Human Factors Approach to Inspect the Procedure of Intravenous Chemotherapy

Objectives
Intravenous chemotherapy is a complex procedure that is highly dependent on medical professionals. Errors caused by human failures could occur across the entire phase of prescribing, dispensing, and administering. Therefore, this study aimed to inspect the procedure of intravenous chemotherapy via human factors and risk management principles in order to find out systematical related issues.

Procedure of direct observations

1. Phase of prescribing:
   - Advantages: All participating hospitals have been adopting electronic ordering systems linked to intravenous chemotherapy. Disadvantages: Too much information revealed on the medical system may result in ignoring the critical one. For example, too many colors for distinction and warning messages may cause "alarm fatigue".

2. Phase of dispensing:
   - Advantages: Using barcode system in the process of examining prescription, preparing, dispensing and delivering drugs had been noticed to improve efficiency and accuracy of the therapy. Disadvantages: Pharmacists were frequently interrupted by people, phone calls or other inquiries which can lower their attention at the work.

3. Phase of administering:
   - Advantages: The signal of wearing gowns at the start of intravenous chemotherapy. In this case, once patients call for help and may interrupt the procedure, other nurses can assist in time. Disadvantages: If pump set failures can be an issue as nurses have to familiar with different kinds of pumps and calculate flow rate in this stage.

Results
Two medical centers and two regional hospitals with different characteristics were involved in the project. The results found:

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Conclusions
Medication errors in intravenous chemotherapy may lead to serious consequences. This project was a preliminary study conducted in order to evaluate the potential risks of healthcare procedures and establish a framework for prospective study. We hope patient safety can improve via reducing human failures through this project. The findings are as follows:

- The design of ordering systems should follow human factor principles to reduce prescription errors.
- Interruptions should be minimized during critical practices. Medical professionals could create a no-interruption zone to distant from nonessential activities.
- We suggested the government could establish standards about the operating interface and screen display of different types of infusion pumps.

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