Nurses’ knowledge about the double-checking process for medicines administration

Zayed Alsulami and colleagues report on the results of a study to explore the understanding and perceptions of checking procedures by clinicians working in a children’s hospital.

Abstract

This study aimed to evaluate nurses’ knowledge, perceptions and opinions of double-checking medication administration in a UK children’s hospital. Of 119 questionnaires distributed, 48 were returned. Only 30 respondents had seen a written version of the hospital double-checking policy. More than half stated that they had not received formal training in double-checking medications. Of 35 nurses providing a definition of double-checking, one gave a response that reflected hospital policy. Most respondents thought that staffing, workloads and interruptions affected adherence to double-checking; 15 reported that double-checking was easier to do at night; and the results suggested that lack of knowledge and of clear guidelines contributed to medication errors.

Literature review

MEDIATION ERRORS were the most common incident type for children and the second most common for neonates reported to the National Reporting and Learning System in a 12-month period (National Patient Safety Agency (2009). Nearly 10% of incidents listed involved patients between birth and four years of age. This age group experienced the second highest number of events compared with other child and adolescent age groups.

Medication errors are, therefore, known to be a significant problem in the care and treatment of children and they occur at all stages (Miller et al 2007). Miller et al estimated that 5-27% prescriptions for children involved an error: prescribing errors accounted for 3-37%, dispensing 5-58%, administration 72-75% and documentation 17-21%.

This suggests that incidents involving administration are the most common, particularly among children in hospital (Miller et al 2007, Ghaleb et al 2010). Furthermore, medication errors among children and neonates may be three times higher than for the rest of the population (Ghaleb et al 2010).

A number of factors contribute to this:

- Drug doses must be calculated for each child’s weight or body surface area, involving sometimes complex calculations.
- Many commercially available drugs are formulated for adult dosages and need recalculation or manipulation for administration to children.
- The pharmacokinetics of many drugs change with gestational and postnatal age, meaning that doses also need to be adjusted for age.
- Many of the drugs used in pediatrics are off label and/or unlicensed, which may lead to medication errors (Conroy 2011).
- The amount of drug in vials used to administer medicines to neonates potentially allows tenfold or greater overdoses from a single vial (Stavroudis et al 2008).

Keywords

Children’s nurses, double-checking, medication administration, nurse training, paediatric medication, prescription drugs
which a drug error may be prevented from reaching the patient.

The Nursing and Midwifery Council’s (NMC) (2010) code of conduct states that each prescription must be double-checked to ensure it complies with the five rights before medication administration. Nurses should follow this policy when they are administering medicines, and the NMC recommends that ‘wherever possible, two registrants should check medication to be administered intravenously’ (NMC 2007). With the exception of checking that the weight or surface area is recorded on the prescription, there is no mention of special requirements for children.

Double-checking is, however, now standard practice in many children’s hospitals in the UK (Conroy et al 2012). A recent systematic review conducted to evaluate the evidence for double-checking the administration of medicines found only 16 relevant articles and only three quantitative studies (Alsulami et al 2012). One was a simulation study, which found that having patient identity as a specific item on a checklist reduced patient identity errors (White et al 2010). None of the studies provided convincing evidence to either support or refute the practice of double-checking during medication administration and none was conducted in a children’s setting (Alsulami et al 2012).

Most descriptive studies have focused on nurses’ perceptions about how and why medication errors occur and their personal experiences of contributory factors and reporting systems in adult settings (Mayo and Duncan 2004, Mrayyan et al 2007, Kim et al 2011). Three studies have focused on the double-checking policies of medication administration in children’s hospitals (Dickinson et al 2010, Conroy et al 2012, Alsulami et al 2013), and all of them showed that the double-checking process needed more clarification and explanation for nurses in practice.

In most UK children’s hospitals and in the hospital where Alsulami et al (2013) carried out their study, policy requires that two registered children’s nurses are involved in the entire process, that is, from when the need for a medicine to be administered is identified until it has been given. The earlier work carried out by the authors in the same hospital demonstrated that there was variation in children’s nurses’ adherence to double-checking steps and highlighted the type of administration errors that occurred despite double-checking (Alsulami et al 2013).

Aims
This study aimed to evaluate nurses’ knowledge, perceptions and opinions of double-checking for medicines administration in one hospital. It also aimed to identify factors contributing to mistakes among nurses in the hope that these issues might be addressed.

Methods
The previous work conducted by the authors, revealing variation in nurse double-checking, informed the questionnaire design for this study (Alsulami et al 2013). One of the research nurses was asked to test the questionnaire and make suggestions for improvement.

Following a short pilot study, a questionnaire was developed consisting of 20 multiple-choice and open-ended questions, divided into two sections. The first section (15 questions) was designed to evaluate nurses’ perceptions and knowledge of the hospital’s double-checking process that they are required to follow. The second section (five questions) asked for demographic information, such as gender, years of experience as a children’s nurse and employment status during the study period.

The questionnaire was distributed to all registered nurses in the children’s hospital, during handover time and by internal mail. A covering letter accompanying the questionnaire explained the study objectives, emphasising that participation was voluntary and anonymous. Nurses were asked to return the completed questionnaires using boxes provided in each ward. A reminder letter was sent to all potential participants two weeks after the distribution of the questionnaire.

All registered nurses who were involved in medicines administration to children were invited to participate in July and August 2012. This included 124 registered nurses from the four inpatient areas (medical, surgical, paediatric intensive care unit and neonatal intensive care unit). A researcher collected the completed surveys from each department and stored them in a secure place for analysis. Data was entered and analysed descriptively using the Statistical Package for Social Science version 17 (SPSS).

Ethical considerations
The study was considered to be a service evaluation by the National Research Ethics Service and did not therefore require ethical or research and development department approval. NHS foundation trust clinical governance procedures were followed.
Results
Of 124 questionnaires distributed, five were returned uncompleted (three nurses were on maternity leave and two had left the hospital). Of the remaining 119 questionnaires, 48 forms were completed and returned (a response rate of 40%).

Demographic characteristics of the respondents are described in Table 1. Twenty four nurses were over 40 years old. In addition, 28 nurses had more than ten years’ experience with medication preparation/administration in a children’s hospital (Table 2). Twenty seven nurses worked full time, with the remainder working part time.

Table 1 Demographic data of participants (n=48)

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<th>Characteristics</th>
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<td>Gender</td>
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<td>Male</td>
<td>2</td>
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<tr>
<td>Female</td>
<td>46</td>
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<td>Age (years)</td>
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<td>Under 21</td>
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<td>21–30</td>
<td>17</td>
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<td>31–40</td>
<td>7</td>
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<td>41–50</td>
<td>10</td>
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<td>Over 51</td>
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<td>Years of experience with preparation/ administration to children and young people</td>
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<td>Less than one year</td>
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<td>One to less than 2 years</td>
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<td>Two to less than 5 years</td>
<td>6</td>
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<tr>
<td>Five to less than 10 years</td>
<td>11</td>
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<td>More than 10 years</td>
<td>28</td>
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Knowledge of double-checking Thirty nurses reported that they had seen the hospital double-checking policy in a written format, four in the hospital’s medicines code. Forty responded that they knew exactly what the double-checking process should involve, but 35 of these replied with comments. Only one respondent wrote a complete definition of the double-checking process, and 26 stated that they had not received any training on the process in this hospital.

Fifty four nurses responded that they double-checked all prescribed medications in the drug chart before administration (Table 3, page 24). Respondents were asked to choose the main reason why they thought the double-checking process was performed: 39 answered that they were doing it to protect children from medication errors (Table 3, page 24).

Thirty six nurses thought that double-checking processes were equally effective with oral and intravenous (IV) drug formulations (Table 3, page 24); 40 suggested that staffing and workload pressures affected their concordance with the double-checking policy. Other difficulties identified were interruptions and the unavailability of a second checker (Table 3, page 24).

Variations on different days and shifts When asked whether they could follow the double-checking process more easily on weekdays or at weekends, nearly all nurses (n=45) responded that they experienced ‘no difference’ and commented that ‘all times are equally busy’ when they did so (Table 4, page 24).

More than half (n=25) the participants stated that they were able to follow the double-checking process equally at all times of day and there was no difference between shifts; however, 15 reported that they could follow it more easily during the night shift than at other times. They perceived that they were ‘less interrupted during the night shift compared with other shift times’.

Recognition of errors Twenty five respondents reported that they had not made or identified any medication preparation/administration errors in the past month, 22 said they had made or identified fewer than five, and one nurse had made/identified 5-10 errors in the past month.

Effectiveness of double-checking Two open questions in this survey were designed to explore the nurses’ attention to the double-checking process and its consequent effectiveness in reducing medication errors. More than half (n=26) of participants answered these questions.
When asked: 'What are the three elements of the double-checking process you are least likely to pay attention to when you are performing a check during medication preparation and administration?', all respondents said that no less attention was paid to any elements for either oral or IV medication administration, with some commenting: ‘I always follow the policy with all elements.’

The second question asked: ‘The literature suggests that double-checking is carried out in a variety of ways, with varying degrees of effectiveness. How do you think an effective process should be performed and do you do this in practice?’

Ten nurses thought that the double-checking process could be more effective if it could be done without interruptions. For example, one reported that ‘policy should be followed in a systematic way without interruption’.

Nurses’ opinions of single checking The last question asked about single checking (Table 5). Half the respondents (n=24) reported that a single-checking process should not be implemented for any medicines. They mentioned safety reasons (that is, human mistakes and errors can occur with drugs if not double-checked by another), particularly with medications given to children and neonates. However, 18 suggested that the single-checking process should be applied for certain types of medicines, for example paracetamol and vitamins.

There was an opportunity for respondents to make further comments and 17 did so. Of these, 14 commented that they agreed with double-checking and preferred to do it when giving medication to children.

Discussion Despite the responses from most nurses that they were aware of the double-checking policy, only one provided a clear description. This was consistent with a study by Dickinson et al (2010), who reported that greater clarity is needed to achieve best practice in hospitals. In this study, the exact meaning of the double-checking process and its steps seemed unclear for most nurses, leaving them confused about definition and practice. Most (n=40) provided only an incomplete description of double-checking. This suggested that the hospital policy for medication administration required further clarification for all staff.

The literature includes few studies in which the components of a double check are defined. Previous work has suggested that differences exist between children’s units as to what precisely is included in the process (Conroy et al 2012). This needs to be remedied.

The local hospital policy requires that two registered children’s nurses are involved from the point at which the need for a medication to be administered is identified until the drug
has been given to the patient. The constituent steps of this process are detailed elsewhere in the policy; bringing these together in a single, more specific, concise document and making it more accessible and available to children’s nursing staff should help raise awareness and understanding. The importance of the role of the second checker should be emphasised. From the personal observations of the authors and others, at present nurses may interpret this in different ways, for example not always including checking the dose against the prescription or the patient’s identity (Sanghera et al 2007, Alsulami et al 2013).

An important finding was that 26 claimed to have had no training on the double-checking process at the hospital. Training at induction and mandatory regular updates on the importance of and how to complete double-checking should help reduce the errors that still occur, despite the policy being in place.

In addition, the present study revealed that most nurses perceived that multiple factors had a direct effect on their ability to follow the double-checking process according to the hospital policy. These factors were consistent with those found in previous studies, for example: distraction and interruption; heavy workloads (Dickinson et al 2010, Kim et al 2011); and unavailability of second checkers (Evley et al 2010).

Most respondents in the present investigation claimed to follow the double-checking policy at all times, although almost one third recognised that they found it easier to follow during night shifts when there was less interruption. Previous work has shown that nurses in this hospital adhere to the double-checking steps more closely at weekends than on weekdays for the same reason (Alsulami et al 2013). Most recalled making or identifying less than five errors in the past month. This is consistent with other studies, which have found that the mean number of errors recalled ranged from 2 to 4.9 per nurse (Mayo and Duncan 2004, Mrayyan et al 2007).

Most respondents stated that to reduce prescription errors they double-checked all prescriptions dosage forms before medication administration and thought that this should be recommended for all routes of administration. Most respondents (n=24) opposed the introduction of single checking, although other nurses (n=18) suggested that it might be useful for certain types of low-risk medicines. This variation in opinions may have been influenced by their individual experiences with medicine administration and the double-checking process, or may have been related to their level of confidence in their practice. This was consistent with the findings from other studies, which were that the double-checking process was perceived to be the most reliable safeguard against medication errors, particularly in the case of high-risk drugs or complex drug dosages (King 2004, Manias et al 2004).

In some children’s units, single checking is permitted for paracetamol and vitamins (Conroy et al 2012). Other reviews and studies have highlighted higher risk situations – for example IV drug administration (Westbrook et al 2011) and complex calculations (NMC 2010) – as areas where double-checking may be of most value. The current practice of double-checking all children’s medicines is based on the vulnerability of children and neonates as noted earlier. In contrast, another study suggested that the single-checking process encouraged nurses to update their drug information and knowledge (O’Connell et al 2007).

In addition, one study found that most nurses appreciated changing their practice to the single-checking process (O’Connell et al 2007). They reported that single-person checking saved time and allowed them more responsibility and accountability. Some opponents of double-checking have suggested that knowing that another person will check their actions minimises the first nurse’s perceived responsibility and thus their vigilance. Armitage (2008) used in-depth semi-structured interviews with multidisciplinary UK health professionals to identify four categories that weaken the value of second-person checks. These were: deference to authority, reduction of responsibility, automatic processing (going through the motions without paying true attention), and lack of time.

Hierarchical differences in the status and perceived mathematical ability of the other person were also highlighted as undermining the checking procedure. Opinions, therefore, differ but, at present, there is insufficient evidence to support a move to single checking from the established practice of double-checking that most children’s hospitals follow. For double-checking to be effective, however,

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<th>Table 5 Participants’ perceptions of single-checking (n=48)</th>
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<td><strong>Question</strong></td>
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<td>In what circumstances do you think single checking (one nurse prepares and administers the medicine alone) should be allowed?</td>
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NURSING CHILDREN AND YOUNG PEOPLE
the process must be clearly defined, nurses should be made absolutely aware of the requirements, and protected time should be allotted for the policy to be followed rigorously and consistently.

Limitations
The study was conducted in one setting only, so the results may not be generalisable. There was a relatively low response rate, although it is common for mailed surveys to yield limited responses (Jones and Treiber 2010) and this problem may be increased when requesting sensitive information. The study occurred out at a critical time for nurses – the hospital was introducing many changes and it was conducted during the summer holiday period.

These factors may have affected the response rates and, therefore, the sample might not reflect the opinions of all nurses at the hospital. In addition, most respondents had never used single checking, so their opinions were not based on previous knowledge or experience of the process. The nurses’ educational qualifications were not recorded and therefore we could not evaluate associations of training with responses.

Conclusion
Nurses had insufficient awareness of, and a lack of clarity about, the details of the double-checking policy for medication administration. Most respondents were agreed in their preference of the double-checking process over single checking, and the importance of reducing error rates. More training and clarification of the double-checking process may improve nurse adherence to the policy in practice and improve patient safety.

References