



Interruptions and medication administration errors

Never Stand Still

Medicine

Centre for Health Systems and Safety Research

Highlights

- 98 nurses were observed administering 4271 medications to 720 patients over 505 hours across two teaching hospitals.
- Nurses were interrupted at least once in 53% of all drugs administered.
- Each interruption was associated with a 12.1% increase in procedural failures (eg not correctly checking a patient's identification) and a 12.7% increase in clinical errors (eg wrong dose).
- The association between interruptions and clinical errors was independent of hospital and nurse characteristics.

The more nurses were interrupted the more errors and the more serious errors they made.

Background

Interruptions have been suspected to be a potentially important contributor to hospital medication errors based largely on self-reports, surveys, and retrospective analyses of voluntary reports.

Methods

We prospectively observed 98 nurses preparing and administering 4271 medication to 720 patients over 505 hours across two Sydney teaching hospitals.

Procedural failures (eg, not checking patient identification) and clinical errors (eg, wrong dose) were identified and categorised by potential severity on the five point Severity Assessment Scale (SAC) scale. Nurses were shadowed by a researcher who recorded information using a handheld computer



(See Figure 1). Researchers recorded what procedures were followed and details of the drug administered. They also recorded all interruptions which occurred. After the observational session, drug data were compared with the patient's medication chart to determine whether the patient received the drug as ordered on their medication chart.

Figure 1: Handheld computer for recording observational data

Results

Each interruption was associated with a 12.1% increase in procedural failures and a 12.7% increase in clinical errors. The association between interruptions and clinical errors was independent of hospital and nurse characteristics.

Interruptions occurred in 53.0% (95%CI 51.6-54.6) of medication administrations observed. Of total drug administrations, 74.4% (n=3177; 95%CI 73.1-75.7) had at least one procedural failure.

Administrations with no interruptions (n=2005) had a procedural failure rate of 69.6% (n=1395;95%CI 67.6-71.6) which increased to 84.6% (n=148;95%CI 79.2-89.9) with 3 interruptions.

Overall, 25.0% (n=1067;95%CI 23.7-26.3) of administrations had at least one clinical error. Those with no interruptions had a rate of 25.3% (n=507;95%CI 23.4-27.2) while those with 3 interruptions had a rate of 38.9% (n=68;95%CI 31.6-46.1).

Nurse experience provided no protection against making a clinical error. Increasing nurse experience was associated with higher procedural failure rates (ie experienced nurses were more likely to fail to follow medication administration procedures such as correctly checking patient identification prior to drug administration).

Error severity increased with interruption frequency. Without interruption, the estimated risk of a major error was 2.3%, with four interruptions this doubled to 4.7% (95%CI 2.9-7.4, P<0.0001).



Simple strategies, such as providing easy access to core information resources (eg, using whiteboards), can be effective in reducing interruptions. The use of interruption vests, which have written on them “Do not interrupt medication round in progress,” or something similar, is another strategy. Recent reports of hospitals

in the United States introducing such vests have been published, however there has been no robust evidence of their effectiveness in the scientific literature. While new information technologies, such as electronic medication management systems show promise in reducing medication errors they are also a potential new source of interruption.

Interruptions, while identified as a consistent and independent source of error at our hospital sites, are clearly only one contributor to errors. We demonstrated a mean baseline clinical error rate of 3 errors for every 10 drug administrations in which no interruptions occurred.

Further information

This summary is based upon the following published paper which presents full details of the research and is the correct citation for this information.

Westbrook JI, Woods A, Rob M, Dunsmuir W, Day RO (2010) **Association of interruptions with increased risk and severity of medication administration errors.** *Archives of Internal Medicine.* 170 (8), 683-690.

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Discussion and implications for practice

We found a significant dose-response relationship between interruptions and procedural failures and clinical errors in medication administration at both study hospitals. The more interruptions nurses received, the greater the number of errors. Furthermore, we found that as interruptions increased within a single drug administration, the greater the severity of error. The risk of a patient experiencing a major clinical error doubled in the presence of four or more interruptions.

The converging evidence of the high rate of interruptions occurring during medication preparation and administration adds impetus to the need to develop and implement strategies to reduce unnecessary interruptions within ward environments. While it is clear that some interruptions are central to providing safe care, there is a need to better understand the reasons for such high interruption rates.

This Series is designed to highlight findings from recent published studies or provide summaries of important work in progress. Where a published study is referenced this should be used as the primary citation for the information provided.
