MEDICATION INCIDENTS REPORTING

Importance of Double checks

Endogenous error- originates solely from within an individual, from a random cognitive event like miscalculating a dose. In the case of frusemide overdose described overleaf, the nurse made an endogenous error when calculating the volume of frusemide for administration. Since endogenous errors arise within a single person, the probability that two individuals will make the same error in association with the same medication for the same patient is quite small. Thus, endogenous errors are likely to be detected if a system of double-check is performed independently whereby one person checks the work of another, as a separate action. This way, the checker is not misled into the same faulty thinking as the person who originally made the error. In the case of frusemide overdose overleaf, had the double-check been performed independently without prior knowledge of the calculation made by the first nurse, it is more likely that the error would have been detected.

Exogenous error- arises from conditions in the external environment, like poor package/label design or unclear presentation of information. Two cases of exogenous error related to the look-alike name mix-up were reported in the 3rd quarter of 2002 whereby hydralazine 25mg tablet was entered in patient's medication profile by pharmacy staff and dispensed against a prescription for hydroxyzine 25mg tablet to the ward. Name and strength similarity between hydralazine and hydroxyzine is an old problem and eight cases have been reported since the establishment of the medication incident reporting programme. Double-checks are often less effective in detecting exogenous errors than endogenous errors, even when the check is performed independently. Some of the same external factors that initially led to the error often remain, and staff with similar training could easily make the same mistake during the double-check.

Although double-check systems are not infallible, more so for exogenous errors, they still have a pivotal role in error detection strategies when placed at the critical areas, and when performed independently. A check might be mandatory for all calculations and measurements within specific categories e.g. medications prescribed for any patients under 12 year of age, when infusion requires a dose in mg/kg/min, for insulin infusion, chemotherapy, setting of infusion pump rates and concentrations for opioids and other high risk drugs. Calculators and computer programmes may improve accuracy, but they are not substitutes for an independent review of calculations and concentrations of solutions.

References

- http://www.ismp.org/msarticles
- Medication errors MR Cohen 1999. American pharmaceutical Association.

Safe Practice: Healthcare professional should take step to minimise error potential wherever similar name pair of drugs are available.

- Educate professional staff to heighten awareness about the potential for these agents for errors
- Use brand and generic names when referring to these drugs
- Ask doctors to print prescription carefully to assure names are clear and distinct
- Ask doctors to include intended use on the prescription
- Encourage the use of MOE prescription in order to minimise the possible transcription errors.
- Store these items by brand names for hydralazine and hydroxyzine whilst by generic names for Keppra and Kaletra; Zyrtec and Zyprexa.

For reference to other similar look alike or sound alike drug pairs where medication incidents have been reported in HA, pls visit cpo.home

Heparin Overdose

A surgeon ordered 3000 units of heparin, but 15000units of heparin was prepared by nurse in the operating theatre. The incident occurred since an incorrect concentration of heparin, 3ml of 5000 U/ml was used instead of 3ml of 1000U/ml heparin, both of which are available in the OT suite. Protamine was given to the patient with good effect.

☺ Safety tips

- The name and dosage of the drug should be double checked, preferably independently by another colleague before preparation and administration.
- Consider limiting the choice of multiple concentrations of the same drug to minimise the chances of errors.

Frusemide dose miscalculation

Frusemide 8mg iv was given to a preterm baby in ICU instead of 0.8mg as prescribed by the doctor as a result of miscalculation on the volume that was needed. The nurse miscalculated that 0.8ml instead of 0.08ml of 20mg/2ml would be required dosage, and another nurse accepted the dosage of 0.8ml as articulated by the colleague. The other nurse said she did actually recalculate the volume needed during the cross checking procedure. Albumin and normal saline as well as an increased flow rate of dopamine infusion were used to stabilise the blood pressure. The baby subsequently recovered with no adverse consequence.

☺ Safety tips

- Dosage and dilution calculations are prone to error. It should be cross-checked, preferably independently by another colleague to avoid confirmation bias before preparation and administration. In addition, staff need to be trained on the proper method for cross-checking.

Unattended medications

While a nurse was administering the medication to a patient, she was called upon to provide prompt assistance to another patient. Meanwhile, the medications of antihypertensives, ferrous sulphate and cloaxacillin were left on the bedside table and taken by a patient adjacent to the initial patient she was attending. The patient who took the unintended medications developed bradycardia and hypotension subsequently. Dopamine infusion was given to the patient who was then transferred to CCU for temporary pacing and further management.

☺ Safety tips

- Medications that are not intended for self-administration should not be left unattended in any circumstances.

Wrong line

Cloxacillin 1g diluted in 10ml of water for injection was injected into a patient's arterial line instead of the venous line in ICU. The patient had an arterial line on her left arm as well as a central venous line for haemodynamic monitoring and intravenous therapy. Two nurses checked the drug and dosage together and the one who was a trainee in ICU was asked to inject the drug into the peripheral line without the other nurse identifying the correct line with her. The trainee injected the cloxacillin into the arterial line as she was unaware that medications should not be injected via an arterial line. The patient immediately complained of left hand pain, mild dizziness and chest pain. Blood was withdrawn from the arterial line repeatedly and flushing with heparinised saline was performed. Lignocaine and papaverine were injected to the arterial line followed by normal saline flushing to reduce the hyperaemia of the patient's left hand. Condition of her left hand improved gradually 30min later.

☺ Safety tips

- Patients who simultaneously have an IV line and other types of non-IV tubing in place, are at risk of a potential mix-up in the lines. It is important that the tubing lines are traced back carefully to the site of insertion before drugs are administered. Additional precautionary measures such as attaching special labels to different lines are very useful.

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Table 1 Distribution of Incidents

	3 Q/2002		4 Q/2002	
	Freq.	%	Freq	%
Distribution of Cases				
In-patient	2241	40.9	1981	44.2
Out-patient	3236	59.1	2498	55.8
Initiator of Reporting				
Medical	11	0.2	13	0.3
Nursing	996	18.2	383	9.2
Pharmacy	4473	81.6	3789	90.5
Others	3	0.1	0	0.0
Staff Involved				
Medical	4982	90.2	4194	91.7
Nursing	420	7.6	262	5.7
Pharmacy	104	1.9	114	2.5
Others	18	0.3	6	0.1
Patient Outcome				
Patient related	264	4.8	229	5.1
Non-patient related	5213	95.2	4250	94.9

Table 2: Distribution of errors

	3 Q/2002		4 Q/2002	
	Freq.	%	Freq.	%
Prescribing Error				
Wrong Drug	452	12.4	277	9.7
Wrong Dosage form	310	8.5	187	6.6
Wrong strength/dosage	1140	31.4	907	31.9
Wrong Duration	251	6.9	203	7.1
Wrong Frequency	443	12.2	297	10.4
Wrong Route	53	1.5	41	1.4
Wrong Abbreviation	67	1.8	37	1.3
Wrong Instruction	176	4.8	164	5.8
Wrong Patient	67	1.8	79	2.8
Double Entry	83	2.3	89	3.1
Drug Omission	107	2.9	52	1.8
Others	487	13.4	513	18.0
Rx Incompleteness				
Missing Drug Name	42	2.6	28	2.0
Missing Dosage Form	134	8.1	104	7.5
Missing Drug Strength	257	15.6	275	19.9
Missing Duration/Quantity	205	12.5	168	12.1
Missing Frequency	278	16.9	200	14.5
Missing Dose	84	5.1	69	5.0
Missing Dr. Signature	143	8.7	153	11.1
Others	502	30.5	386	27.9
Dispensing Error				
Wrong Drug	47	39.5	48	41.4
Wrong Dosage form	8	6.7	8	6.9
Wrong Strength/dosage	27	22.7	18	15.5
Wrong Quantity	3	2.5	10	8.6
Wrong Patient	11	9.2	7	6.0
Wrong label information	10	8.4	11	9.5
Double dispensing	0	0.0	0	0.0
Drug Omission	6	5.0	8	6.9
Others	7	5.9	6	5.2
Administration Error				
Wrong Drug	20	10.2	12	7.3
Wrong Dosage form	1	0.5	1	0.6
Wrong Dose	26	13.2	17	10.4
Wrong Flow rate	26	13.2	16	9.8
Wrong Patient	17	8.6	9	5.5
Wrong Route/method	2	1.0	5	3.0
Wrong Time	18	9.1	15	9.1
Extra Dose	29	14.7	34	20.7
Dose Omission	45	22.8	37	22.6
Unordered Drug	0	0.0	3	1.8
Others	13	6.6	15	9.1

Tables 1-5 summarised the medication incident (MI) statistics for the last two quarters of 2002 (July-Sept 02 and Oct -Dec 02). Of 40 eligible hospitals/institutions, a total of 5,477 and 4,479 reports were received during 3rd and 4th quarters of 2002, respectively. Approximately 95% of them were rectified before reaching the patients and approximately 99% of incidents with no impact on patients.

"Nil incident to report" was submitted by 5 hospitals in both quarters and a hospital had no return during the 4th quarter of 2002. The rates of reported MIs were 68 and 56 per 100,000 items dispensed in the 3rd and 4th quarters of 2002, respectively.

Table 3: Distribution of incidents by error type

	3 Q/2002		4 Q/2002	
	Freq.	%	Freq.	%
Prescribing	3636	65.0	2846	63.1
Incomplete Rx	1645	29.4	1383	30.7
Dispensing	119	2.1	116	2.6
Administration	197	3.5	164	3.6

Table 4 Distribution of incidents by attributed causes

Underlying Causes	3 Q/2002		4 Q/2002	
	Freq.	%	Freq.	%
Communication failure/misinterpretation of order	47	0.8	43	0.9
Non-compliance with policies/procedures	371	6.7	285	6.3
Incorrect computer entry	170	3.0	169	3.7
Miscalculation	13	0.2	11	0.2
Mislabelling	53	1.0	13	0.3
Similar Drug Name/Appearance	33	0.6	52	1.1
Transcription	280	5.0	195	4.3
Distraction	1044	18.7	725	16.0
Inadequate Knowledge/Skills	294	5.3	222	4.9
Lack of Supervision	2	0.0	1	0.0
Complicated Dosage Regimen	37	0.7	7	0.2
Illegible handwriting	143	2.6	120	2.6
Unclear Prescription	28	0.5	32	0.7
Commercial Packaging/Product Labelling	5	0.1	4	0.1
Medicine unavailable	7	0.1	6	0.1
Storage Problem	0	0.0	0	0.0
Unknown	2598	46.6	1562	34.4
Others	452	8.1	1095	24.1

Table 5 Distribution of incidents by severity

	3 Q/2002	4 Q/2002
	Freq.	
No. of preventive interventions	5213	4250
No. of incidents	264	229
Severity Index of incidents		
1	194	183
2	62	37
3	6	6
4	2	3
5	0	0
6	0	0

6= an incident occurred that resulted in patient death
5= patient received medication incorrectly and sustained permanent injury
4= patient injured by the error and required either antidote to reverse the process or transferred to a higher level of care
3= patient required increasing monitoring with a change in vital sign as a result of the incident but no ultimate injury
2= patient required increasing monitoring as a result of the incident but no change in vital sign and no patient injury
1= incident occurred that did not result in patient injury