Parents and caregivers experience in managing children’s medicines after discharge from a New Zealand hospital

Rajeshni Naidu, Debbie Bassett-Clarke, Ross Nicholson, June Tordoff

ABSTRACT

AIM: To investigate the level of understanding parents/caregivers have regarding prescribed medicines for their sick children, and how they manage these medicines at home following hospital discharge.

METHODS: English-speaking parents/caregivers of sick children were recruited if their child was admitted to Middlemore Hospital in New Zealand and prescribed two liquid medicines, specifically an analgesic and an antibiotic. A questionnaire was developed and used to interview parents/caregivers on three separate occasions. The questionnaire was firstly administered during their hospital stay; secondly, by telephone post-discharge; and thirdly via a home visit two to three days after the estimated completion date of the antibiotic course.

RESULTS: Eighteen participants from the five main ethnic groups (Pacific Island n=7, NZ European n=5, Māori n=4, Asian n=2) completed all three interviews. Parents/caregivers had a reasonable understanding of the purpose of the medicines prescribed. Doctors, nurses and pharmacists provided variable medicines information to parents/caregivers on hospital discharge. Parents/caregivers used a variety of measuring equipment at home, but over a quarter (28%) were not supplied with an oral syringe to measure appropriate doses of medicines at home, and some lacked knowledge on safe storage and appropriate disposal of medicines.

CONCLUSION: This study found variation and gaps in the information for medicines provided at discharge. To facilitate the safe use of medicines, consistent and clear information about the use, storage and disposal of medicines needs to be provided by all healthcare professionals involved; and accurate measuring equipment should be provided free of charge with instructions.

Children require special consideration for prescribing or administering medicines, especially on discharge from hospital, when parents/caregivers are expected to manage medicines at home. Lack of safe and effective data on medicines use in children, makes it more complex. Factors such as drug formulation, palatability, appearance, ease of administration and parents/caregivers’ perceptions of medicines, all affect adherence. Especially, as some liquids are formulated from crushed tablets, have a short expiry, and require refrigeration.

Parents/caregivers may require further education on how to safely administer medicines to children, because medication errors in children have been reported to be three times more likely than in adults, and more commonly associated with measuring incorrect dose volumes. Errors are often due to inappropriate measuring equipment, and standardised measuring devices (oral syringes, measuring cups or calibrated measuring spoons) are preferred over non-standard equipment, such as kitchen spoons.

Parents/caregivers with lower health literacy levels have also previously been identified as most likely to make dosing errors.

Our study aimed to identify how well parents/caregivers in the Counties Manukau Health (CMH) region understood their children’s discharge medicines and how they manage medicines at home.

Methods

The study was approved by the University of Otago Human Ethics Committee (H16/051), and CMH. This study was designed and conducted by RNa as part of a master’s degree in clinical pharmacy. Supervision and advice were provided by DB-C (clinical pharmacist), RNi (consultant paediatrician), and JT (academic pharmacist).

Recruitment for this prospective, observational study was conducted on paediatric wards at Middlemore Hospital, CMH from 27 June to 2 December 2016. The study population were parents/caregivers of children ≤14 years old, diagnosed with skin or respiratory infections and prescribed two liquid medicines (an antibiotic and analgesic) on a discharge prescription. People who did not speak English, and children with complex medical histories or on other medicines (long- or short-term) were excluded from the study.

The aim was to recruit 20 participants with a
similar ethnic distribution to CMH region (i.e., 41% Pacific Island (n=8), 24% Māori (n=5), 24% New Zealand (NZ) European (n=5) and 11% Asian (n=2)). Potential participants were approached by nurses, handed a participant information sheet and those interested were then approached by the researcher. They were asked to sign a consent form, give permission to record their interviews and to allow photographs to be taken of measuring equipment and medicine storage places in their homes. Participants were invited to have a support person (friend/whānau) present during the interviews.

A three-part questionnaire was purposively developed and used by the researcher to complete the interviews with the participants. Before use with the participants, the questionnaire was pilot tested by five parents/caregivers who had previously administered liquid medicines to their children and amended in the light of their comments. The researcher administered the questionnaire by reading the questions to each participant and writing down their answers.

Part A of the questionnaire was completed while the participant’s child was still on the ward; Part B was completed by a telephone interview two to three days post-discharge; and Part C was completed approximately two to three days after estimated completion of antibiotic course.

Data was analysed quantitatively using descriptive statistics; and qualitatively using conventional content (thematic) analysis of responses/comments. The questionnaire data was analysed manually, and examples of responses/comments are presented in italics in this article.

**Results**

During the study, 55 potential participants were identified and 39 agreed to participate. Due to recruitment and time constraints, the study ceased when 18 participants from the five main ethnicities completed all three interviews.

The demographics are described (see Table 1) with further ethnic distribution of the participants as Pacific Island – Samoan (3), Tongan (1), Niuean (2), Samoan/Cook Island/Tongan (1); Māori – NZ Māori (1), NZ Māori/Niuean (1), NZ Māori /NZ European (1), NZ Māori /Samoan (1); NZ European – NZ European (4), NZ European/Chinese/ NZ Māori (1) and Asian – Indian (1), Chinese (1).

The participants’ children were three months to seven years old. Ten were diagnosed with a respiratory infection (pneumonia) and prescribed antibiotic suspensions either amoxicillin (8), amoxicillin/clavulanic acid (1) or erythromycin (1). Eight had a skin infection (cellulitis or abscess) and were prescribed amoxicillin/clavulanic acid (5) or cephalaxin (3). All children were also prescribed paracetamol suspension.

Doctors handed out prescriptions to most participants (14, 78%) on discharge and nurses gave to the remaining participants. The types of medicines information provided by health care professionals (HCPs) from hospital on discharge and from community pharmacy varied (see Table 2).

Three participants stated that they were not provided with any information on medicines on hospital discharge while another two could not recall. Two participants stated that no information was provided by community pharmacy, two could not recall and on two occasions partners of participants collected medicines from pharmacy so participants were not aware of information provided.

Sixteen participants (89%) reported that they made no attempt to obtain further information about the discharge medicines from any other sources when they reached home.

**Compliance with discharge medicines**

At the time of the home visit 15 (83%) participants reported that the prescribed course of antibiotic was complete. Reasons given for non-completion were: “The baby would go to sleep and miss his evening dose”, “I forgot to take the child’s medicine to preschool missing a lunchtime dose”; and “I simply forgot”.

**Knowledge about analgesics and antibiotics**

Seventeen (94%) participants knew the purpose of paracetamol and 15 (83%) knew how often or when to give.

Descriptions for the purpose of paracetamol included: pain and fever (15); pain (1); fever, flu, runny nose (1); and sick or headaches in adults, not sure in children (1); and described the times that they administered paracetamol “only for [when] unsettled”, “not if alright”, “only when needed”, “only when she is in pain”, “whenever temp is high”, “for example for fever” and “only when it’s a problem”.

All 18 (100%) participants knew the purpose of antibiotics (for pneumonia or skin infection) and thirteen (72%) were able to recall the duration. Two themes were identified.

- Infection: described as “for infection”, “antibiotic”, “for pneumonia”, “to fight infection in leg”, “chest infection” and “to kill bacteria”.
- Healing: described as “to heal the scars” and “for healing”.

**Table 1: Participant demographics**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Number (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Island</td>
<td>8</td>
</tr>
<tr>
<td>Māori</td>
<td>5</td>
</tr>
<tr>
<td>New Zealand European</td>
<td>5</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
</tr>
<tr>
<td>Asian – NZ Māori</td>
<td>1</td>
</tr>
<tr>
<td>Māori/Niuean</td>
<td>1</td>
</tr>
<tr>
<td>NZ European</td>
<td>1</td>
</tr>
<tr>
<td>NZ Māori</td>
<td>1</td>
</tr>
<tr>
<td>NZ European</td>
<td>4</td>
</tr>
<tr>
<td>NZ European/Chinese</td>
<td>1</td>
</tr>
<tr>
<td>Asian – Indian</td>
<td>1</td>
</tr>
<tr>
<td>Chinese</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 1: Demographics of participants (n=18).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pacific Island (n=7)</th>
<th>Māori (n=4)</th>
<th>NZ European (n=5)</th>
<th>Asian (n=2)</th>
<th>Total (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred language by parents/caregivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Bilingual</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Age of parent/caregiver participating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16–25yrs</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>26–35yrs</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>36–45yrs</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Median number of children in each household (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12yrs</td>
<td>4 (1–4)</td>
<td>3 (1–4)</td>
<td>3 (2–5)</td>
<td>3 (2–4)</td>
<td>3 (1–5)</td>
</tr>
<tr>
<td>13–17yrs</td>
<td>0 (0–2)</td>
<td>1 (0–4)</td>
<td>0 (0–1)</td>
<td>0 (0–0)</td>
<td>0 (0–4)</td>
</tr>
<tr>
<td>&gt;18yrs</td>
<td>3 (1–6)</td>
<td>2.5 (2–3)</td>
<td>2 (1–8)</td>
<td>3 (3–3)</td>
<td>2.5 (1–8)</td>
</tr>
<tr>
<td>Main caregiver of the sick child at home</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Mother &amp; Father</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Aunt &amp; Grandmother</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mother, Father &amp; Grandmother</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Highest level of participant’s education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>High school</td>
<td>4</td>
<td>2</td>
<td></td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Tertiary</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>
Table 2: Type and frequency of discharge medicines information provided to parents/caregivers on their child’s discharge from hospital and when filling prescriptions at community pharmacies.

<table>
<thead>
<tr>
<th>Types of information provided to parents/caregivers (n=18)</th>
<th>Frequency item was provided by hospital staff (doctor or nurse) n (%)*</th>
<th>Frequency item was provided by community-pharmacy staff n (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of medicine</td>
<td>12 (66.7)</td>
<td>5 (27.8)</td>
</tr>
<tr>
<td>Purpose of medicine</td>
<td>9 (50.0)</td>
<td>3 (16.7)</td>
</tr>
<tr>
<td>Dosing regimen (how much to give)</td>
<td>1 (5.6)</td>
<td>8 (44.4)</td>
</tr>
<tr>
<td>Frequency of dosing (how often to give)</td>
<td>0</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>Duration of the course</td>
<td>7 (38.9)</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>When to contact doctor</td>
<td>1 (5.6)</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>How to store medicine</td>
<td>0</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>To take prescription to pharmacy to fill and/or for more medicines information</td>
<td>3 (16.7)</td>
<td>0</td>
</tr>
<tr>
<td>To give with food or without food</td>
<td>1 (5.6)</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Asked about or provided measuring equipment</td>
<td>0</td>
<td>1 (5.6)</td>
</tr>
</tbody>
</table>

Note *= percentage of maximal response (n=18).

Figure 1: How well parents/caregivers perceive they understand instructions on the medicine labels.

Scores out of 10 (1= Not very well, to 10 =Very well)
Understanding instructions
Participants were asked how well they understood the labelling instructions (to assign on a scale of 1= not very well to 10 = very well, see Figure 1). Seventeen (94%) of participants claimed to understand the instructions well/very well, scoring 8–10 on the scale.

Taste issues
Four participants found it difficult to administer antibiotics because of its taste; amoxicillin/clavulanic acid (2), amoxicillin (1), erythromycin (1). One participant said: “erythromycin was horrible…it had a strong aniseed flavour”.

Dose measuring equipment
Participants were found to use different types of measuring equipment at home. The majority (13, 72%) used oral syringes, but some used two or more types of measuring equipment, depending on the circumstances (see Table 3). One participant claimed to use kitchen spoons.

Accessibility of measuring equipment
Parents/caregivers obtained oral syringes from hospital and/or community pharmacies. The oral syringes were supplied free of charge from the hospital, or parents/caregivers were charged a small fee ($1–$2) from community pharmacies. Some parents/caregivers used measuring equipment with faded or non-existent markings due to frequent use.

Ability to measure/calculate doses
One participant capably measured a 6.25mL dose of antibiotic using an oral syringe for a child under one year but used measuring spoons (with 2.5mL and 5mL volume sizes) for older children.

In contrast, one participant struggled to measure 6.8mL of paracetamol describing the dose as “confusing”, and another was not able to measure 3.75mL of paracetamol. The latter thought “it was a random number and quite hard to give [so] gave slightly less”.

Storage of medicines
Almost all participants (17, 94%) kept medicines requiring refrigeration (i.e., antibiotics) in the appropriate place and seven (39%) kept analgesics in the refrigerator as well. One participant did not have a refrigerator, so kept all medicines on a kitchen shelf. Analgesics not requiring refrigeration were kept in a variety of places, such as kitchen cupboards, on top of the refrigerator, in a medicine box or in the parent’s bedroom.

Fifteen (83%) participants confirmed medicines were stored out of the reach of children. The other three stored medicines that could have been easily accessible to young children. In these cases, medicines were in an unlocked cupboard in the corridor, inside or on top of kitchen drawers.

Disposal of medicines
Nine participants (50%) disposed expired or unused medicines in general household rubbish.

Table 3: Scenarios where parents/caregivers have used different types of measuring equipment at home to measure oral liquid medicines.

<table>
<thead>
<tr>
<th>Number of parents/caregivers using (n=18)</th>
<th>Different scenarios of parents/caregivers using different types of measuring equipment to measure oral liquid medicines</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Oral syringes.</td>
</tr>
<tr>
<td>3</td>
<td>Oral syringe and a measuring cup. (One used oral syringe initially but when the volume got low in the medicine bottle, parent/caregiver poured liquid medicine into a measuring cup to measure dose. Another used a proprietary oral syringe available with Nurofen® suspension bottle bought from pharmacy.)</td>
</tr>
<tr>
<td>1</td>
<td>Proprietary measuring cup (available with Augmentin® suspension bottle dispensed by pharmacy) and kitchen spoon for liquid paracetamol.</td>
</tr>
<tr>
<td>1</td>
<td>Proprietary measuring cup (Augmentin® suspension bottle), proprietary oral syringe (Nurofen® bottle), and a cylindrical measuring spoon to measure both antibiotics and analgesics.</td>
</tr>
</tbody>
</table>
Table 4: Types of discharge medicines information preferred by parents/caregivers (n=18).

<table>
<thead>
<tr>
<th>What form of information preferred by parents/caregivers?</th>
<th>n (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written</td>
<td>3 (16.7)</td>
</tr>
<tr>
<td>Verbal</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>Both written &amp; verbal</td>
<td>12 (66.7)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>All</td>
<td>18 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What language is preferred by parents/caregivers?</th>
<th>n (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>13 (72.2)</td>
</tr>
<tr>
<td>English &amp; own language</td>
<td>5 (27.8)</td>
</tr>
<tr>
<td>All</td>
<td>18 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Information about medicines?</th>
<th>n (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the medicine for?</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>How much medicine to give?</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>How to measure the medicine?</td>
<td>9 (50.0)</td>
</tr>
<tr>
<td>How to give the medicine in relation to food?</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>How often to give the medicine for?</td>
<td>15 (83.3)</td>
</tr>
<tr>
<td>How long to give the medicine for?</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>How does the medicine work?</td>
<td>12 (66.7)</td>
</tr>
<tr>
<td>What are the side effects of the medicine?</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>How much does the medicine cost?</td>
<td>9 (50.0)</td>
</tr>
<tr>
<td>Where to get the medicines from?</td>
<td>5 (27.8)</td>
</tr>
</tbody>
</table>

Note *= percentage of maximal response (n=18)*
whilst seven (39%) poured them down the sink. One did both, while another poured liquid medicines down the sink but flushed tablets down the lavatory. Only one participant knew that unused medicines could be returned to the pharmacy for disposal. Three participants stated that they would like the expiry date written on the dispensed medicine, so they would know when to discard.

**Further information that parents would like to receive**

Based on their experience, participants were asked what types of medicines information they would like to receive in future from a hospital, for their children, prior to discharge (see Table 4).

Most of the participants (72%) who wanted written information preferred to receive it in English, whilst 28% wanted written information provided in both English and their own language (Māori n=1, Samoan n=1, Tongan n=1, Chinese n=1 and Indian n=1). They stated: “it will be good to be able to read it later, sometimes you forget” and “it is good in verbal [form] because they explain to you and it is also good to get on paper ... because when you are in the hospital, you may be tired and exhausted and may not take ... in all the information and remember it later”.

Most (16, 89%) participants made no further attempts to obtain any more medicines information once they reached home.

**Discussion**

Parents and caregivers play an integral part in managing their children’s medicines after hospital discharge. How well they are able to do this at home might depend on how well they are informed by the HCPs involved.

**Medicine information requirements**

This New Zealand based study found that HCPs provided variable types of medicines information when giving prescriptions to parents/caregivers of sick children at the time of hospital discharge. This is consistent with a UK study that found variable or inconsistent information was provided to parents by HCPs at paediatric diabetes outpatient clinics. Most importantly, the majority of parents/caregivers agreed that they would like specific medicines information when receiving a prescription for their child such as the indication or purpose of the medicine(s), their dose, frequency, administration in relation to food, duration of medicine course, accurate measurement, mechanism of action, possible side effects, and procurement costs. In addition, participants were unsure what to do about missed doses and how to dispose of medicines safely. These types of information needs concurred with earlier findings in Australia, where parents requested information on dose, administration, indication and adverse drug reactions. HCPs need to work together to consistently provide these important medicine information needs to parents/caregivers. They also need to adopt health literacy strategies to communicate easy to understand medication information especially for our parents/caregivers from multicultural backgrounds.

**Measuring equipment**

The present study found that participants used a variety of devices for administering medicines. Unfortunately, over a quarter (28%) did not use the most accurate device, an oral syringe, but used a measuring cup and some of these had faded markings. A higher risk of dosing errors with parents using measuring cups has been previously reported. A United States (US) randomised controlled study (n=2,099) found parents made more dosing errors with measuring cups than with oral syringes (adjusted odds ratio = 4.6; 95%CI, 4.2–5.1). In total, 84% made one or more errors, 21% gave more than twice the prescribed dose and the error rate was much higher when smaller doses were prescribed. A US study based in a dental clinic found parents were more likely to accurately measure a dose 95% of the time when using an oral syringe or cylindrical measuring spoon, compared to 60% of the time with a medicine cup with black calibrations and 42% of the time when using one with clear calibrations. Worryingly, in our study, parents only had access to medicine cups with clear calibrations so a greater margin of error was likely. Our study found parents’ perception was to use oral syringes for infants and measuring spoons for older children. This is consistent with the dental study where only a small proportion of participants (19% (n =23)) used oral syringes because “their children were not infants.”

Kitchen spoons were sometimes used by participants in the present study. These are not stan-
Storage and disposal of medicines

Appropriate and safe storage of medicines in homes can also help prevent or at least reduce the risk of unintentional overdose in children. Most of our parents/caregivers were storing medicines appropriately. However, it is important to remind parents/caregivers to store medicines safely at home.

The very surprising finding of this study was the fact that the majority of parents/caregivers were not aware of the most appropriate method of disposing of unwanted medicines. Inappropriate disposal of medicines can cause environmental pollution while use of expired medicines can cause harm if administered to children due to medicine degradation resulting in toxicity or sub-therapeutic effect. We suggest that HCPs and government bodies work together to increase medication safety awareness.

Recommendations

This study generates important information for quality improvement and a standardised paediatric discharge process is recommended to improve parents/caregivers understanding and management of their children’s medications at home. This discharge process will need to include the relevant HCPs including pharmacists to work collaboratively and consistently using health literacy communication strategies such as (i) providing written medication information for better recall of information, (ii) using teach-back techniques to see if parents/caregivers have understood instructions, (iii) avoiding giving too much information all at once, (iv) using interpreters for those with a language barrier, and (v) providing measuring equipment for improved adherence and correct administration of medication at home.

Limitations

This was a small study based in one centre so the results cannot be generalized widely across New Zealand or elsewhere. Participants with no English language skills and those with children having more complex medical conditions were excluded. These parents/caregivers would be a good target for future studies as health literacy, health system navigation and treatment complexity issues may have an impact on managing medicines.

We did not examine how accurately participants measured liquid doses. Had this occurred, it would have produced more information around dosing errors and understanding of instructions.

Future studies

The findings from this study warrant further studies in this area. Firstly, a larger study, throughout New Zealand incorporating non-English speakers and/or more medically complex paediatric patients could be undertaken to find the medicine information needs for a wider group of parents/caregivers. Secondly, the clarity, comprehension/barriers to understanding of labelling instructions or any verbal and written medicine information provided needs to be examined.
Conclusion

This small New Zealand based study with parents/caregivers from various ethnicities showed variation in discharge medication education and information provided by HCPs to assist them to manage their children’s medicines at home.

While the majority of parents/caregivers had a reasonable understanding of antibiotics and analgesics use, they lacked appropriate measuring equipment and knowledge on how to measure liquid medicines accurately, and on the safe storage and disposing of medicines at home. A significant proportion of parents/caregivers were not provided with oral syringes, which could have adversely affected their child to receive correct doses of medicines at home. The study provides useful information for quality improvement and future training of all the HCPs involved in a discharge process. HCPs must ensure they provide, using a health literacy lens, appropriate and consistent information on medications, medication equipment free of charge, plus education and training on administration instructions, so that parents/caregivers can manage medicines well at home after their child’s discharge from hospital.
COMPETING INTERESTS
Nil.

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REFERENCES


Appendices

Appendix 1: Interview questionnaire.

(NOTE: The interviewer may re-phrase the question if more explanation is needed).
Part A: Demographics (During admission)

1. What ethnic group do you belong to?
   • European
   • Māori
   • Pacific Peoples*
   • Asian*
   • Middle Eastern/Latin American/African
   • Other Ethnicity
   *Please state which sub-group you belong to e.g. Samoa/Indian

2. What language do you prefer to speak most of the time?
   • English
   • Both English and another language (please state other language)
   • Other language only (please state other language)

3. What age group do you belong into?
   • 16 to 25 years
   • 26 to 35 years
   • 36 to 45 years
   • >45 years

4. How many adults and children live in your household?
   • Children (≤12 years)
   • Adolescents (13-17 years)
   • Adults (≥ 18 years)

5. Who looks after your child's medicines at home? (Tick more than one if needed.)
   • Mother
   • Father
   • Grandparents
   • Siblings
   • Caregiver
   • The child themself (please specify age)
   • Others (please specify)

6. What is the highest education level of the main caregiver(s) administering and looking after medicines for your children?
   • No school
   • Below high school
   • High School
• Tertiary qualifications
• Other (please specify)

Part B: Post discharge (2 to 3 days after discharge)

7. Who gave you the prescription before discharge?

• Nurse
• Doctor
• Other (please specify)
• Don’t remember
• Don’t know

8. Were your child's medicines explained to you before discharge?

• Yes
• What information was given?
• No
• Don’t remember
• Comments

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Reason for medicine</th>
<th>Type of medicine</th>
<th>When to take it</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>Specify details in here</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Have you picked up the medicines from a pharmacy?

• Yes
• No
• If No, then can they explain why this has happened?

10. Were your child's medicines explained to you when you picked them up from a community pharmacy?

• Yes
• What information was given
• No
• Don’t remember
• Comments

11. Were your child's medicines explained to someone else who may have picked them up for you from a community pharmacy?

• Yes
• What information was given
• No
12. Have you sourced information about these medicines from anyone or anywhere else?

- Internet
- GP
- Community support group
- Plunket
- Family or whānau
- Other (please specify)

13. Has your child started taking the medicines?

- Yes
- No
- If No, then can they explain why this happened?
- Comments

Part C: Post discharge (2 to 3 days after expected completion of antibiotics course)

14. Is your child still taking any medicines?

- Yes
  - Which ones
  - Why is that?
- No
  - Which ones
  - Why is that?

15. What do you use to measure liquid medicines?

- Medicine measuring spoons
- Oral Syringe
- Medicine measuring cups
- Don’t have any medicine measuring cups/syringes/spoons and use:
  - Kitchen spoons
  - Drinking cups/glass
  - Other (please tell me/show me)

16. Where do you store medicines at home (Tick more than one if needed)?

- Fridge
- Cupboard
- Out of reach of children
- Bathroom
- Other place (please specify/show)

17. How long do you keep your medicines for?

- Until the course finishes
- Until the medicine expires
- Other (please specify)
18. How do you discard expired or unwanted medicines?

• Return them to the pharmacy
• Put them down the sink
• Put them down the toilet
• Put them in the rubbish bin
• Other (please specify)

19. How well do you understand the instructions on the labels?

1 2 3 4 5 6 7 8 9 10
Not very well  Very well

Appendix Figure 1:

..........mL Paracetamol ..........mg/5mL suspension
Give .......... mL every 4 to 6 hours when required for pain and fever. Max 4 doses per day.

(Interviewer shows the participant this label, completed with the child’s dosing instructions given by doctor on prescription and given by community pharmacy)

20. What is this medicine for?

21. How do you measure the volume? Please can you show me?

Appendix Figure 2:

..........mL Antibiotic* ..........mg/5mL suspension
Give .......... mL .......... times daily until finished.

*Antibiotics that are commonly prescribed for cellulitis are flucloxacillin, cephalexin, amoxicillin/clavulanic acid and erythromycin.

22. How long are you going to give this medicine for?

(Interviewer shows the participant this label, completed with the child’s specific antibiotic, dosing instructions given by doctor on prescription and given by community pharmacy)

23. What is this medicine for?

24. How many days did you give this medicine for?

25. Have you had any difficulties with any of these medicines?

• No
• Yes (please specify)
These questions below are about what type of information you would like to receive prior to your child's discharge from hospital.

26. In what form would you like to receive any information about your child's medicines in?

- Written information
- Verbal information
- Both written and verbal information
- In pictures (please specify type e.g. times of the day, number of spoonfuls)
- Audio-visual recording (e.g. television)
- Other (please specify)

27. What language would you like to receive information about your child's medicines in?

- English
- Your own language (please specify)

28. What information would you like on discharge about your child's medicines (Tick more than one if needed)?

- What the medicine is for?
- How much medicine to give?
- How to measure the medicine?
- How to give the medicine in relation to food?
- How often to give the medicine?
- How long to give the medicine for?
- How does the medicine work?
- What are the side effects of the medicine?
- How much does the medicine cost?
- Where to get the medicines from?
- Other (please state)