急診小兒常用藥物劑量決策支援系統

Building a Weight-Based Pediatric Dosage Decision Support System in Emergency Department

中文摘要

IOM 於 1999 年提出報告 To Err is Human：Building a Safer Health System 指出，美國人每年因醫療錯誤而死亡的人數高達 44,000 ~ 98,000 人，因此近年來病人安全之議題受到極大的重視，雖然有許多有關如何改善病人安全的報告發表，但是其中以小兒用藥安全之議題的文獻卻仍相當的缺乏。根據研究報導，小兒科的病患比年人更易因爲醫療疏失而發生傷害，因爲小兒藥物劑量通常需要醫師做劑量之調整，然而在劑量計算過程卻是一個相當容易發生藥物錯誤(Medication Error, ME)因素。小兒用藥缺乏一個標準劑量值，因爲同年齡的嬰幼兒體重個體化差異性很大，因此小兒科病患容易遭遇 ME 及傷害，尤其是在急診小兒科。近年來國內的急診小兒藥物疏失頻傳，探究其原因爲缺乏專爲小兒科設計的資訊系統來協助醫療人員提升小兒用藥安全。因此本研究之目的在整理急診小兒常見 ME 之藥物，歸納整理相關之藥物劑量資訊並建立劑量決策規則，並建立一個「急診小兒常用藥物劑量決策支援系統」來輔助急診小兒科之醫療人員，期望降低藥物劑量錯誤發生率，提升急診小兒科病患之用藥安全。

本研究是以北部某醫學中心急診小兒科作爲研究施行單位。首先整理有關急診小兒常見 ME 之文獻資料，歸納出常用之藥物，然後收集統整相關藥物的劑量建議、適應症狀、給藥途徑及藥物劑量等資訊，制定劑量決策規則並將此規則建立於藥物劑量資料庫中，並建置以 Web 爲操作介面的「急診小兒常用藥物劑量決策支援系統」，用來協助急診醫療人員進行小兒用藥劑量之評估。最後以劑量合理性評估及系統滿意度調查之方式來評估系統之效益。

整理歸納出急診小兒常見 ME 之藥物，系統建置 34 項藥物劑量相關之資訊，並建置劑量決策規則及急診小兒常用藥物劑量決策支援系統。系統建議劑量合理性可達 98.3%，針對使用者滿意度調查之結果，系統總滿意度達 97.1%，醫療人員認爲本系統可以提供快速且適合病患之劑量建議，對於小兒劑量之評估相當有幫助，不僅可以減輕工作上之心理壓力且可以降低 ME 之發生。此評估結論肯定了本研究之結果。因此我們期望在不久的將來會有越來越多專爲小兒專科所設計的資訊系統被應用在臨床上，小兒病患的醫療照護品質將會越來越好。

英文摘要

Since the Institute of Medicine released a report entitled “To Err Is Human” which estimated that approximately 44000–98000 deaths each year resulting from medical

mistakes in hospitals. Patient Safety has become an increasingly well-recognized public health issue in recent years. Although many researches on Patient Safety have been published, only a few medication error (ME) studies have been conducted in children. Historically, pediatric patients suffered from more adverse drug events and harms than adults. Medicine dosage is given to pediatric patients often require dosage calculation by health care professionals, and it is often regarded as an important reason to cause ME. Unique features of pediatric care such as lack of standardized dosing because of size variation in the pediatric age range may increase the risk of medical error and harm to patients, especially in the emergency department. Unfortunately, there is still no specific information system for child providing recommended dosage to improve Patient Safety in the pediatric emergency department in Taiwan.

The aims of this study were collected and arranged the information of medicines which are most prone to ME in the pediatric emergency department. And then use this information to build a pediatric dosage decision support system in the emergency department. Using this system support the health care professionals in prescribing, dispensing and administration by real-time dosage recommend which was calculated based on children’s weight. We expected that this system reduced the rate of ME and improved the safety of pediatric patient.

This study was performed in an emergency unit in a medical center in Taiwan. Initially, by literature review and a professional conference we collected the drugs most common prone to ME in the pediatric emergency care setting. Next, we collected these drugs’ information about therapeutic indications, dosage, administration, maximum dose from the drug instructions leaflet, MICROMEDEX, pediatric dosage handbook. After arranging and categorizing these drugs’ information we created an electronic database for pediatric dosage in emergency room. Subsequently, a Weight-Based Pediatric Dosage Decision Support System was designed on web interface to support the pediatric emergency care professionals (ex. physicians, pharmacists and nurses) prescribing or re-checking the dosage. Finally, the effect and performance of this system was evaluated by accuracy analysis of recommended dosage analyzing questionnaires from emergency care professionals.

34 medications were chosen as the study targets of this system. After organizing these medications’ information, we made the rules of dose calculation based on patient’s weight and built a database to manage pediatric emergency medications’ information. The results of the evaluation of this system were satisfactory. 98.3% of the

recommended dosage was accuracy and 97.1% emergency staffs who involve in this study agreed that this system is beneficial to them. In the emergency staffs' opinion, this system is beneficial to prescribe or re-check the pediatric dosage. It was not only reducing the pressure of calculation, but also reducing the rate of ME in the pediatric emergency department. By the result of this study, a specific information system for child can improve the safety on drug using, we expected that more pediatric specific clinical decision support systems will be designed and applied, thereby having more safety in the pediatric department in the future.