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QUANTIFICATION OF THE AMOUNT OF TIME SPENT IN VARIOUS PATIENT CARE ACTIVITIES AMONG DOCTORS IN PEADIATRIC WARDS OF HOSPITALS IN NAIROBI COUNTY

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ABSTRACT

Background: **This paper presents work sampling study among doctors in selected hospitals of Nairobi County in Kenya. Among the activities doctors perform in their work some contribute directly to patient care, some indirectly and others not at all. With changing landscape in doctor patient relationship more attention is being paid to documentation, patient education and consultation with colleagues. Most work sampling studies among health workers in hospitals have been done on nurses with few studies done among on doctors.**

Objective: **The study sought to determine the difference in the proportion of time required to carry out activities by doctors that contribute directly, indirectly or not at all to patient care in paediatric wards of the hospitals under study.**

Design: **Work sampling study**

Setting: **Paediatric Wards of four hospitals in Nairobi County, Kenya namely Kenyatta National Hospital (KNH), Aga Khan University Hospital, Nairobi (AKUH, N), St. Mary's Mission Hospital (SMMH) and Mbagathi District Hospital (MDH).**

Materials and Methods: **Key informant interviews were used to establish the different types of activities that physicians carry out in their daily routine. The results of the interviews helped design the work sampling study which was carried out using an Observation Schedule & Work Sampling Data Collection application tool. The data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 22.**

Results: **A total of 6188 observations were made out of which 79.0 % (4,890) were for direct patient care activities, 12.5 % (771) were for indirect patient care activities and 8.5% (527) were allowance activities. Documentation and Daily patient rounds consumed the highest proportion of total man hours (28.3% and 21.7% respectively). Significant correlation was found between direct patient care activities and ward occupancy (p= 0.001). No Significant correlation was found between indirect patient care activities and ward occupancy (p= 0.345).**

Discussions: **Direct patient care activities consume more time than other categories of patient care activities; Documentation of care given consumes the highest proportion of time among individual patient care tasks inexcess of even daily patient round.**

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INTRODUCTION

Time Motion Studies and work sampling techniques are the basic techniques used for data collection in studies for estimating the amount of time required for work activities by personnel in both manufacturing and service industries.

Researchers have distinguished between time motion studies and work sampling Methods of studying work activities(1). Work sampling method collects data at intervals of time while the time-and-motion technique uses an observer who records the exact amount of time being devoted to each task and is a more labor intensive approach but yields more accurate results.

Work sampling technique can be carried out through observation or self-reporting. Comparison between self-reported and observational work sampling techniques as applied to ward-based nurses found self-reported technique not a reliable method for obtaining an accurate reflection of the work (2). Work sampling technique has been found to yield 20 percent more estimated time in studying work activities in a health care setting as compared to time motion studies(1).

Work sampling is cost effective as one observer can be used to study the activities of several personnel. It also reduces the Hawthorne effect since there is no one to one observer to subject ratio. With work sampling the study can be interrupted without significant effect to the results. It has become the method of choice when studying work activities among health workers especially within hospitals. (4) Extensive use of both methods is evident in research literature to quantify duration of tasks for medical and allied staff in the work environment for Human Resources Planning purposes (5,6,7,8). Gilchrist et al when carrying out time motion studies to assess a doctors' activities in a typical work day, were able to show that Patient Care delivery activities extend beyond direct patient contact(9). Earlier studies focusing on physician work activities have been done (12,13).

These studies have employed work sampling techniques. Accurate estimation of health workers' activity based work load facilitates better human resources planning which in turn has an impact on patient outcomes. The benefits on patient safety of using a systematic method of staffing was has been demonstrated in a prospective cohort study over an eight year period from the year 2002 by Diane et al who showed a reduction in nine nursing – sensitive indicators following the implementation of the Nursing Hours Per Patient Day (NHPPD) staffing method in Australia. (Error! Reference source not found.).

The use of this staffing method was associated with lowered mortality rates and lower morbidity rates of pneumonia, deep vein thrombosis, sepsis, pressure ulcers, physiologic and metabolic derangements among others.

MATERIALS AND METHODS

The study design employed Work Sampling methodology. Work sampling is a method of finding the percentage occurrence of a certain activity by statistical sampling and random observations. It involves the statistical technique for determining the proportion of time spent by workers in various defined categories of activity (for example setting up for a procedure, taking patient history, forced waiting…etcetera.)(Error! Reference source not found.) The work sampling study was observational in nature. This meant that the researcher records information about the subjects without manipulating the study environment.

Pre Survey Data Collection on Variables

Preliminary analysis (Departmental Survey) of the department was done including a review of the physical layout of the Patient Care Areas; the patient care processes and procedures; department work schedules, schedules of administrative and clinical meetings, services offered to other departments.

This analysis was carried out for each department to be surveyed.

Survey Data Collection on Variables

Data was collected regarding these variables using the work sampling method in a 3 - stage cross sectional study.

Stage one (1) involved carrying out a questionnaire survey of doctors working in the department. A list of all the activities carried out in a department was compiled after carrying out key informant interviews among the doctors working in a department. The interview employed use of an orally administered questionnaire to establish the different types of activities that physicians carry out in their daily work and the approximate length of time each activity takes. The activities were classified into Primary and Secondary Categories after consultation with senior doctors in the department and on the basis of past studies. This obtained a subjective assessment of the amount of time required to carry out both the direct and indirect patient care activities. The results of the survey helped design the work sampling study tool.

Stage two (2) involved observing and collecting study variables data in an objective manner using the work sampling methodology. In this methodology the doctors were each assigned an identification number label at the beginning of each shift. A "floor mapping" form was filled which indicated where each of the labelled doctors was working. Then at predetermined intervals of every fifteen minutes the observer made a round of the work area and identified the action being performed at the time of observation. The observer recorded the following data on an Observation Schedule and Data Collection Tool:

    i.   Time of observation

    ii.   Doctor's identification number

    iii. The performed activity number (activity code)

    iv. Specific remarks for further clarification if required

The work sampling was done for a maximum of two working weeks including all the days of the week Monday through to Sunday. The required number of observations needed was informed by the sample size determination calculations.

Stage three (3) involved analyzing the data collected in phase two to come up with descriptive statistics of the proportion of total time spent in per patient care activity identified in the key informant interviews. The data collected was entered into an Excel sheet suing MS-Excel 2013 and each response coded in order to identify it uniquely. Once entered crosschecking was done in order to assure consistency.

Data entry and Storage and Coding was done followed be development of data categories and themes. Data reduction where essential elements of the data was extracted followed. Finally Authenticating of the data and drawing of conclusions concluded the analysis. Further analysis was done using SPSS version 22.The study was carried out among Paediatric Wards of four hospitals in Nairobi County, Kenya.

Two of the hospitals are classified as Tier IV namely Kenyatta National Hospital (KNH) and Aga Khan University Hospital Nairobi (AKUH,N). The former is a state owned public hospital while the latter is a private hospital. Both are teaching and referral status hospitals. The other two are classified as Tier III Hospitals namely St. Mary's Mission Hospital(SMMH) and Mbagathi District Hospital (MDH). The mission hospital is privately owned while the district hospital is public. Tier I & II facilities were excluded since they do not have in patient services.

RESULTS

Table 1 highlights the patient care activities categories that were identified through key informant interviews. They were classified into three categories namely Direct Patient Care Activities, Indirect Patient Care Activities and Allowance activities. A total of 14 Patient Care Related Activities were identified falling into three broad categories. Allowance Category with threeactivity Types, Direct Category with six activity Types and Indirect Category with five activity Types.

Table 1

Patient Care Activities

Direct Patient Care activities	Indirect Patient Care Activities
• Consulting with Colleagues • Documentation • Emergencies • Patient Assessment & Reassessment • Daily Rounds • Ward Procedures	• Academic • Clinical Meetings • Admin Duties • Quality Improvement • Out Of Department Service
Allowance Activities	
• Personal (bathroom, food) • Study/course work • Miscellaneous	

The data collection was done in Seven days in each Ward. Total numbers of days were 56 however after cleaning a salient outlier entry was deleted ending up with 55. The locations encompassed Public and Private facilities with Paediatric Inpatient Units and the distribution is as shown in Table 2

Table 2

Sample profile

	Workdays Sampled	Number of Observations	Proportion observations	Direct Activity %	Indirect Activity %	Allowance Activity %
Total	55	6181	100%	79.0%	12.5%	8.5%
Tier						
IV	34	4062	65.7%	82.9%	7.5%	9.6%
III	21	2119	34.3%	71.9%	21.6%	6.6%
Owner						
Private	14	1094	17.7%	73.3%	21.4%	4.9%
Public	41	5087	82.3%	80.1%	10.7%	9.2%

Table 2 illustrates the proportion of total observed time that each activity shown in table 1 above occupied. The time required to carry out the patient care activities was estimated using the work sampling method and tabulated as shown in below.

Table 2
Patient Care Activities

Activity	(N)	Percentage Time
Direct Patient Care Activities	4890	79.0%
Documentation	1753	28.3%
Daily Rounds	610	9.9%
Emergencies	108	1.7%
Ward Procedures	1343	21.7%
Consulting with Colleagues	553	8.9%
Patient Assessment & Reassessment	523	8.5%
Indirect Patient Care Activities	771	12.5%
Clinical Meetings	434	7.0%
Out of Department Service	286	4.6%
Admin Duties	40	0.6%
Academic	7	0.1%
Quality Improvement	4	0.1%
Allowance	527	8.5%
Miscellaneous	354	5.7%
Personal(bathroom, food)	120	1.9%
Study/Course Work	53	0.9%
Total	**6188**	**100.0%**

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Table 3 shows the above results reclassified according to the sample profile (hospital tiers and hospital owners) of the study locations. The relative importance of Documentation of care given is portrayed.

Table 3

Sample profile sub classification of Direct Patient Care Activities

	Direct Patient Care Activities			Indirect Patient Care Activities %	Allowance %	Total
	Patient Contact	Documentation of Care Given	Communication between Doctors			
Total	41.8%	28.3%	8.9%	12.5%	8.5%	100.0%
Tier						
IV	41%	35%	8%	8%	10%	100%
III	55.9%	15.2%	0.8%	21.6%	6.6%	100.0%
Owner						
Private	54.4%	12.4%	6.9%	21.4%	4.9%	100.0%
Public	44.2%	30.8%	5.1%	10.7%	9.2%	100.0%

Table 4 shows the results of correlation study done between ward occupancy and direct activity hours as well as indirect activity hours. With respect to direct activity hours there is significant correlation (p-value is 0.001) whose strength of relationship is weak (0.358) correlation between occupancy and direct activity hours. As for indirect activity hours versus occupancy the study indicates no significant correlation (Pearson r=0.13 and a p-value of 0.345).

Table 4

Pearson correlation of ward occupancy rate and patient care activities

		Direct Activity Hours	Indirect Activity Hours
Occupancy	Pearson Correlation	.304**	0.164
	Sig. (2-tailed)	0.024	0.233
	N	55	55

**Correlation is significant at the 0.05 level (2-tailed)*.

DISCUSSION

This study classified activity types into two broad categories of direct patient care activities and indirect patient care activities. Using Structured Key Informant Interviews a total of 14 Patient Care Related Activities were identified. These were grouped into the broad categories of Allowance Activity Types, Direct Activity Types and Indirect Activity Types.

Other related studies on work sampling had more than three categories of activities; For instance documentation of patient information and communication among doctors were considered distinct classes from direct patient activities (3,10). Most studies of work samplings among hospital health workers use the three broad categories of direct patient care activities, indirect patient care activities and allowance/personal activities (11) Clear differences in the proportion of time spent carrying out the various types of patient care activities was observed. Of the 6188 observations made in this study, 79.0 % (4,891) were for direct patient care activities , 12.5 % (771) were for Indirect patient care activities and 8.5% (527) were allowance(resting) activities.

Ammenworth(3) and Fuchtbauer(10) observed that allowance accounted for 9.7% and 8.0% respectively. This was comparable to the 6.1% observed in this study. When documentation and communication were included as direct patient care activities in the work sampling studies by Ammenworth(3) and Fuchtbauer(10) the results were 76.5% and 80.0% respectively which was comparable to the 71% of this study. In contrast for indirect patient care activities this study observed a much higher rate (22.9%) compared to 4.2% and 5.8% by the Ammenworth and Fuchtbauer studies respectively. This variation can be accounted for in part due to the variation in classification of patient care activities. Thus comparison of results from work sampling studies that have used tools with varied classification of activities is difficult (14) .

A significant correlation between Direct activity hours and Occupancy was observed. Indirect activity hours versus occupancy indicated no significant correlation. This finding implies that occupancy is a moderating variable in the case direct patient care activities effect on number of doctors required but not a moderating variable in the case of indirect patient care activities. There may be studies showing similar findings but which are yet unpublished.

This study illustrates that there is considerable amount of time spent in documentation of care given by doctors when performing their duties. Hospital administrators should consider use of Electronic Medical Records so as reduce time spent in documentation of patient care. Finally, it should be investigated if ward occupancy can be used as a predictor of workforce required since this study showed a positive correlation between direct patient care activities and ward occupancy rates.

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