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Bedside and Home: A Comparative Synthesis of Paediatric Medication Error as Reported by Health Professionals and Caregivers in a Nigerian Tertiary Hospital

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Abstract
Background*: Paediatric medication error is usually studied from a single vantage point — either the hospital professional's account of error within the clinical medication-use process, or the caregiver's account of error occurring after discharge, at home. These two vantage points are rarely reported alongside one another from the same department, which limits the field's ability to see where hospital-level and home-level error risk converge or diverge.*
Objective*: To synthesise and compare findings from a health-professional survey and a caregiver survey conducted concurrently in the same paediatric department, examining where the two informant groups converge on dose error as the dominant risk and where their accounts diverge in ways that carry distinct implications for intervention.*
Methods*: This paper draws on two descriptive cross-sectional surveys conducted in the paediatric department of a Federal Medical Centre in South-South Nigeria over the same three-month period in 2020: 89 health professionals (physicians, nurses, pharmacists) and 215 caregivers of children attending the department. Because the two surveys used different instruments administered to non-overlapping respondent groups, the comparison presented here is a descriptive, narrative synthesis rather than a paired statistical test of informant agreement; this distinction is maintained throughout.*
Results*: Dose error was the leading single error type identified by both groups — 40.5% of health professionals and a combined 69.0% of caregivers (34.5% under-dose, 34.5% over-dose) — despite the two groups being surveyed about entirely different phases of the medication journey (in-hospital process versus home administration). Health professionals additionally identified route error (23.6%) as a major category with no direct caregiver-reported analogue, since caregivers do not select or change a drug's route of administration; caregivers, in turn, reported home-specific risk behaviours — immediate re-dosing after vomiting (41.9%) and forceful feeding after refusal (35.3%) — that have no equivalent in the hospital-professional instrument.*
Conclusion*: Dose error is the one risk that is genuinely shared across the hospital-to-home medication journey in this setting, making it the single highest-priority target for any intervention that must work across both environments; route error and interruption-related administration risk remain hospital-specific concerns, while vomiting- and refusal-related re-dosing behaviour is a distinct, home-specific risk requiring caregiver-facing rather than hospital-facing intervention.*

Keywords: *medication error; paediatric; health professionals; caregivers; patient safety; dual-informant; Nigeria*

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I. Introduction

A child's exposure to medication error does not begin and end within the hospital. It begins with a prescribing decision, passes through transcription, dispensing and in-hospital administration, and then, for most outpatient prescriptions, continues into the home, where a parent or caregiver takes over responsibility for measuring and administering each subsequent dose without professional supervision. This whole-journey view is consistent with the framing adopted by the World Health Organization's Third Global Patient Safety Challenge,

Medication Without Harm, which explicitly names transitions of care — including the handover of responsibility from health professional to caregiver — as one of its three priority action areas for reducing avoidable medication-related harm (World Health Organization, 2017). Research on paediatric medication error has tended to specialize in one half of this journey or the other: hospital-based studies examine the prescribing-to-administration chain performed by health professionals, while a smaller caregiver-focused literature examines home practice after discharge. Few studies bring both halves of the same journey into a single frame of reference, drawn from the same department and the same period, which limits the field's ability to see whether the dominant risk changes character as a child's medication moves from hospital to home, or whether one risk (such as dosing error) persists across the whole journey while others are specific to one setting or the other.

This paper takes advantage of two surveys conducted concurrently within the same paediatric department — one of 89 health professionals, one of 215 caregivers — to construct that dual-informant view. It is important to state plainly what kind of comparison this is and is not. The two surveys used different instruments, were administered to two entirely distinct respondent groups (professionals were not asked about the same children as the caregivers surveyed, and vice versa), and were not designed as a matched or paired assessment of the same medication episodes. What follows is therefore a descriptive, narrative synthesis of two independently collected datasets from the same setting and period — valuable for identifying where the two informant groups' accounts of risk converge or diverge, but not a formal test of inter-rater or informant agreement, and it should not be read as one.

The specific aims of this synthesis were: (i) to compare the dominant type of error reported by health professionals against that reported by caregivers, to establish whether dose error remains the leading risk across both the in-hospital and home phases of the medication journey; (ii) to identify risk categories that appear in one informant group's account but have no direct analogue in the other, and to consider what this implies about where each type of risk actually originates; and (iii) to translate this dual-informant picture into a set of intervention priorities that are matched to the setting (hospital versus home) in which each risk actually occurs.

II. Methods

2.1 Design and data sources

This paper is a secondary, comparative synthesis of two primary descriptive cross-sectional surveys conducted in the paediatric department of a Federal Medical Centre in South-South Nigeria between February and April 2020. The first survey enrolled 89 health professionals (physicians, nurses and pharmacists) using a 19-item structured questionnaire addressing the stage and type of medication error within the clinical medication-use process. The second survey enrolled 215 caregivers of children attending the department, using a 23-item structured questionnaire addressing home medication knowledge, attitude and practice. Full methodological detail for each underlying survey, including sampling, instrument development and ethical approval, is reported in the two primary papers from which this synthesis is drawn.

2.2 Approach to comparison

Because the two instruments were not designed to be directly comparable item-for-item, comparison was restricted to categories that had a genuine conceptual counterpart across both surveys — principally, the classification of error as dose-related, route-related, timing/frequency-related, or other. This approach follows precedent set by studies that have compared multiple informant sources of patient-safety data collected independently within the same institution; for example, a comparative study in an English acute hospital found that patient-reported safety incidents captured risk categories that overlapped only partially with staff-reported incidents from the same wards, arguing for treating multi-informant data as complementary rather than substitutable (Armitage et al., 2018). Categories present in only one instrument (for example, stage of the in-hospital medication-use process, which has no caregiver equivalent, and caregiver behavioural response to vomiting or refusal, which has no health-professional equivalent) are presented as setting-specific findings rather than forced into a comparison they were not designed to support. No formal statistical test of agreement between the two groups was performed, since the surveys were not matched at the level of the individual child or medication episode. To avoid duplicating results already reported in full elsewhere, the complete demographic tables, cadre-level breakdowns and caregiver-practice frequencies are not reproduced in this paper; they are presented in full in the two companion papers (Manuscript 1 for health professionals, Manuscript 2 for caregivers), and only the comparative summary figure and synthesis specific to this paper are presented below.

III. Comparative Findings

3.1 Convergence: dose error as the shared dominant risk

As reported in full in the companion health-professional paper (Manuscript 1, Table 1 and Figure 3), dose error was the single most frequently identified predominant error type among the 89 health professionals surveyed (40.5%). As reported in full in the companion caregiver paper (Manuscript 2, Table 1), the combined

under-dose and over-dose categories accounted for the largest share of error reported by the 215 caregivers surveyed (34.5% + 34.5% = 69.0%). Rather than reproduce those tables here, this section draws out what their alignment implies when read together: although the two figures were derived from different instruments describing different phases of the medication journey, their agreement on dose error as the leading risk category suggests that dosing is not a problem confined to a single point of failure, but a risk that re-asserts itself independently at multiple, structurally unrelated points — in the hospital's prescribing-to-administration chain, and again, separately, in the home during reconstitution and dose measurement.

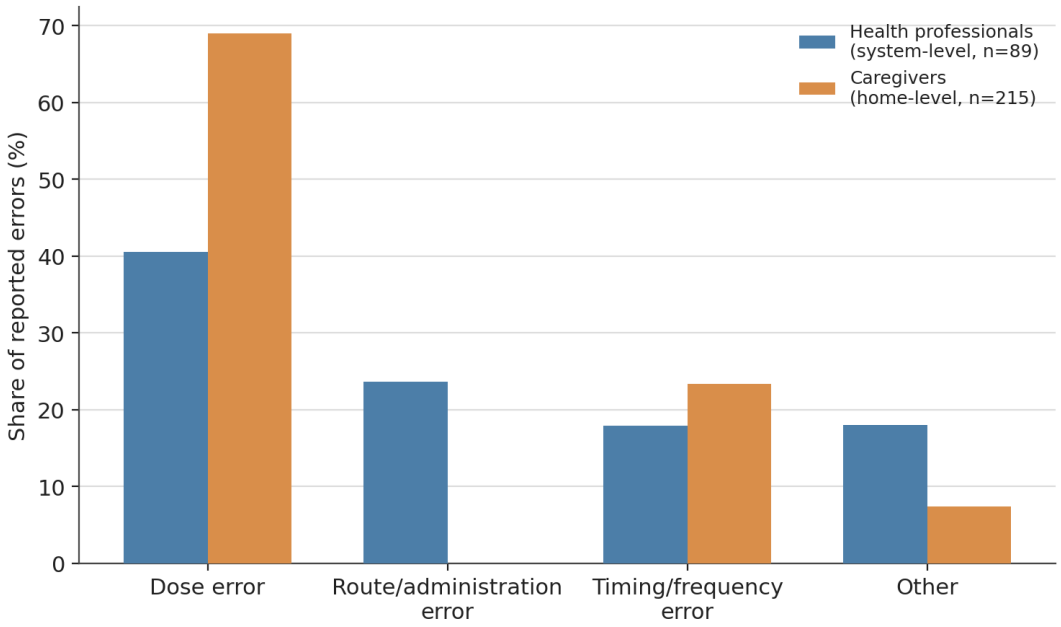

Figure 1. Share of reported errors by broad category, health professionals (system-level, n=89, as detailed in Manuscript 1) versus caregivers (home-level, n=215, as detailed in Manuscript 2). This chart is a purpose-built comparative summary and does not reproduce either companion paper's own figures; dose error is the only category with a substantial presence in both informant groups.

3.2 Divergence: setting-specific risk categories

Route error was the second most common predominant category among health professionals (23.6%, led by inappropriate route at 49.5% of route errors — see Manuscript 1, Section 3.4, for the full cadre-level breakdown), reflecting decisions and actions — selecting an intravenous versus intramuscular route, for instance — that occur exclusively within the clinical setting and have no caregiver-facing equivalent, since caregivers administering an oral medication at home do not make route decisions in the same sense. This category is therefore properly understood as a hospital-specific risk requiring a hospital-facing intervention (for example, double-checking of route at the point of administration), rather than one that a caregiver-facing intervention could meaningfully address.

Conversely, caregivers reported two behavioural risk patterns with no equivalent in the health-professional instrument (full frequencies in Manuscript 2, Section 3.4): immediate re-dosing after the child vomited a dose (41.9%) and forceful re-feeding after the child refused a dose (35.3%). These are risks that arise specifically from the caregiving context — a parent alone at home, making a judgement call in the moment, without the option of consulting a colleague or checking a chart — and they have no structural counterpart in the hospital-professional data, since a nurse or physician administering medication under supervision is not typically in the position of deciding, alone, whether to re-dose after a child has vomited.

3.3 A structural observation

One useful way to read these two independently reported findings side by side, without collapsing them into a single dataset, is that dose error appears to be an intrinsic risk of paediatric weight-based dosing itself — present regardless of who is performing the calculation or measurement, and regardless of whether that person is a trained health professional working from a chart or a caregiver working from a verbal or written instruction at home — while route error and vomiting/refusal-related re-dosing are each artefacts of the specific environment in which they occur, and consequently call for setting-specific rather than universal solutions.

IV. Discussion

The persistence of dose error as the leading risk category across both the hospital-professional and caregiver surveys, despite the two groups being asked about entirely different phases of the medication journey using different instruments, lends support to a view already present piecemeal in the literature: that paediatric dosing is uniquely error-prone not because of any single point of failure but because weight-based calculation is required at multiple, independent steps — prescribing, transcribing, dispensing, in-hospital administration, and again at home during reconstitution and measurement — each of which offers an independent opportunity for the same underlying type of mistake to occur, a mechanism explicitly described in a recent scoping review of factors associated with paediatric medication administration error, which characterised weight-based dosing as a multi-step calculation process in which each step is an independent error opportunity (Motta Robayo et al., 2026). A single intervention addressing only one of these steps, such as computerised prescribing (which addresses only the prescribing-to-transcribing interface) or improved caregiver counselling alone (which addresses only the home interface), would by this logic leave the remaining steps' dose-error risk untouched. The dual-informant picture assembled here argues for treating dose error as a cross-cutting priority requiring coordinated attention at both the hospital and home ends of the journey, rather than as a problem that either setting can solve unilaterally.

The absence of a caregiver-facing analogue for route error, and the corresponding absence of a hospital-facing analogue for vomiting- and refusal-related re-dosing behaviour, is a reminder that not every risk identified in one setting travels with the child into the other. Route error is, almost definitionally, a risk that can only arise where a health professional is making a choice about how a medication is given; it would be a category error (in the ordinary sense of that phrase) to expect a caregiver-facing intervention, however well designed, to have any effect on it. Symmetrically, the specific judgement calls a caregiver makes alone at home when a child vomits or refuses a dose — a decision point that a recent Indian tertiary-hospital survey found lacks consistent, simple guidance for caregivers, even though clinicians themselves weigh the time elapsed since ingestion when making the equivalent decision in hospital (Thangaraju et al., 2022) — are not meaningfully addressable through hospital-side interventions such as double-checking or barcode administration, since by the time this decision arises the child is no longer in a supervised clinical environment at all.

This distinction has a direct, practical implication for how a hospital department might prioritise its patient-safety resources. A programme that treats "medication error" as a single, undifferentiated target risks spreading effort evenly across risks that are not, in fact, equally addressable by the same type of intervention. The synthesis presented here suggests a more differentiated approach: dose-error-focused interventions (standardised measuring devices, explicit dose-demonstration at the point of dispensing, and independent double-checking of calculated doses) deployed at both the hospital and the caregiver-counselling interface, since this is the one risk genuinely shared across the journey — a Dutch hospital-side study found that combining automated dispensing with barcode-assisted administration measurably reduced both omission and wrong-dose errors (Jessurun et al., 2021), while an Indian home-side study found that a simple pictogram-based counselling intervention measurably reduced caregiver dosing error, including among less-educated mothers (Patidar, Mathur & Pathak, 2021), illustrating that comparable dose-error interventions exist for both ends of the journey; route-specific safeguards (checklists, independent verification of high-risk intravenous or intramuscular orders) confined to the hospital side, since this risk has no home-setting equivalent; and simple, rule-based caregiver guidance for managing vomited or refused doses — for example, a clear, easily remembered time-based rule for redosing after vomiting, informed by work such as Thangaraju et al. (2022) — delivered specifically at the point of discharge or dispensing, since this risk has no hospital-side equivalent and will not be touched by any purely in-hospital intervention.

4.1 Limitations

This synthesis has two main limitations. First, because the two underlying surveys used different instruments and were not administered as a matched assessment of the same medication episodes, no formal statistical test of agreement between the two informant groups could be performed; the comparison offered is a descriptive juxtaposition useful for generating hypotheses, not a confirmatory test of discordance. Second, both underlying surveys carry the single-centre, convenience-sampling and self-report limitations already noted in the two primary papers from which this synthesis is drawn.

V. Contribution to Knowledge

This synthesis adds to the paediatric medication-safety literature in the following specific ways:

- It is, to the authors' knowledge, among the first Nigerian analyses to place a health-professional error survey and a caregiver home-practice survey from the same department and period side by side, making explicit which risks are shared across the hospital-to-home journey and which are confined to one end of it.
- It identifies dose error as the one risk category that independently re-emerges in both the clinical and the home setting, providing an evidence-based rationale for prioritizing dose-focused intervention

(standardized devices, dose demonstration, independent double-checking) at both ends of the medication journey rather than at either end alone.

- It draws an explicit, practical distinction between error categories that require a hospital-facing intervention (route error, administration-stage risk) and those that require a caregiver-facing intervention (vomiting- and refusal-related re-dosing behaviour), a distinction that is easy to state in principle but rarely made operational with matched, same-setting data.
- Methodologically, it demonstrates and is transparent about the boundary between a legitimate descriptive synthesis of two independent datasets and a formal statistical test of informant agreement, a distinction that is important for the wider literature on multi-informant medication-safety research and that this paper does not overstate.

VI. Conclusion

Read side by side, the health-professional and caregiver surveys from this paediatric department converge on one clear, shared priority — dose error — and diverge in ways that map cleanly onto the setting in which each risk actually occurs: route error and administration-interruption risk on the hospital side, and vomiting- or refusal-related re-dosing behaviour on the home side. A patient-safety strategy for this department, and plausibly for comparable Nigerian tertiary paediatric services, would be best served by treating dose error as a genuinely cross-cutting target addressed at both ends of the medication journey, while directing route-related and caregiver-behavioural interventions specifically to the setting in which each actually arises.

References

[1]. Armitage G, Moore S, Reynolds C, Laloe PA, Coulson C, McEachan R, Lawton R, Watt I, Wright J, O'Hara J. Patient-reported safety incidents as a new source of patient safety data: an exploratory comparative study in an acute hospital in England. J Health Serv Res Policy. 2018;23(1):36–43.

[2]. Jessurun JG, Hunfeld NGM, Van Rosmalen J, Van Dijk M, Van den Bemt PMLA. Effect of automated unit dose dispensing with barcode scanning on medication administration errors: an uncontrolled before-and-after study. Int J Qual Health Care. 2021;33(4):mzab142.

[3]. Motta Robayo CL, Martínez Pinto J, Tabango Goyes B, Varela Chagüendo L, Duque Grisales E, Ballesteros-Ramírez R. Factors associated with medication administration errors in hospitalized pediatric patients: a scoping review. Ther Adv Drug Saf. 2026;17. doi:10.1177/20420986261478390.

[4]. Patidar P, Mathur A, Pathak A. Can use of pictograms reduce liquid medication administration errors by mothers? An interventional study. BMC Psychol. 2021;9:99.

[5]. Thangaraju P, Natha JS, Venkatesan S, Tanguturi Yella SS. A survey from a tertiary care hospital in India on pediatric medication re-dosing practices after patient vomiting. J Pediatr Pharmacol Ther. 2022;27(5):457–462.

[6]. World Health Organization. Medication Without Harm: Global Patient Safety Challenge on Medication Safety. Geneva: World Health Organization; 2017.