurse novices start the activities considering 7.5 times of the processing times. That is, the nurse experts start the handling of the nursing activities with less slack time than the novices. Normally, nursing is a high statistic work, accordingly with which there are a lot interruptions and/or operation failures, especially for nurse novices. Consequently, we believe that novices will generally start to handle the nursing activities in an earlier time.

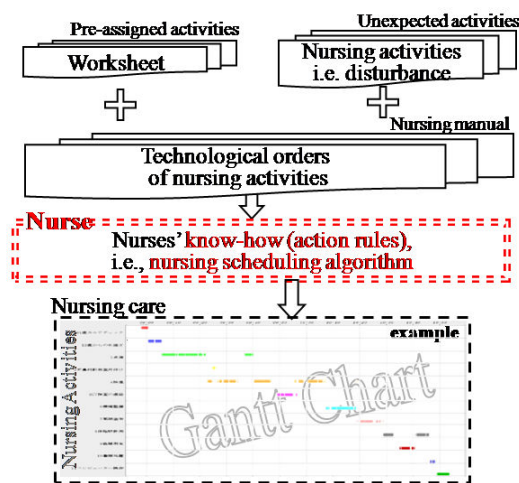*Keywords*: Nursing care, nurses' action rule, dispatching rule, scheduling.

References

1) M. Cheng, H. I. Ozaku, N. Kuwahara, K. Kogure, and J. Ota, Analysis of Daily Nursing Care - a Nursing Care Scheduling Algorithm, Proc. of the IEEE International Conference on Robotics and Biomimetics (ROBIO2007), pp.1715-1720, 2008
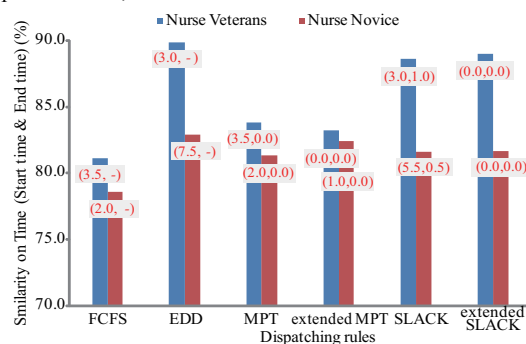

Fig. 1 Abstract nursing flow model

Fig. 2 Similarity on time