

## Time and motion study for pharmacists' activities in a geriatric hospital

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### Abstract

**Objectives** This study aimed to identify and quantify activities undertaken by pharmacists in a geriatric hospital.

**Methods** A data collection form was developed, validated and tested for applicability and practicality. Pharmacist activities were organised into three categories: Clinical, Administration and Others. Clinical activities incorporated patient discharge, patient admission, checking the ward controlled drugs record book, emergency trolley and patient medication trolley, prescription monitoring, ward round, discussion with health care professionals, and other professional activities; Administration activities included checking the ward medication stock and medication order; Others included break and inactive time. Observers conducted 6000 min of direct observation using a time and motion technique and observed the work activities of three pharmacists on three wards. Data were analysed using Microsoft Excel 2007 and SPSS version 16.0. Descriptive statistics were carried out.

**Key findings** The time dedicated to Clinical activities was 3636 min (60.60%), Administration activities 1646 min (27.43%) and Others 718 min (11.97%). When considering total time in minutes for Clinical and Administration activities, ward round (1348 min), medication order (1255 min), patient discharge (723 min) and prescription monitoring (562 min) occupied most of the pharmacists' time. Ward round activities were subdivided into: patient profiling (545 min), actual ward round (668 min) and conference (135 min).

**Conclusions** The time and motion study indicated that the pharmacists' time is mainly allocated to clinical activities. However, there is still a large proportion of time taken up by administrative activities, which can be conducted by non-pharmacist personnel, allowing more time to be directed to patient care.

**Keywords** clinical pharmacy; direct observation; time and motion study; ward round

### Introduction

Studies to describe and evaluate impact of activities undertaken by clinical pharmacists have been carried out.<sup>[1–4]</sup> However, time and motion studies by direct observation to quantify the time taken for clinical pharmacy interventions are less well documented.<sup>[5]</sup> Such studies may be undertaken to identify activities carried out by pharmacists in the community<sup>[6–9]</sup> and hospital setting.<sup>[4,10]</sup> The objective of this study was to carry out a time and motion study by direct observation to identify and quantify activities undertaken by pharmacists at Zammit Clapp Hospital (ZCH).

### Methods

ZCH is a 60-bed hospital specialising in geriatric medicine. The Pharmacy Department staff consisted of three pharmacists each responsible for a ward. One ward consists of 10 patient beds whereas the other two wards each have 25 patient beds. Ward rounds are held once a week on each ward. A patient profile is prepared by the pharmacist upon admission and is updated daily during the prescription monitoring process. Using the profile, the pharmacist identifies pharmaceutical care issues to be discussed with the other health care professionals in the team during the ward round. The conference is held after the ward round during which the patient is reviewed by the team in an office setting. Progress of the patients

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is discussed and discharges are planned. Attendance by the pharmacist is subject to pharmacist availability.

Consent to carry out the study was obtained from the ZCH Research Committee. The observers (FW, MM (see Acknowledgement<sup>a</sup>)) attended ZCH for 1200 min of pre-orientation visits on 5 days to observe the work activities of the pharmacists. A list of these activities was compiled and a data collection form was developed to document the observations. Face and content validity testing of the form was undertaken by the pharmacists at ZCH and a pharmacist in academia. Amendments suggested were implemented.

The final data collection form organised pharmacist activities into three categories: Clinical (must be performed by a pharmacist), Administration (may be performed by competent non-pharmacist personnel under pharmacist supervision), and Others (break time and inactive time). Clinical activities incorporated patient discharge, patient admission, checking the ward controlled drugs record book, emergency trolley and patient medication trolley, prescription monitoring, ward round, discussion with health care professionals, and other professional activities; whereas Administration

activities included checking the ward medication stock and medication order (Tables 1 and 2). Checking the patient medication trolley was classified as Clinical as the pharmacist checks the patient medication drawer in the trolley against the patient ward prescription sheet to review patient drug therapy and minimise risk of medication errors. Emergency trolley checking was classified as Clinical since according to hospital policy it must be checked and sealed by a pharmacist and every transaction related to this trolley should be documented.

A pilot study was carried out to test the practicality of the data collection form and the applicability of the classification system. The observers conducted 1200 min of observation, observing the work activities of the three pharmacists on the wards continuously on 3 days. The time taken for each activity observed was recorded under the correct division in the data collection form.

No major changes to the data collection form were required after this pilot and these 1200 min were included in the total 6000 min of observation. Data were analysed using Microsoft Excel 2007 and SPSS version 16.0 and descriptive statistics carried out.

**Table 1** Descriptive statistics for Clinical activities

Divisions/sub-divisions of data collection form	n	Total time (min)	Range (min)	Percentiles (min)		
				25	50	75
<b>Patient discharge</b>						
Checking and printing discharge letter	14	66	2–10	3.00	3.00	7.00
Checking applications for free medications/medical devices	9	93	3–25	5.50	9.00	13.50
Preparation of discharge medication information sheet	10	219	4–37	17.50	20.50	31.25
Preparation of discharge medications	15	142	3–19	5.00	8.00	15.00
Discharge counselling to patient and/or carer	16	203	5–26	8.25	10.00	18.50
<b>Patient admission</b>						
Checking drawers in patient medication trolley with ward prescription sheet and labelling medication containers	16	87	2–15	3.00	5.00	6.00
Initial filling of patient profiles	16	150	4–22	5.25	8.00	11.50
<b>Checking ward controlled drugs and trolleys</b>						
Ward controlled drugs record book	22	67	1–6	2.00	3.00	4.00
Emergency trolley	22	36	0.33–10	0.33	0.50	0.85
Patient medication trolley	22	252	4–22	7.00	10.00	15.25
<b>Prescription monitoring</b>						
Checking medication amendments with ward prescription sheet and updating patient profiles	22	562	12–45	20.00	25.00	30.25
<b>Ward round</b>						
Detailed patient profiling	11	545	10–100	35.00	50.00	60.00
Actual ward round	5	668	60–170	97.50	150.00	161.50
Conference	2	135	35, 100 <sup>a</sup>	35.00	67.50	100.00
<b>Discussion with health care professionals</b>						
With pharmacist	9	85	2–25	3.50	7.00	13.50
With nurse	17	87	2–12	3.00	5.00	6.00
With doctor	15	106	2–20	4.00	6.00	8.00
Other health care professionals	2	10	3, 7 <sup>a</sup>	3.00	5.00	7.00
<b>Other professional activities</b>						
Discussion with patient carer after discharge	4	41	5–16	5.50	10.00	15.25
Student demonstrations/teaching	1	55	55 <sup>a</sup>	55.00	55.00	55.00
Preparation of medications for hospital staff	2	11	2, 9 <sup>a</sup>	2.00	5.50	9.00
Dispensing of prescriptions for day hospital	1	16	16 <sup>a</sup>	16.00	16.00	16.00

<sup>a</sup>Actual values.

**Table 2** Descriptive statistics for Administration activities

Divisions/sub-divisions of data collection form	n	Total time (min)	Range (min)	Percentiles (min)		
				25	50	75
Checking ward medication stock						
Main medications cabinet	22	278	4–25	9.75	11.50	15.50
Injections cabinet	22	72	1–5.5	2.00	3.50	5.00
Refrigerator	22	27	0.33–2.33	1.00	1.00	1.25
Nutrition supplements	22	14	0.33–1.08	0.50	0.67	0.71
Medication order						
Preparation of medications/medical devices for ward	22	403	5–50	10.00	17.00	23.00
Delivery of medications to ward	22	254	5–23	8.75	10.00	15.00
Organisation of bulk orders for pharmacy main store	9	196	9–35	12.00	20.00	31.00
Recording orders in written forms	22	97	2–12	3.00	3.50	5.00
Entry of forms into computer system	8	305	15–60	25.00	37.50	53.75

## Results

The 6000 min of observation were divided into: 3636 min (60.60%) for Clinical activities, 1646 min (27.43%) for Administration activities, and 718 min (11.97%) for activities in the Others category. For the Clinical and Administration activities, ward round (1348 min; 22.47%), medication order (1255 min; 20.92%), patient discharge (723 min; 12.05%), prescription monitoring (562 min; 9.37%) and checking of ward medication stock (391 min; 6.52%) were predominant.

Tables 1 and 2 show the sample size (*n*), total time, range and percentiles (25th, 50th and 75th) for each activity sub-division.

## Discussion

The time and motion study provided information on workload distribution of pharmacists at ZCH and indicated that clinical activities particularly ward round, prescription monitoring and patient discharge activities occupied most of the pharmacists' time. This study gives an insight into the work distribution of pharmacists and uses a direct observation method. The findings do not rely on reporting by pharmacists but rather on how the time is actually spent. The weaknesses of the study are that the observation was carried out over 100 h for the three pharmacists, which could have been extended. Also, the impact of the clinical activities on patient outcome was not assessed. The time and motion study technique adopted for the study required an observer observing the pharmacist continuously. This has two drawbacks: it is time-consuming and could influence the pharmacist's work patterns.

In a 3-month self-reporting study carried out by Montazeri and Cook<sup>[2]</sup> in a 15-bed medical-surgical intensive care unit of a Canadian hospital, most of the clinical pharmacist's time was spent on interventions, intensive-care-unit rounds and profile review. In another study by Robinson and Stump<sup>[3]</sup> carried out by self-reporting over 2 weeks in four decentralised practice sites in a US hospital, clinical pharmacists spent the largest percentage of their time on profile review. The results from this local study are comparable to these reports since most of the pharmacists' time at ZCH was taken

up by activities involving reviewing and updating patient profiles.

In the study by Robinson and Stump,<sup>[3]</sup> other prominent activities were the retrieval of laboratory data, therapeutic drug monitoring and pharmacokinetic calculations. These activities were not included as separate activities in our study since they were not identified as significant activities by the pharmacists during the pre-orientation visits. This could be an area which should be developed further by the hospital pharmacists locally.

Evidence from our study indicates that pharmacists find themselves performing activities that are not necessarily clinical tasks. For optimal utilisation of pharmacist expertise, administrative tasks should take up a minimum of the pharmacist's time and clinical tasks should be performed as efficiently as possible. Yet, although it is important for hospital pharmacists to allocate most of their time to clinical activities, the administrative activities cannot be completely abolished. Within the administrative activities, issues relating to availability and accessibility of medicines are handled and such information is important if pharmacists are to contribute fully to individual patient care at the clinical level.

## Conclusions

This time and motion study indicated that pharmacists' time is mainly allocated to clinical pharmacy activities. However, there is still a large proportion of time taken up by administrative activities which can be conducted by non-pharmacist personnel such as trained pharmacy technicians, allowing more time to be directed to patient care.

## Declarations

### Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

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