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How often do parents administer medications to their children in hospital? A prospective direct observational study

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ABSTRACT

Parents and carers play a critical role in supporting their children while in hospital. Multiple qualitative studies have explored parental involvement in the care of hospitalised children. Administration of medication to young children can be difficult and cause anxiety and stress for children. Parents are often willing and able to assist, yet little is known about how often parents are given responsibility for medication administration in hospital.

We analysed data from a prospective direct observational study of nurses administering medication at a major paediatric referral hospital in Australia. Data from observations of 298 nurses preparing and administering 5137 medication doses to children on nine medical and surgical wards between 07:00 and 22:00 were analysed. Details of drugs administered, whether medications were left for parents/carers to administer, and if nurses observed the administration by parents, were recorded. Parents were at their child's bedside during 89.7% (n=4610) of observed medication administrations. Parents gave 20.3% (n=1045) of medications. In 14.3% (n=733), medications were left with parents to administer without a nurse present. In 6.1% (n=312) of doses, medications were given to parents, but the administration was observed by a nurse. Parents were most likely to be given medications to administer to young children (1–5 years), and the medications most frequently administered were analgesics and anti-epileptics.

Parents/carers are integrally involved in the administration of many medications to children in hospital. The extent of parents' role and the impact on medication administration efficiency has been largely absent from the healthcare literature. Given that one in five medication doses is administered by parents, hospitals should recognise this contribution and consider if any additional support for parents is required.

INTRODUCTION

The central involvement of families and parents/carers in the care of their child while in hospital is well recognised, and paediatric care is often described as a partnership between providers and families, conceptualised as 'family-centred care'.^{1 2} Many qualitative studies have explored how relationships between care providers and parents of

children in hospital are navigated and negotiated. A systematic review of parent participation in the care of hospitalised children reported on 26 studies of which 21 investigated health professionals' or parents' views about parent participation and five studies evaluated interventions.³ All studies used surveys and/or interviews to assess outcomes. The involvement of parents in care tasks is a common theme with both positive and negative consequences identified. Parents report the importance of their involvement in care to support their children and reduce anxiety. However, studies have also identified that expectations of parental involvement in performing care tasks can result in them feeling they need to be hyper-vigilant and assume responsibility for safe-guarding their child while in hospital.⁴ Quantitative evidence of the extent of parent's involvement in specific care tasks is very limited.

Medication administration is a frequent form of care for children in hospital. Parents report that they want to be involved in administering medications, recognising that children may be reluctant to receive medication from nurses.⁵ To assist in the process, some hospitals have instituted policies which provide guidance for nurses and families about when and how this should occur.⁶ One English hospital asks parents to self-certify that they are competent to administer their child's medication.⁷ A small study involving 30 parents of children in a UK hospital identified that supporting parents to administer a small defined list of medications could also reduce medication administration delays.⁸ However, how frequently parents are involved in medication tasks in hospital is unknown. A recent analysis of medication work practices in three English paediatric inpatient units identified that while families provide practical support in medication administration,



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Table 1 Medications administered to children in hospital by parent/carers and nurses (n=5137)

Variable	Nurse administered	% (95% CI)	Medications administered by parent/carers				Total dose administrations		
			Yes: nurse observed	% (95% CI)	Yes: left with parent not observed	% (95% CI)		Yes: nurse observed or dose left with parent	% (95% CI)
All dose administrations	4092	79.7 (78.5–80.7)	312	6.1 (5.5–6.8)	733	14.3 (13.3–15.3)	1045	20.3 (19.3–21.5)	5137
Time of dose administration									
Morning (07:00–9:59)	1335	77.7 (75.6–79.6)	107	6.2 (5.2–7.5)	277	16.1 (14.5–17.9)	384	22.3 (20.4–24.4)	1719
Day (10:00–15:59)	1257	87.7 (85.9–89.3)	97	6.8 (5.6–8.2)	80	5.6 (4.5–6.9)	177	12.3 (10.7–14.1)	1434
Evening (16:00–22:00)	1500	75.6 (73.7–77.4)	108	5.4 (4.5–6.5)	376	19.0 (17.3–20.7)	484	24.4 (22.6–26.3)	1984
High risk medicine*									
No	3671	78.6 (77.4–79.7)	274	5.9 (5.2–6.6)	726	15.5 (14.5–16.6)	1000	21.4 (20.3–22.6)	4671
Yes	421	90.3 (87.3–92.7)	38	8.2 (6.0–11.0)	7	1.5 (0.7–3.1)	45	9.7 (7.3–12.7)	466
Route of administration									
Oral	2775	74.8 (73.4–76.1)	297	8.0 (7.2–8.9)	639	17.2 (16.0–18.5)	936	25.2 (23.9–26.6)	3711
Inhalation/nasal	93	50.3 (43.1–57.4)	6	3.2 (1.5–6.9)	86	46.5 (39.4–53.7)	92	49.7 (42.6–56.9)	185
Rectal	16	76.2 (54.9–89.4)	0	0.0 (0.0–15.5)	5	23.8 (10.6–45.1)	5	23.8 (10.6–45.1)	21
Topical	49	94.2 (84.4–98.0)	2	3.8 (1.1–13.0)	1	1.9 (0.1–10.1)	3	5.8 (2.0–15.6)	52
Transdermal	3	75.0 (30.1–98.7)	0	0.0 (0.0–49.0)	1	25.0 (1.3–69.9)	1	25.0 (1.3–69.9)	4
Intravenous infusion	791	99.6 (98.9–99.9)	3	0.4 (0.1–1.1)	0	0.0 (0.0–0.5)	3	0.4 (0.1–1.1)	794
Intravenous injection	242	99.6 (97.7–100.0)	1	0.4 (0.0–2.3)	0	0.0 (0.0–1.6)	1	0.4 (0.0–2.3)	243
Other	123	96.9 (92.2–98.8)	3	2.4 (0.8–6.7)	1	0.8 (0.0–4.3)	4	3.1 (1.2–7.8)	127
Child with English as a second language									
Missing	454	78.8 (75.3–82.0)	47	8.2 (6.2–10.7)	75	13.0 (10.5–16.0)	122	21.2 (18.0–24.7)	576
No	3213	78.9 (77.6–80.1)	234	5.7 (5.1–6.5)	624	15.3 (14.3–16.5)	858	21.1 (19.9–22.4)	4071
Yes	425	86.7 (83.4–89.5)	31	6.3 (4.5–8.8)	34	6.9 (5.0–9.5)	65	13.3 (10.5–16.6)	490
Aboriginal or Torres Strait Islander child									
Missing	454	78.8 (75.3–82.0)	47	8.2 (6.2–10.7)	75	13.0 (10.5–16.0)	122	21.2 (18.0–24.7)	576
No	3490	79.9 (78.6–81.0)	259	5.9 (5.3–6.7)	621	14.2 (13.2–15.3)	880	20.1 (19.0–21.4)	4370
Yes	148	77.5 (71.1–82.8)	6	3.1 (1.4–6.7)	37	19.4 (14.4–25.6)	43	22.5 (17.2–28.9)	191
Patient age									
<1	668	80.7 (77.8–83.2)	51	6.2 (4.7–8.0)	109	13.2 (11.0–15.6)	160	19.3 (16.8–22.2)	828
1 to <3	525	70.1 (66.7–73.3)	100	13.4 (11.1–16.0)	124	16.6 (14.1–19.4)	224	29.9 (26.7–33.3)	749
3 to <6	462	75.7 (72.2–79.0)	61	10.0 (7.9–12.6)	87	14.3 (11.7–17.3)	148	24.3 (21.0–27.8)	610

Continued

Table 1 Continued

Variable	Medications administered by parent/carer				Total dose administrations				
	Nurse administered % (95% CI)	Yes: nurse observed % (95% CI)	Yes: left with parent not observed % (95% CI)	Yes: nurse observed or dose left with parent % (95% CI)					
6 to <12	878	77.3 (74.8–79.6)	60	5.3 (4.1–6.7)	198	17.4 (15.3–19.7)	258	22.7 (20.4–25.2)	1136
12 to <16	1183	87.6 (85.7–89.2)	28	2.1 (1.4–3.0)	140	10.4 (8.8–12.1)	168	12.4 (10.8–14.3)	1351
≥16	376	81.2 (77.4–84.5)	12	2.6 (1.5–4.5)	75	16.2 (13.1–19.8)	87	18.8 (15.5–22.6)	463
Patient sex									
Male	1980	77.8 (76.1–79.4)	188	7.4 (6.4–8.5)	377	14.8 (13.5–16.2)	565	22.2 (20.6–23.9)	2545
Female	2112	81.5 (79.9–82.9)	124	4.8 (4.0–5.7)	356	13.7 (12.5–15.1)	480	18.5 (17.1–20.1)	2592
Medications by Anatomical Therapeutic Chemical (ATC) classification									
Analgesics (N02)	894	83.1 (80.7–85.2)	123	11.4 (9.7–13.5)	59	5.5 (4.3–7.0)	182	16.9 (14.8–19.3)	1076
Anti-epileptics (N03)	211	63.2 (57.9–68.2)	20	6.0 (3.9–9.1)	103	30.8 (26.1–36.0)	123	36.8 (31.8–42.1)	334
Antibacterials for systemic use (J01)	641	88.8 (86.3–90.9)	22	3.0 (2.0–4.6)	59	8.2 (6.4–10.4)	81	11.2 (9.1–13.7)	722
Psycholeptics (N05)	216	74.2 (68.9–78.9)	20	6.9 (4.5–10.4)	55	18.9 (14.8–23.8)	75	25.8 (21.1–31.1)	291
Drugs for acid-related disorders (A02)	171	71.5 (65.5–76.9)	12	5.0 (2.9–8.6)	56	23.4 (18.5–29.2)	68	28.5 (23.1–34.5)	239
Diuretics	118	67.8 (60.6–74.3)	10	5.7 (3.2–10.3)	46	26.4 (20.4–33.4)	56	32.2 (25.7–39.4)	174
Vitamins (A11)	232	81.4 (76.5–85.5)	3	1.1 (0.4–3.0)	50	17.5 (13.6–22.4)	53	18.6 (14.5–23.5)	285
Drugs for constipation (A06)	104	68.9 (61.1–75.7)	5	3.3 (1.4–7.5)	42	27.8 (21.3–35.4)	47	31.1 (24.3–38.9)	151
Blood substitutes and perfusion solutions (B05)	132	75.9 (69.0–81.6)	1	0.6 (0.0–3.2)	41	23.6 (17.9–30.4)	42	24.1 (18.4–31.0)	174
Anti-inflammatory and anti-rheumatic products (M01)	105	74.5 (66.7–80.9)	17	12.1 (7.7–18.5)	19	13.5 (8.8–20.1)	36	25.5 (19.1–33.3)	141
Corticosteroids for systemic use (H02)	159	84.1 (78.2–88.6)	11	5.8 (3.3–10.1)	19	10.1 (6.5–15.2)	30	15.9 (11.4–21.8)	189
Mineral supplements (A12)	125	82.8 (76.0–88.0)	2	1.3 (0.4–4.7)	24	15.9 (10.9–22.6)	26	17.2 (12.0–24.0)	151
Other	984	81.376.3–86.6)	66	5.54.2–6.9)	160	13.211.3–15.4)	226	18.716.3–21.3)	1210

*High-risk medications were defined by the hospital as anti-infectives, potassium and other electrolytes, insulin, narcotics/opioids and sedatives, chemotherapy agents and heparin, and other anti-coagulants.

they were 'largely unacknowledged at an organisational level'.⁷

Using data from a direct observational study of nurses' medication administration practices in a large paediatric hospital, we aimed to quantify the extent to which parents/carers were involved in the administration of medications to their children in hospital.

METHODS

This was a prospective direct observational study of nurses administering medication to children in hospital, conducted as part of a stepped-wedge cluster randomised controlled trial to assess the impact of electronic medication systems on errors.⁹ Data were collected from nine general medical and surgical wards (excluding oncology, intensive care unit and the emergency department) in a 340-bed paediatric referral hospital in Sydney, Australia. In total, 298 nurses were observed preparing and administering 5137 medication doses to 1565 patients on weekdays and weekends between 07:00 and 22:00 by trained researchers. Details of drugs administered, including whether medications were left for parents (includes family members or carers) to administer, and if nurses observed the administration of the medications by parents, were recorded. Full details of the observational methods have been published previously.¹⁰ A secondary analysis was undertaken to assess the frequencies and proportions of medication doses left with parents, and those observed by nurses to be administered by a parent, by patient characteristics (eg, age, sex) and medication details (route, type, administration time).

RESULTS

Overall parents were at their child's bedside during 89.7% (n=4610) of observed medication administrations; 90.4% (3719/4113) on weekdays and 87.0% (891/1024) on weekends.

Parents were involved with 20.3% (n=1045) of dose administrations. In 6.1% (n=312) of doses, medications were given to parents, and the administration was observed by a nurse. In 14.3% (n=733) of dose administrations, medications were left with parents to administer, but a nurse was not present for the actual administration.

Parents were most often responsible for giving medications during the morning and evening periods and most frequently administered oral or inhalation medications (table 1). Parental involvement in medication administration was greatest for children aged 1 to <3 years (29.9% of all doses administered by parents) and for children between 3 and <6 years (24.3%) (table 1).

Parents of children with English as a second language were less likely to be given medication to administer to their children (13.3%: 95% CI 10.5 to 16.6 of doses; 65/490) compared with other children (21.1%: 95% CI 19.9 to 22.4; 858/4071 doses). Parents of Indigenous children (Aboriginal or Torres Strait Islander) and non-Indigenous children were similarly involved in medication

administration (respectively 22.5% (95% CI 17.2 to 28.9) vs 20.1 (95% CI 19.0 to 21.4)), although this information was not available for 11.2% (n=576) of administrations.

In terms of volume, parents were most frequently involved in the administration of analgesics. For specific medication groups, parents were frequently involved in the administration of antiepileptics (36.8% of all doses), diuretics (32.2%) and drugs for acid-related conditions (28.5%) (table 1). Of medications left with parents 9.7% (n=45) were high risk, the majority (84.4%, n=38) of which were administered in the presence of a nurse.

DISCUSSION

Our results confirm a high level of parental presence, while children are in hospital and regular involvement in medication administration. One in five medication doses was given by parents, most (70.4%) without the presence of a nurse. A small proportion of these medications were high risk, but most of these were administered in the presence of a nurse. We could identify no similar study against which to compare our findings, and thus the generalisability of these results is unknown. In an observational study of 2000 medication administrations conducted in 2012 in a UK paediatric hospital, 64 (3.2%) medication doses were observed to be given by a parent but not observed by a nurse. All were classified as errors because this was a deviation from hospital policy.¹¹ No data on overall parental involvement in medication administration were reported.

Our previous analysis of factors associated with medication administration errors among this sample showed that the presence of a parent at the bedside was not associated with reduced errors,¹² but it is highly likely that children are more comfortable taking medications from their parents.⁵ Our findings demonstrate that parents/carers' involvement in medication administration reduces the demands on nurses, yet quantification of their contribution to supporting the hospital workforce is largely absent in the literature. Involvement of parents can also assist in improving medication adherence after discharge. The lower level of involvement of parents of children with English as a second language may be a missed opportunity to support these parents to gain a greater understanding of their child's medications.¹³ Hospitals should consider how best to support parents' involvement in medication administration.

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REFERENCES

- Coyne I. Disruption of parent participation: nurses' strategies to manage parents on children's wards. *J Clin Nurs* 2008;17:3150–8.
- O'Connor S, Brenner M, Coyne I. Family-centred care of children and young people in the acute hospital setting: A concept analysis. *J Clin Nurs* 2019;28:3353–67.
- Power N, Franck L. Parent participation in the care of hospitalized children: a systematic review. *J Adv Nurs* 2008;62:622–41.
- Shields L, Pratt J, Hunter J. Family centred care: a review of qualitative studies. *J Clin Nurs* 2006;15:1317–23.
- Williams L, Caldwell N, Collins E. Helping parents/carers to give medicines to children in hospital. *Arch Dis Child* 2016;101:e2.
- Sydney Children's Hospital Network. Medication administration by parents and carers or self medication by a young person: practice guideline. Sydney, 2018.
- Sutherland A, Phipps DL, Gill A, et al. Medication safety gaps in English pediatric inpatient units: An exploration using work domain analysis. *J Patient Saf* 2024;20:7–15.
- Khan K, Harrington A, Pannu R, et al. Self-administration of in-patient medications: a pilot study in children with cystic fibrosis. *Arch Dis Child* 2016;101:A34–5.
- Westbrook JI, Li L, Raban MZ, et al. Stepped-wedge cluster randomised controlled trial to assess the effectiveness of an electronic medication management system to reduce medication errors, adverse drug events and average length of stay at two paediatric hospitals: a study protocol. *BMJ Open* 2016;6:e011811.
- Westbrook JI, Li L, Raban MZ, et al. Associations between double-checking and medication administration errors: a direct observational study of paediatric inpatients. *BMJ Qual Saf* 2021;30:320–30.
- Alsulami Z, Choonara I, Conroy S. Paediatric nurses' adherence to the double-checking process during medication administration in a children's hospital: an observational study. *J Adv Nurs* 2014;70:1404–13.
- Westbrook JI, Li L, Woods A, et al. Risk factors associated with medication administration errors in children: A prospective direct observational study of paediatric inpatients. *Drug Saf* 2024;47:545–56.
- Rungvivatjarus T, Huang MZ, Winckler B, et al. Parental factors affecting pediatric medication management in underserved communities. *Acad Pediatr* 2023;23:155–64.