Minimising harm from missed drug doses

**In this article...**

- The consequences of omitted medication doses
- Reasons why patients may not receive a medication dose
- Current guidance on safe medication administration

**5 key points**

1. Missed or delayed medicines can result in death
2. Health professionals do not always seem to be aware of their organisation's policies and procedures for the safe administration of medicines
3. Most reported incidents of omitted medication involved patients who were nil by mouth
4. If a patient cannot take drugs by the oral route, alternative administration should be sought
5. A proactive approach is required to ensure the number of medication omissions is reduced

**Abstract**


**Background**

The National Patient Safety Agency reported that more than 21,000 patient-safety incidents, including death, occurred between September 2006 and June 2009 as a result of missed or delayed medication doses.

**Aim**

To identify the number of incidents reported between 2005 and 2013 associated with the oral route not being available. Find ways to improve practice.

**Method**

The National Reporting and Learning System was searched for medication incidents categorised as omitted and delayed from 1 January 2005 until 31 December 2013. Search terms were used to filter for incidents associated with the oral route not being available.

Qualitative analysis of all incidents meeting the search criteria with outcomes of death or severe and moderate harm, as well as a sample of incidents reporting low and no harm, was undertaken.

**Results**

In total, 1,882 incidents of omitted and delayed medicines that met the search criteria were identified. The majority in hospitals. There were six deaths and 581 harms. The largest number of reports concerned patients who were nil by mouth. Analysis of the medicines described found that the most commonly omitted medicine (17%) was anti-epileptic medication.

**Discussion**

It is estimated that the actual prevalence of omitted doses where the oral route was not available is greater than this paper describes.

**Conclusion**

Positive intervention is needed in this area to reduce harm to patients.
criteria of the oral route not being available were reported to the NRLS over the nine-year period. There were reports of six deaths and 581 harms (Table 1).

The majority of incidents (1,777, 94.4%) were reported by acute hospitals; 59 were reported by community nursing, medical and therapy services (including community hospitals); 37 by mental health services; seven by learning disabilities services; one by general practice; and one by a community pharmacy. The largest number of reports (1,441, 76.6%) concerned medicine administration (Table 2).

Qualitative analysis of a sample of 200 incident reports (all moderate, severe and death outcomes, and an opportunistic sample of low and no harm) identified common themes. The largest number of reports concerned patients who were “nil by mouth” (114, 57%, Table 3). Analysis of the medicines described in this sample found that most incidents (17%) included omission of one or more doses of anti-epileptic medication (Table 4).

The themes identified by the analysis are outlined below.

Nil by mouth
Qualitative analysis of the 114 incidents concerning nil-by-mouth patients indicated that, where they were being prepared for surgery or an investigative procedure, staff were unaware of, or did not adhere to, the organisation’s nil by mouth and fasting policies and procedures. The requirement for administration of critical medicines was the most frequently identified cause of the incident. Other incidents showed the patient was nil by mouth for no documented reason.

The length of time for which the patient was nil by mouth was often extended due to delayed operating lists. The omission of critical medicines pre-operatively frequently led to the patient’s condition deteriorating – for example, developing hypertension during surgery. At other times, it resulted in the patient not being in an optimum state for surgery, which had to be cancelled.
Dysphagia
A reduced or unsafe swallowing reflex (dysphagia) was the cause of medicine omission in 35 of the sampled incident reports (Table 3). In these cases, a swallowing assessment is required, usually by a speech and language therapist (SALT).
Qualitative analysis of these incidents indicated failure of staff to inform the prescribing doctor and pharmacist that swallowing difficulties were present in patients. In some cases, there was a delay in the identification of an alternative route of administration. Furthermore, there appeared to be a delay in exploring alternative methods for oral medicine administration – for example, in patients who can consume thickened fluids, it is possible for some liquid medicines to be added to thickened drinks or soft food with the patient’s consent and following discussion with a pharmacist, and as such, consumed orally.

There were incident reports of administration of solid-dose forms in patients with an unsafe swallow or those who were too drowsy to swallow safely, leading to tablets being retained in the mouth. This resulted in a medicine omission as well as risk of choking. Other reports showed oral solid-dose medicines were being crushed inappropriately to enable swallowing.

Unused alternative route of administration
A total of 21 (10.5%) incidents of omitted doses took place where an alternative route of administration was available but not used. These incidents involved:
» Failure to prescribe and administer medicines following nasogastric or percutaneous endoscopic gastrostomy (PEG) tube insertion;
» Medicines being prescribed by the IV route but not administered.
These incidents indicated a lack of awareness by clinical staff to use an alternative route, where available.

Medication refused by patient
There were 14 (7%) incidents where the patient refused to take their oral medicine. In some of these incidents, patients were deemed non-compliant to treatment and may have lacked the mental capacity to make appropriate decisions, with behavioural issues acting as an additional barrier. Furthermore, there were failures to identify and use alternative routes of administration that may be more acceptable for the patient in some of these cases.

Other themes
There were 16 (8%) incidents due to “other themes”. These included:
» Medicine unable to be given orally and no alternative route sought while waiting for SALT assessments;
» Nasogastric tube insertion/delays in nasogastric tube insertion, and placement confirmation;
» Failure to identify alternative liquid forms of medicine for nasogastric or PEG tube administration;
» Non-availability of drinking water to help the patient to consume solid-dose medicines;
» Medicines not available.

Discussion
From this analysis, it is evident that patients have experienced avoidable harm from omitted medicine doses where the oral route was not available. Efforts should

### BOX 1. ACTUAL PATIENT SAFETY INCIDENT REPORTS

**NIB BY MOUTH (NBM) INCIDENTS**

**Older patient admitted to hospital after a period of melena stool. Patient has an extensive cardiac history, transfused three units of red blood cells. It was deemed that an oesophago-gastro duodenoscopy was appropriate and the patient was kept NBM for this procedure. During fasting, their normal cardiac and diuretic medications were omitted. Patient in respiratory distress due to pulmonary oedema, was given high dose of intravenous diuretics and non-invasive bilevel positive airway pressure, which were unsuccessful.

- **Reported outcome:** death

**Patient was not administered cardiac medication post-operatively. Went on to develop cardiac failure.**

- **Reported outcome:** death

**Patient assessed as NBM and no medications were prescribed. There was a bottle of carbamazepine on the side but the only thing documented on the drug chart was the nasogastric feed prescribed by the dietician. I questioned this with the nurse on duty, who stated the patient is NBM and, therefore, not prescribed any medication. I asked if a risk assessment was in place or incident form completed. The nurse showed me a fit chart. I followed this up the next day and was informed the patient had had a seizure/fallen out of bed and sustained a black eye. Since recording this, the patient has died.**

- **Reported outcome:** severe harm

**Reduced swallowing reflex**

**Patient reviewed by outreach with reduced level of consciousness, reduced blood pressure, heart rate and temperature. On review of medication, difficult to ascertain when medications for epilepsy were given and when doses were changed. Patient had anti-epilepsy drugs that morning as had nasogastric tube in situ, but had not had medication for previous 10 days – probably due to being NBM, having swallowing difficulties or no nasogastric tube. Patient was a vulnerable adult with learning disabilities.**

- **Reported outcome:** death

**Patient admitted, not given anti-parkinsonian medication even though drug was written on prescription chart. Patient aspirated and designated NBM. No nasogastric tube inserted and no medication given. Further aspiration. No referral to physiotherapist for suctioning, no nutrition given for five days. Patient on Liverpool Care Pathway.**

- **Reported outcome:** death

**Patient had low potassium over a number of days, which was being treated with low-dose Sando-K as had reduced renal function. Potassium levels did not increase and Sando-K dose not increased to correct low potassium. Patient had cardiac arrest. Patient transferred to ICU. Cause of cardiac arrest documented as likely hypokalaemia. Patient experienced hypoxic brain injury and died several weeks later, having not regained consciousness. Staff member responsible for not giving Sando-K identified and spoken to. They stated that it was not given because the patient was too drowsy to swallow safely at the time.**

- **Reported outcome:** death

**Patient admitted to ward, known to have diabetes insipidus and on desmopressin. NBM for swallow assessment – no desmopressin administered. Glasgow Coma Scale score dropped from 14 to seven the following day. Patient was intubated, ventilated and transferred for neurosurgery. Sodium found to be 188, potassium 2.7.**

- **Reported outcome:** moderate harm
be made to minimise this. The reported NRLS figures are not an actual reflection of prevalence, particularly as reporting is low from primary care sectors, so it is estimated that the issue is much greater than this paper describes. The national medication safety officer network needs to work with the multidisciplinary medication safety groups to review incidents at a local level and develop actions to minimise risk.

**Literature and guidance review**

Several studies have been undertaken to research missed doses and reasons for omissions. In a 2009 study, Green et al looked at omission errors on admission to acute medical wards. This study of all inpatient prescription charts at an NHS hospital recorded all drugs prescribed and not administered in the first 48 hours, along with the reasons for omission. In total, 271 patient charts were analysed; of these, 20% of prescriptions affecting 17% of patients had omitted doses.

In 19% of cases there was no recorded reason for the omitted dose, but where reasons where given, the main ones were:

- Medicine not being available on the ward (38% of omissions);
- Patient was nil by mouth (32%);
- Patient refused the medicine (10%).

The authors concluded that omitted doses could lead to increased morbidity and length of stay, and that the current system that permits omission of medicines with inadequate justification must be revised.

A review of prescription records for 51 patients with Parkinson’s disease during surgical admission identified that 71% missed doses of their medicines (Derry et al, 2012). Overall, in this study, 12% of all prescribed medicines were missed (mean 0.7 missed doses per patient per day) and no reasons for missed doses were recorded in 64% of cases. The complications – most commonly neuropsychiatric – that arose from missed doses were documented in 69% of non-day case admissions.

In a study of medication errors on a ward for older people and a stroke ward at each of four NHS hospitals over four months, Kelly et al (2012) found that the rate of medication errors in patients with dysphagia was 21.1%, compared with 5.9% for those without. The main cause of medication errors for such patients was wrong formulation and incorrect preparation of medicines. The wrong formulation category included eight incidences of patients chewing medicines and nursing staff crushing tablets to aid administration.

**Guidance**

Guidance for nurses and midwives is available in Standard 8 of the Nursing and Midwifery Council’s Standards for medicines management (NMC, 2007). This includes advice to administer or withhold in the context of the patient’s condition (for example, digoxin not usually to be given if pulse <60) and co-existing therapies.

Where there are contraindications to the prescribed medicine, a reaction or where assessment of the patient indicates that the medicine is no longer suitable, the following steps must be taken:

- The prescriber, or another authorised prescriber, must be contacted at once.
- A clear, accurate and immediate record should be made of all medicine administered, intentionally withheld or refused by the patient, ensuring the signature of the person completing the report is clear and legible.

It is the responsibility of any health professional who is delegated the task of administering medication to ensure a record is made when doing so.

Where medication is not given, the reason for this must be recorded.

There is no guidance on administering or omitting medicines to patients during pre-operative fasting. The focus when patients have their medicines omitted is recording a reason code, rather than managing the patient’s health and wellbeing.

In a guideline for the multidisciplinary team on perioperative fasting in adults and children, the Royal College of Nursing (2009) advises that regular medicines be continued pre-operatively unless there is advice to the contrary. Patients can have up to 30ml of water to help take medicines.

The guidance also states that if an elective operation is delayed, consideration should be given to allow the patient a drink of water to prevent dehydration and excessive thirst. There is no mention of administering regular medicines that are required to be administered due to the delay.

**Conclusion**

It is clear there is evidence to show that failure to respond to a patient’s medication needs when the oral route becomes unavailable is a patient safety issue. Guidelines have been provided that support a proactive approach by all health professionals to ensure continuity of medicines therapy but there is a requirement to highlight the need for positive intervention in this area.

**References**


**For more on this topic go online...**

- Nil by mouth: best practice and patient education

  Bit.ly/NTNBMBestPractice