

# Accuracy and Completeness of Medication Histories in Patients in Medical Admission Ward at University Teaching Hospital

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## ABSTRACT

**Background:** Quality documentation of medication histories at the time of hospital admission with regard to accuracy and completeness is not documented at the University Teaching Hospital (UTH), in Zambia. Our study aimed to assess the accuracy and completeness of medication histories obtained in patients upon hospital admission.

**Materials and Methods:** We conducted a prospective cross-sectional study at medical admission ward, University Teaching Hospital, over a period of 3 months. Our study enrolled 322 patients admitted to this ward who were above 18 years of age and could communicate verbally, if not, were accompanied by a caregiver. These patients' clinical records were screened to review all medications the patient was taking, and patients/caregivers were interviewed to obtain a complete medication history. All information obtained from patients through interviews was compared with medications recorded in the patient's clinical records when admitted to the hospital. The Statistical Package for Social Sciences (SPSS) version 22 was used for all statistical calculations.

**Results:** Of 287 clinical records, 175 (61%) incidents of inaccurate medication histories at the time of admission were identified, and that medication histories in clinical records of patients were incomplete or poorly documented.

**Conclusion:** Our study shows that 61% of medication histories in patients at the time of admission to hospitals are inaccurate. Quality documentation of medication histories in clinical records at the time of hospital admission is poor.

**Keywords:** Accuracy of medication history, complete medication history, medication history, Medication, Medication discrepancy

## INTRODUCTION

Medication-related hospital admissions account for 2–4% of all admissions in Australia, with higher rates (above 30%) in the elderly above 75 years, for unintended admissions, most of which are preventable.<sup>1</sup> A medication history is a detailed, accurate and complete account of all currently and recently prescribed and non-prescribed medications that a patient had taken before a newly established or ambulatory care. Globally, inaccurate and incomplete medication histories at hospital admission do exist with a high rate of errors<sup>2</sup> which can considerably harm patients.<sup>3</sup> Studies done in North America, Europe, Australia and Asia to describe the extent of inaccurate medication histories at the time of hospital admission showed that up to 67% of patients under study have at least one medication history error.<sup>2,4,5,6,7,8,9</sup> Abu -Yassin and Colleagues reported a relatively scanty published literature on this subject in Africa.<sup>9</sup>

Barnsteiner foresaw the need for a study on all parts of the medication reconciliation process to provide an evidence base for addressing adverse drug events.<sup>10</sup> A recent study showed that in Saudi Arabia, inaccurate medication histories at the time of hospital admission were common; however, the results might be considerably different in other developing countries as studies of this nature are lacking.<sup>9</sup> Cornish *et al.* believed that better methods to ensure accurate admission medication histories were needed to improve patient care and minimise adverse drug events. Greenwald *et al.*<sup>11</sup> supported the need for studies to assess the potential solutions to overcome these and other common barriers.<sup>12</sup> A study done at a tertiary care teaching hospital by Cornish and Colleagues in Canada in 2003 on patients admitted to the general internal medicine units with 151 eligible patients showed that 54% had medication history errors. From these,

39% had the potential to cause moderate to severe discomfort or clinical deterioration.<sup>11</sup> Unroe *et al.* upon examining 205 patient records of a tertiary care academic teaching hospital in Durham, North Carolina in 2005 found that while 178 patients had medications listed, 23% of these had one or more discrepancy identified on admission; 19% of these were considered to be potentially harmful.<sup>8</sup> In a study carried out in 2009 at a 1200 bed tertiary hospital in Riyadh, Saudi Arabia, by Abu-Yassin *et al.*, 37% of patients were found to have at least one discrepancy in their admission medication histories, with the most common being omissions of medications (35%) and dosage errors (35%).<sup>9</sup> In Nigeria, a low level of medication history documentation was reported in patients before admission.<sup>13</sup>

Our study intended to assess the accuracy and completeness of medication histories obtained in patients upon hospital admission. An accurate and comprehensive medication history taking the approach that included an interview, inspection of medication containers or lists, or both, documenting the patient's medication history was used, and this was compared with medications recorded in the patient's clinical records (i.e. medical notes and drug chart) at the time of admission to the hospital.

## MATERIALS AND METHODS

Our study was a cross-sectional study conducted at the University Teaching Hospital, Medical Admission Ward, Lusaka, from January 2015 to March 2015. A total of 322 participants meeting the eligibility criteria of 18 years of age and above, able to communicate verbally, if not, were accompanied by a caregiver were included. Participants, less than 18 years of age, unable to consent, outpatients and those in isolation rooms were excluded from the study.<sup>11</sup>

Patients were identified from the Medical admission register. If eligible, interviews were conducted, including examining medication vials (if available) to obtain a complete medication history. The interviews were conducted generally on the day after the admission at the bedside of the patient. Patient's clinical records were screened to review all medications the patient was on before hospital admission. Data obtained from interviews was compared with that on the patient's clinical records.<sup>5,9</sup>

A Statistical Package for Social Science (SPSS) software, version 22 (SPSS Inc., Chicago, IL, USA) was used to analyse data. For open-ended questions and clinical notes reviews, data was captured, analysed qualitatively and then entered quantitatively into SPSS. Data were expressed as frequency and percentage and presented using tables. A cross-tabulation of Accuracy of medication histories and Completeness of documentation was executed using the Pearson chi-square test,  $p < 0.05$  was considered statistically significant.

Fully informed written consent was sought from all participants following the study's clearance from ERES CONVERGE IRB Ethics Committee (Ref. No. 2014-Sept-009) and the University Teaching Hospital management.

## Definitions

Our definition of an accurate medication history was based on the definition by Gleason *et al.*<sup>14</sup> "A complete matching of the medication name, dose, route and frequency of the two lists, i.e. one obtained by the admitting physician and that obtained after admission through interviews and other sources by another clinician, e.g. pharmacist."

Complete medication history encompassed all currently and recently prescribed medications (including vaccines, diagnostic and contrast agents, radioactive medications, parenteral nutrition, blood derivatives, and intravenous solutions), samples from your doctor, and any medications bought without a prescription, including over-the-counter medications (OTC), vitamins, and herbal supplements.<sup>14,15</sup>

We used the Joint Commission 2010's definition of medication as "any prescription medications, sample medications, herbal remedies, vitamins, nutraceuticals, vaccines, or OTC; diagnostic and contrast agents used on or administered to persons to diagnose, treat, or prevent disease or other abnormal conditions; radioactive medications, respiratory therapy treatments, parenteral nutrition, blood derivatives, and intravenous solutions (plain, with electrolytes or drugs); and any product designated by the Food and Drug Administration (FDA) as a drug."<sup>16</sup>

We adopted Collins *et al.*<sup>17</sup> definition of medication discrepancy. "Any aspect of medication prescribing not recorded by the admitting physician but is recorded in the pharmacy researcher-acquired medication history."

## RESULTS

### *Characteristics of the study participants*

Of the 322 patients that met the eligibility criteria, 154 (47.8%) were male, 27 (8.4%) were not on any medications before hospital admission, and 25 (7.8%) patients did not have any medication histories in their clinical notes hence, the accuracy of medication history was not determined in such. We interviewed 171 (53.1%) patients and 151 (46.9%) caregivers.

### *Determination of accuracy of medication histories at the time of hospital admission*

Of the 287 medication histories, 112 (39.1%) were accurate as no discrepancies were noted in medication name, dose, route and frequency of administration (Table 1).

Table 2 shows the number of discrepancies (inaccuracies) that were identified during the review of clinical records. The most common discrepancy was medication omissions at 27.2%, while dose omission, route, and administration frequency at 11.8%, 18.5% and 11.8% respectively. More than one discrepancy per medication history was reported in some instances; therefore, they were grouped under others (8.4%). In some cases, patients were issued with prescriptions without the medications being captured in their clinical records (10.8%). Some medications were documented on drug charts and not in medical notes (4.9%) and vice-versa (2.1%).

### *Determination of completeness of documentation of medication histories in clinical records at the time of admission*

The study showed that medication histories in patients' clinical records in the medical admission ward were poorly documented, as shown in Table 3. POM, OTC, and CAM accounted for 55%, 12.4% and 7.5% respectively, whereas, Social history, ADRs and allergies were documented in 12.7%, 2.2% and 1.9% respectively. Adherence and other groups (such as samples, vaccines, and ENT) were recorded in 0.3% and 0.6%. Of the 322 clinical records, 7.8% did not have medication histories indicated.

### *Determination of the association between accuracy and completeness of documentation of medication histories in clinical records at the time of admission.*

There was an association between accuracy and completeness of documentation of medication histories in clinical records at the time of admission ( $p=0.001$ )

## DISCUSSION

### *Determination of accuracy of medication histories at the time of hospital admission*

Our study shows that medication histories in patients at the time of hospital admission are inaccurate. Of the 287 medication histories examined, 61% were inaccurate. This was consistent with the findings of a systematic review of 22 studies undertaken by Tam *et al.*, which reported medication history errors to vary between 10 and 67%.<sup>2</sup> The study carried out by Miller and Colleagues found a much higher percentage (96%) probably due to a longer medication reconciliation period (1-8 days) that was involved,<sup>18</sup> unlike most studies (within 72 hours of admission).<sup>9,11</sup>

Our study found at least one medication history discrepancy present in 61% medication histories. The predominate discrepancy was medication omissions (27.2%) although it was lower than what other pooled data from other studies like Cornish *et al.* (46%) and Crook *et al.*, (90%) showed.<sup>7,11</sup> The results of our study also have shown discrepancies in dose omission, route, and frequency of administration at 11.8%, 18.5% and 11.8% respectively

During the interviews, some of the patients' medications were still taking were identified as we also inspected medication containers. It was noticed that these medications were not captured anywhere in clinical records (10.8%). In some cases, patients were issued with prescriptions without the medications being captured in their clinical records.

The outcome of the review of the clinical records further demonstrated that admitting physicians documented medications on drug charts and not in medical notes (4.9%) and vice-versa (2.1%). This is in line with what Collins *et al.* found in their U.K. study.<sup>17</sup> Medications were documented in medical notes without indicating the dosage, route and the frequency of administration (8.7%); however, some of these were captured on the drug charts. We found physicians overlooking dose, route, and frequency of administration at 11.8%, 18.5% and 11.8% respectively in clinical notes corresponding to what was obtained in a study by Miller and Colleagues.<sup>18</sup>

In a similar study in Slovenia, Re'onjaet *al.* reported more than one discrepancy per medication history similar to this study, this was difficult to analyse (therefore, were grouped under others).<sup>19</sup> Other discrepancies (8.4%) included wrong frequency of administration, wrong drug descriptions or names, incomplete dose, and differences between clinical notes.

#### *Determination of completeness of documentation of medication histories in clinical records at the time of admission*

This study provides evidence that medication histories in clinical records at the time of hospital admission at UTH are incomplete. There was poor documentation of POM, OTC and CAM accounting for 55%, 12.4% and 7.5% of completeness respectively. Social history, ADRs and allergies were documented in 12.7%, 2.2% and 1.9% respectively. Adherence and other groups (such as samples, vaccines, and ENT) were recorded in 0.3% and 0.6%. The results of our study are comparable with those of Yusuf, and Awotunde although study designs were different.<sup>13</sup> Equally, Re'onjaet *al.* reported a high level of incomplete information on drug use in the medical record.<sup>19</sup> A study that was conducted by Unroe *et al.* showed that 13.2% of patients did not have their medications recorded on admission, whereas in this study 7.8% did not have medication histories in their clinical records.<sup>8</sup> Some limitations were identified with the study. The study was conducted at a single centre (Medical admission ward); this made it difficult to generalise the findings to other hospitals. Of the 334 eligible participants, 322 gave a full response.

This study's findings showed that medication histories in clinical records of patients at the time of admission to hospitals are generally inaccurate (61%) and incomplete. It can also be concluded that the completeness of medication history documentation affects medication history accuracy ( $p = 0.001$ ), as shown in Table 4.

Based on the study's findings, the authors recommend using a standardised form to be used by physicians on admission, which should capture all the requirements of complete medication history. This should be attached to the patients' file, where the information will be accessible (Table 5). Admitting physicians need to be sensitised about the importance of recording an accurate and complete medication history of the patients.

Clinical pharmacists should be engaged in documenting medication histories of patients on

admission. This has been indicated by several studies that have been done in most developed countries.<sup>9,20,21,22</sup>

There is a need to carry out a study at multi centres for the results to be generalised and to know the association between the level of practice and drug history taking.

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## ANNEX

**Table 1: Accuracy of medication histories at the time of hospital admission.**

	Frequency	Percent
Accuracy	112	39.07
Inaccuracy	175	60.97
Total	287	100

**Table 2: Types of discrepancies**

Type of discrepancy	Frequency	Percent
Medication Omissions	78	27.2
Dosage omission	34	11.8
Route omission	53	18.5
Frequency omission	34	11.8
Meds* on chart but not doc** in notes	14	4.9
Meds* in notes but not doc** on chart	6	2.1
Meds* identified from interviews but not in Clinical records	31	10.8
Wrong dose	8	2.8
Meds* doc** in notes with no dose, route and Others	25	8.7
	24	8.4

**Table 3: Completeness of documentation of medication histories**

Prescription-only medications	177	55
Over-the-counter	40	12.4
Complementary and alternative medicines	24	7.5
Social history (alcohol, smoking, illicit drugs)	41	12.7
Adverse drug reactions	7	2.2
Allergies (food, drugs, chemicals)	6	1.9
Adherence	1	0.3
Others	2	0.6

**Table 4: Association between the accuracy of medication histories and completeness of documentation**

	Value	df	Standard deviation
Pearson chi-square	140.322 <sup>a</sup>	6	0.001
Likelihood ratio	89.199	6	0.000
N of Valid cases	322		

**Table 5: Proposed Medication History Documentation Form**

**MINISTRY OF HEALTH**

**University Teaching Hospital, Private Bag R.W. 1X, Lusaka**

*This form must be completed by practitioners clerking in patients on admission and filed in the patients file. Additional information can be added as it becomes available.*

<b>Patients' details</b>				<b>Allergies: (Tick and include reaction details)</b>	
Name:.....				Medication ( ).....	
Date of birth:.....				Chemicals ( ).....	
File No:.....				Food ( ).....	
<b>Source of information: (Tick)</b>					
Patient ( ) / Caregiver ( )			Patient's own medicine ( )		
Recent discharge ( ) date.....			Repeat prescription ( ) date.....		
Other ( ) specify.....					
<b>Medications on admission (including herbal, vitamins and over-the-counter)</b>				<b>Comments and changes on admission</b>	
Medication name	Dose	Route	Frequency	Comments, e.g. reasons why any medication is not prescribed	

<b>Additional information needed:</b>	
<b>Social history: (Tick)</b>	<b>Adherence: (Tick)</b>
Alcohol ( )	Poor compliance ( )
Smoking ( )	Medications recently stopped/courses completed ( )
Illicit drugs ( )	Patient brought medicines to the hospital ( )

	Print name	Designation	Signature	Date	Time
Completed by					
Amendments made by					