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Using Hospital Information System Data to Capture Nurse Workload

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Abstract. Aim Using hospital information system (HIS) data to capture nurse workload. **Method** Direct and indirect nursing items were included by survey and group discussion, workload of nurses is calculated by the work hour measurement of nursing item. Nursing items were matching with HIS index. An ETL (Extract, Transform, Load) tool, Microsoft SSIS, is to capture all HIS index if it happened in a day. **Results** The workload of a ward can be calculated automatically the day before. **Discussion** This study provides a new approach to achieve nursing workload. However, a confirmatory study should be implemented in the future to verify the reliability of workload.

Keywords. Nursing workload, Hospital information system, Nursing item

1. Introduction

Nursing human resources allocation can affect the patient outcomes, work experience of nursing staff and hospital operational efficiency directly or indirectly [1-2]. Traditional nursing allocation methods cannot resolve the unbalanced nurses wandering between work overload and redundancy completely [3]. The Hospital Information System (HIS) includes big data about patient healthcare and nursing care activities from admission to discharge. However, only 5% to 10% are used for analysis [4]. Using HIS data is a promising method to calculate the workload of nurse. Therefore, this study used HIS data to capture nurse workload.

2. Methods

This study firstly established nursing items through the method of survey and group discussion. Then work hour of each nursing item were measured by stopwatch time measurement method and individual written 24h recording in West China Hospital, Sichuan University, a tertiary hospital for medical, teaching, scientific research, and prevention in the west of China.

Based on HIS index which already had, nursing item contain “order” item and “non-order” item. “Non-order” items will synthesize a HIS index. “Order” item have two situations: if they are same context, nursing item is equal to HIS index; if HIS is a

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part of nursing activity, several nursing item will synthesize a HIS index. This progress is prepared for the system parameters to calculate the nursing workload automatically, rather than daily manual statistics.This study use an ETL (Extract, Transform, Load) tool, Microsoft SSIS to import the work hour of each HIS index into HIS.

3. Results

Measured direct nursing items have 92 items. Total number of times is 7954. Recorded indirect nursing items have 21 items. After this synthesize process have been done, Microsoft SSIS import the work hour of each HIS index into HIS (Table 1). Therefore, total work hour of a ward everyday can be calculated automatically from HIS.

Table 1. HIS items with work hour and constraint rule (part)

HIS item	Work hour (min）	Order code	Order	Constraint rule
Admission	41.09			Data come from HIS
Discharge/transfer	46.07			
Blood pressure measurement	2.59	7289‖1	Blood measurement	Based on frequency of orders
… (76 indexes omit)	……	……	……	……

4. Discussion

This study capture the nursing workload based on the HIS index the day before. This method provides a new approach to achieve nursing workload. Moreover, the work hour of nursing item should be adjusted at regular intervals, and confirmatory study should be implemented in the future to verify the reliability of workload.

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