Post-Implementation Study of a Nursing e-Chart: How Nurses Use Their Time

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Abstract. Nursing documentation is a significant component of electronic health records nevertheless integrating a new chart into nursing activities required multiples strategies to ensure adherence. Current literature demonstrates that nurses spend part of their time performing activities no related with patients' direct care and sometimes even does not fall under their purview. Thus it is important to quantify the effect that a new system could have in the proportion of time dedicated to documentation. The objective of this work was to determine the time dedicated to different activities including those related to electronic documentation after the implementation of a renewed nurse chart in an Electronic Health Record at Hospital Italiano de Buenos Aires. An observational, cross sectional and work sampling study was performed. During the study 2396 observations were made in 3 wards. Nurses' activities included 36.09% of direct care, 28.9% of indirect care, 0.67% support tasks, 22.99% non related to patient tasks, 11.32% personal activities and documenting on EHR 17.43%. The comparison with the previous study shows indirect care activities decreased 12.28% and non-related to patients increased 11.85%. The results demonstrate that the new nurses' e-chart did not increase documentation time.

Keywords. Electronic health record, nursing e-chart, nursing documentation, work sampling methodology

1. Introduction

When an electronic health record (EHR) is implemented, it is expected to benefit both patients and healthcare professionals by enhance patient care, reduce medical errors and improve quality of health records. But the adoption of it by the professionals is an essential condition to ensure that its expected benefits will materialize [1][2]. The impact that EHR has in nursing documentation its immense considering the nature of the nursing care and its weight as a healthcare-working group [3]. It is also well known that nursing work have a highly cognitive demand that requires an effective management of priorities [4], furthermore nurses refer to neglect the patient while focusing on the new system [5] and expect that a renewed nursing e-chart reduce time lost in administrative tasks while increasing the time dedicated to patients [6]. Some studies have reported that time nurses spend performing activities which are not related with direct patient care increases the overall workload, and the implementation of a new EHR can impact on that issue either positively or negatively depending on an

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adequate consideration has been given to workflow as well as to meet the nurses' requirements [7][8]. Information related to how nurses use their time and what proportion do they dedicate to each activity it is important for nursing management and staffing requirements, furthermore when we are thinking introduce a new electronic system that could change some nursing activities and workload [9] [10] [11].

Regarding a renewed nursing e-chart implemented in the EHR at Hospital Italiano de Buenos Aires (HIBA), the objective of this work was to determine the necessary time to carry out the nursing activities including those related to electronic nursing documentation in the post-implementation period and comparison with the pre-implementation findings.

2. Materials and Methods

HIBA is a university hospital with more than a 150-year history. It belongs to a health nonprofit network with an infrastructure of 750 beds. Additionally, 1500 nurses, 2800 doctors and 1900 employees works at the organization. It possesses a research institute and an University Institute (UI). Furthermore has developed an 'in house' health information system since 1998 that includes a patient-centered EHR with differing levels of care (outpatient, inpatient, emergency and home care). The nursing e-chart embedded in it has evolved at the same time from paper-based to scan records and finally a computerized one. The later electronic nursing record (ENR) version implemented in December of 2014 at HIBA is structured in sections organized by *Assessment-Diagnosis-Planification-Execution and Evaluation* according to the nursing process' stages.

The pilot study in the pre-implementation phase take place in three sectors: the Adult General Care Unit (GCU) with 44 beds and a nurse-patient ratio of 1:8; the Adult Intermediate Care Unit (IMCU), with 28 beds and a nurse-patient ratio of 1:3, and the Adult Intensive Care Unit (ICU) composed of 38 beds distributed regarding the patient's requirements and a nurse-patient ratio of 1:2. For the post-implementation work we chose the same representatives areas.

The study design resides in an observational descriptive research using a work sampling (WS) methodology. Data collection consisted in observations and work samples following paths described in the literature by D.F. Sitting [12]. Three trained observers carried out a series of randomly observations of the activities performed by a sample of different nurses in each selected area, identifying the amount of time of the activities. We obtained five categories of tasks from the literature review [11] and subsequent consensus with the nursing department. They consisted in: *direct care, indirect care (include documentation in EHR), support activities, non-patient related activities, and personal activities*. The estimated amount of time for each category was provided for Chief of nursing department, expressed in percentages. We established the use of the EHR (or EHR documentation) on 15% [11]. Nurses documented in EHR using central station desktops. The analysis includes mean, standard error (ER) and estimation for two samples proportion of repeated measurements from different observations, differentiated per sector and categories. Differences between the categories are given with a 95% confidence interval (CI) of the difference.

3. Results

From November 02 to 28, 2015 there were 2396 observations, GCU had 40,7% observations, IMCU had 26.79%, and ICU 32.51%. The observed nurses were 66, being 82 % of them women and the total mean seniority was 7.45 years. Overall, the direct care activities reach 36.09; indirect care 28.9%, support tasks 0.67%, non-related to patients' tasks 22.99% and 11.32% personal activities. Meanwhile documenting on EHR (as task included within indirect care activities) includes 17.43%. If the data is compared with the results of the pre implementation pilot [12], direct care; personal activities and support tasks had similar percentages. Meantime indirect care activities decreased 12.28% and non-related to patients increased 11.85%. The following tables show the data of GCU, IMCU and ICU areas and the comparison between period's observations. We choose to represent categories where differences were found.

Table 1 shows comparison between pre and post findings in GCU for the activities indirect care (including documenting on EHR), support, non-related to patients and documenting on EHR as a category.

Table 1. General cares unit activities Pre and Post comparison

Period	Indirect care		Support		Non related to patients			Documenting on EHR		
	Pre (IC95%)	Post (IC95%)	Pre (IC95%)	Post (IC95%)	Pre (IC95%)	Post (IC95%)	P	Pre (IC95%)	Post (IC95%)	P
Repeated mesures	42.32% (39.10 - 45.57)	30.26% (27.38 - 33.24)	1.41% (0.75 - 2.39)	0.10% (0.00 - 0.57)	9.52% (07.70 - 11.60)	23.49% (20.85 - 26.27)	0.0000	20.02% (17.48 - 22.74)	19.18% (16.75 - 21.79)	0.3224
Mean	42.32%	30.26%	1.41%	0.10%	9.52%	23.49%		20.02%	19.18%	
ES	0162	0147	1.14%	0.31%	0.70%	1.35%		1.31%	1.26%	
Estimated	30.00%		10.00%		20.00%			15.00%		

Table 2 shows the IMCU data for the activities indirect care (include documenting on EHR), non-related to patients and documenting on EHR.

Table 2. Adult Intermediate Care Unit Pre and Post comparison

Period	Indirect care			Non related to patients			Documenting on EHR		
	Pre (IC95%)	Post (IC95%)	P	Pre (IC95%)	Post (IC95%)	P	Pre (IC95%)	Post (IC95%)	P
Repeated measures	36.78% (33.23 - 40.43)	27.04% (23.98 - 30.27)	0.0000	10.77% (8.59 - 13.27)	22.52% (19.65 - 25.58)	0.0000	18.18% (15.42 - 21.20)	15.35% (12.90 - 18.04)	0.0704
Mean	36.78%	27.04%		10.77%	22.52%		18.18%	15.35%	
ES	1.80%	1.57%		1.15%	1.48%		1.44%	1.27%	
Estimated	30.00%			10.00%			15.00%		

Table 3 shows ICU data for the activities indirect care, non-related to patients and documenting on EHR.

Table 3. Adult Intensive Care Unit Pre and Post comparison

	Indirect care		Non related to patients			Documenting on EHR		
Período	Pre (IC 95%)	Post (IC 95%)	Pre (IC95%)	Post (IC95%)	P	Pre (IC95%)	Post (IC95%)	P
Repeated measured	44.42% (40.88 - 47.98)	29.18% (25.99- 32.53)	13.22% (10.92 - 15.80)	22.83% (19.90 - 25.95)	0.0000	23.62% (20.67 - 26.76)	17.77% (20.67 - 26.76)	0.0022
Mean	44.42%	29.18%	13.22%	22.83%		23.62%	17.77%	
ES	1.62%	1.47%	1.21%	1.51%		1.52%	1.37%	
Estimated	30.00%		5.00%			15.00%		

4. Discussion

Regarding the pre-implementation phase where nurses' expectations assessment shows time to documentation as one of the main issues of concern. In this study, we evaluated how nurses use their time after the implementation of a renewed nursing e-chart and compare the findings with the results of the previous pilot study. Based on the results from this work, the GCU indirect care tasks matched with the estimated percentage, there are minor differences in non-related to patients and personal activities and major differences in direct care, documenting on EHR and supports tasks. The differences for IMCU were minor for documenting on EHR, direct care and indirect care. Major differences between estimated percentage and observation were found in personal, non-related to patients and support tasks. In the ICU area direct care, indirect care and personal activities get percentages close to estimation follow by documenting on EHR. Meanwhile non-related to patients and support tasks show bigger differences. Support task category that in previous study had few activities in all units reached in this one 0.67%, far from the estimation. Although there are differences in indirect care category but when documenting on EHR task is extracted, there is no statistically significant difference between the pre and post studies results (GCU: 20.02 % vs. 19.18 %, (p: 0.3224); IMCU: 18.18% vs. 15.35%, (p: 0.0704), ICU: 26.62% vs. 17.77 %, (p: 0.0022)). We assume that the differences are in the rest of activities included in the category indirect care. Among all categories, as in the previous study, support activities shows the biggest differences between estimated percentage and observations. With the old nursing record, our nurses spent 20.67% of their time documenting on EHR in the 3 wards. With the new one e-charting time decreased to 17.43 %, consistent with other author's findings [13][14]. Some evaluation studies have investigated the relationship between EHR and time efficiency revealing an increase of documentation time (7.7% to 32.9%) and a decrease (2.1% to 45.1%) [15] And even a rise of time committed to patients' care [16]. The findings of this work allow us to examine the impact that a new ENR has on nursing workload by examined how they use their time. But there is some limitations: the observations met just the minimum required and were performed only in adults units during morning and afternoon shifts for three weeks. In addition this study should have been conducted from 3 to 6 months later of the e-chart implementation but due a lack of resources and the Joint Commission International (JCI) accreditation process going on at HIBA that was not possible until one year later and that could have affected our evaluation. However the results show the renewed

nursing e-chart did not alter the time that concerned nurses, because when WS technique was applied that change does not showed up. Perhaps other techniques could be more accurate but our findings reveal that the time it takes is the same than before the new e-chart implementation. An analysis of the nurses' workflow indicates that they expend time performing tasks that are not part of their practice. Suggestions for future evaluation of implementation it is to focus on the 'non-nursing related activities' rather than attribute the time consumption to nurse's e-chart or the EHR.

Acknowledgments

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