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ORIGINALES

A situational study of electronic records in an internal medicine unit: barriers and opportunities

Estudio situacional de los registros electrónicos en una unidad de medicina interna: barreras y oportunidades

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ABSTRACT:

The objective of this study was to identify the resources, workflows and perception of nurses of internal medicine unit, related to electronic records in order to determine if the implementation of tablets in hospital units could cover the nurses' needs more satisfactorily.

A descriptive, cross-sectional study with non-probability sampling was carried out during July and August of 2016. The study involved 31 observations of 18 nurses, with 392 patients admitted. The variables were: shift, working methodology, "round" time, time taken to write up data, total time, number of patients admitted and time spent per patient. Each nurse was asked how they worked and why.

The average total time was 59,16 min (DT:16,6), and 12.65 (DT:1,11) patients admitted. Time spent per patient was 4,65 min (DT:1,15) and was lower during the afternoon shift [M:4,14; [DT: 0.84] than during the night shift [M: 5.47; DT: 1,12]. The night shift always used the same method of work, whereas different systems were used during the afternoon. The nurses expressed the need for a lightweight record system that would enable them to record information in real time near the patient without having to go elsewhere, and which would make it easy to consult and exchange information.

The two working methods used in the observation unit do not satisfy the needs of nurses, are slow and cumbersome and make it difficult for nurses to access and record information. The adoption of tablets could reduce these problems and meet nurses' expectations and thus opens a new line of research.

Keywords: Electronic Health Records; Nursing; Computers Handheld; Equipment and Supplies; Internal medicine

RESUMEN:
El objetivo de este trabajo fue conocer los recursos, flujos de trabajo y percepción de las enfermeras de una unidad de medicina interna, relacionados con los registros electrónicos, con el fin de determinar si la implantación de tablets en las unidades de hospitalización, podrían responder a sus expectativas.
Se llevó a cabo un estudio descriptivo, transversal, muestreo no probabilístico, consecutivo durante los meses de julio y agosto del 2016. Se realizaron 31 observaciones, a 18 enfermeras, 392 pacientes ingresados. Las variables: turno, metodología de trabajo, tiempo "ronda", tiempo transcripción de datos, tiempo total, número de pacientes ingresados y tiempo invertido por paciente. También se preguntó a cada enfermera sobre cómo trabajaban y el motivo.
La media de tiempo total fue 59,16 min (DT:16,6), y 12,65 (DT:1,11) pacientes ingresados. Tiempo invertido por paciente 4,65 min (DT:1,15), inferior en el turno tarde [M:4,14; DT: 0,84] que el de noche [M: 5,47; DT: 1,12]. El turno noche siempre utilizaba el mismo método de trabajo y era el turno tarde que presentaba sistemáticas diferentes. Las enfermeras manifestaron la necesidad de un sistema de registro ligero, en tiempo real, a pies de cama del enfermo, evitando desplazamientos, de fácil acceso para la consulta e intercambio de información.
Los dos métodos de trabajo de la unidad de observación no satisfacen las necesidades de las enfermeras, son lentos, pesados y dificultan el acceso a la información y el registro. La incorporación de tablets podría reducir estos problemas y cubrir sus expectativas, abriendo una nueva línea de investigación.

Palabras clave: Registros Electrónicos de Salud; Enfermería; Computadores de Bolsillo (tablets); Equipamientos y Suministros; Medicina Interna

INTRODUCTION

The nursing records have numerous objectives and uses for nursing staff. For example, these include practical evaluation, a source of information for investigation, and providing a written work progress and evidence of the care given. Also for teaching/training, a management tool (workloads, evaluating results, resource allocation etc.), legal requirements, patient safety, communication and continuity of care [1-4].

Difficulties exist, however, in the completion of the records by nursing staff leading to relevant information being missing, imprecise notes, errors and inconsistencies [1,2,4-6]. On the other hand, institutional requirements and technological changes have driven the development of electronic records that have allowed us to quantify and demonstrate the nursing contribution through results. Improving immediate access to information from any location would assist in decision making and in the communication between professionals, facilitating record standardisation and obtaining indicators affecting patient safety [7-11].

But also, electronic records have given break up and slow systems, that do not make easy to take decisions. They are not enough developed, time taken to write up data and make it difficult for nurses to access to relevant information and complete records. Increasing the professional time dedication [9-11].

For improve records, it is important to make easy the necessary tools for improve the use for the professionals. For example, the equipments and supplies that promote the records on the point of care, like 'tablets' [12-15].

The improvement in the system records have a direct effect in the improve satisfaction of the professionals [16] and the security of patients [10,14,17].

However, before changing the records system with 'tablets', it was considered important to know what the professionals needed, their expectations and the ways in

which they work. With this information, we could evaluate suitability and what the expected benefits could be. That is to say, until now, with the existing records systems we have only had an approximate idea of the reality in the hospital´s internal medicine unit.

OBJECTIVES

To identify the work unit's resources relating to the records.

To determine the workflows, 'round' time, data input time and total times.

To identify the nurses' percepctions of the records system.

To identify the nurses' expectations of a records system and if the 'tablets' could meet these expectations.

METHODOLOGY

A descriptive, cross sectional study was carried out during the months of July and August of 2016. The study population were all nurses who were working in an internal medicine unit. The criteria for inclusion in the study were that the nurses were employed, with three years' experience and that they volunteered to take part [(18)]. The criteria for exclusion was that they were off work when the information was gathered.

At the same time, a non-probability sampling study of all the nurses that met the inclusion criteria within the study period was also undertaken. That is to say, those nurses that met the inclusion criteria and were at work during the data collection period.

This meant that not individuals but actions and activities were studied. A person may have been observed, and acted, on more than one occasion. The same person was always studied on the same shift.

The so called 'round' was also studied. This is the established routine carried out at the start of the afternoon and night shifts, where the patient's vital signs are noted, and nursing activities are stantardised.

The nurses have portable or 'lap-top' computers available to them, and these are fixed to the equipment trolleys. These trolleys are normally found in the places where the nurses work. In order to carry out the 'round', and depending on the nurses´judgment, two different working methods were used. In the first, called the 'split' method, the clinical history was consulted in the work area via the computer. The patient's vital signs were then taken and recorded on paper to be written up later. The second method used is called the 'joined' method. Here the nurse left the work area and moved to the corridor with the trolley and 'lap-top' to consult the records. They went into the room to measure the patient's vital signs and after these were to the corridor again to recorded direcly at the patient´s room door. The trolley and computer could not enter the room. On no occasion was consultation, measurement and recording carried out at the patient's bedside. 'Rounds' were not carried out on the morning shift.
31 observations of 18 nurses and 392 admitted patients were carried out. Each observation was undertaken at the beginning of the shift and lasted a maximum of 3 hours.

A database containing the study variables was used for collecting the information. Structural variables were defined as shift, working methodology, 'round' time, time taken to write up information, total time, number of patients admitted and time dedicated to each patient. The prime variable was identified as being the time spent on each patient, due to this being more standardised, keeping in mind the admitted patients.

The choice of variables is justified in a study which took place in a Toronto hospital. The recording and total times were measured, along with the time spent on each patient and the number of patients admitted. In this study, a group recording data on paper was compared with a group using computerised recording. The rest of the variables had been chosen to adapt the investigation to the field of study, the real life situation of the work units and to a different composition of the control and experimental groups [(9)].

The data was analysed using statistical package SPSS 17.0, calculating measurements of main trend and spread. In order to check the normality of the variables, the Shapiro-Wilk test was used and parametric and not parametric checks were applied. (Fisher's Exact test, Student's t-test)

In conversation, each nurse was also asked how they worked and why,- 'What methodology do you use? Why?' The answers were grouped together, drawing up central themes and categories.

This study forms part of the investigative process for a doctoral thesis, with the approval of the Clinical Investigation Comitee, Bellvitge Hospital. The confidentiality and privacy of the participants has been respected.

RESULTS

Of the total sample (n=31), 61,3% (n=19) of the observations were carried out on the afternoon shift and 38,7% (n=12) on the night shift.

If we assess the how the work was carried out, the 'joined' method was the most representative, with 74,2%, and the 'split' method 25,8%. This leads us to say that the majority of nurses prefer to leave the trolley and computer in the corridor and carry out all the activities at the same time (see table 1).

Table 1. Categorical variables.

	n=31	%
Shift		
Morning	0	0
Afternoon	19	61,3
Night	12	38,7
Method		
Joined	23	74,2
Split	8	25,8

Author produced.

Looking at the night shift, we saw that 100% of those observed used the 'joined' working method. The 'split' method was only found to be used on the afternoon shift. 57,9% on this shift used the 'joined' method, while 42,1% used the 'split' method (p=0.0012) (see table 2).

Table 2. Work method / Shift relationship.

	Method		
		Fisher's Exact test	
Torn	Joined (n=23) %		Split Split (n=8) %
Afternoon	57,9	gl=1	42,1
Night	100	p=,0012	0

Author produced. *p<.05

During the period studied, of the quantitative variables, a mean of 12,65 (SD: 1,11) admitted patients was established.

The nurses completed the 'round' in a mean time 35,88 (SD: 10,5) minutes. We also found means of 12,63 minutes (SD: 1,77) devoted to writing up records, 59,16 minutes (SD: 16,6) total time, and 4,65 minutes (SD: 1,15) devoted to each patient (see table 3).

Table 3. Quantitative variables

	Total (n=31)	
	M	**SD**
Round Time	35,88	10,5
Write up Time	12,63	1,77
Total Time	59,16	16,6
Nº of Admitted Patients	12,65	1,11
Time per patient	4,65	1,15

Author produced.

Next the main variable, the time spent on each patient, was analysed along with the rest of the categorical variables.

The proof of normality Shapiro-Wilk (S-W) for n<50, shows us that the hypothesis Ho (p<0.05) cannot be rejected and that the time devoted to each patient by the nursing staff is uniform, following a normal distribution in both shifts. (S-W night = ,154; afternoon = ,161).

On assessing the time spent per patient on the different shifts for independent samples (the same person was only observed on one shift), it was found that the time per patient on the night shift (M: 5,47; SD: 1,12) exceded that for the afternoon shift (M: 4,14; SD: 0,84) with significant differences existing between means with similar variances. (F Levene = 0.44, p = 0.511, T Student = 3.76, p = 0.001).

On the other hand, for the same variable, no differences between the means for the 'joined' (M: 4,41; SD: 0,71) and 'split' (M: 3,76; SD:0,91) working methods were obtained. (F Levene = 1.107, p = 0.307, T Student = 1.73, p = 0.101).

In other words, it was concluded that the working methods used by nursing staff did not significantly influence the time devoted to each patient. Differences did, however, exist between shifts (see table 4).

Table 4. Relationship between time per patient, shift and method.

Time per patient

	Shift (n=31)		Method (n=31)	
	Afternoon (n=19)	Night (n=12)	Joined (n=23)	Split (n=8)
M	4,14	5,47	4,41	3,76
SD	0,84	1,12	0,71	0,91
T/U	T/U:-3,76 (P=,001) gl=29		T/U=1,73 (p=,101) gl=29	

Author produced *p<0.05 T/U = T Student

When asked why they used one work system or the other, thoughts of some of the nurses studied coincided; that they saved time. Curiously this was the same for both the 'joined' and 'split' method work groups.

The 'joined' group believed they saved time as a result of being able to carry out all the activities together (vital signs, intravenous, giving medication etc) meaning that less time was needed. They also thought that fewer displacements were required and thus more time could be spent on other activities.

> "I do everything at the moment and I forgot. We have the effect of saving time" INF01

> "It is more comfortable, I administer medication at 4pm, I travel less and I can consult any questions I have" INF09

The 'split' group argued that they saved time by being able to move with aparatus and the paper recording system enabled them to be more flexible. They said they could also move quicker because they worked lighter, and entered patients' rooms with equipment so as to work at the patient's bedside.

> "because I have the impression that I'm going faster ... I do not enter and leave both of the room..." INF05

> "It is more practical and agile, when in time and in time to bring less resources on top, the car weighs a lot..." INF07

> "One of the reasons is that I do not have to LOAD with the car of the unidsis that carry on the computer, weighs a death and the wheels turn fatal"! INF08.

The nurses said that a source of difficulty for them was the weight and poor manoeuvrability of the trolley.

The night shift explained that their reasons for using the 'joined' system reflected this.They said that their decision was also supported by the fact that carrying out all the tasks at the same time meant they did not have to enter patients' rooms at different times, thus aiding patients' nightime rest and wellbeing.

> "It is for the comfort of the patient, to enter and leave less than the room. In this way you do it all together, look at the constants, ... medication and annoy you less" INF12 i 13.

The fact that there was one nursing auxiliary less and staff had to rely on asking for help when necessary was also identified as giving them difficulties and leading to time differences.

Enabling the admitted patients to rest as much as posible was a night shift staff priority. This was viewed as being even more important than saving time, and was one of the reasons for chosing the 'joined' working method.

The night shift also gave patient safety as a significant consideration. One reason they gave for using the 'joined' system was to avoid errors in writing up information.

> "Separately there are more chances of error, so it's more practical" INF18.

DISCUSSION

From the results obtained it was evident that the night shift always used the 'joined' method and that the afternoon shift operated different systems. The incorporation of 'tablets' could standardise the working methodology.

One of the reasons given for the choice of a particular way of working, was the saving of time. However, analysing the quantitative data, no indication of any relationship between these two variables was found.

The concept of time is important for the nursing staff, and they base their organisation around being able to carry out their tasks quickly. Nursing is a pragmatic profession, valuing real and practical results from any activity performed. Saving time on bureaucracy is always in mind and, as such, is a main consideration. Thus, before implementing any changes in working systems, this would have to be a prime consideration in order for these changes to be accepted by the nursing staff.

In the reference bibliography, it is confirmed that those experiences providing a reduction in bureaucratic or administrative tasks and that avoid record duplication, are positively received by nurses. Systems that allow rapid communication and simple access to the required information are also viewed as factors to make their work easier, leading to the establishment of an inherent link between these factors and the saving of time. This time can then be spent directly with the patient. [11, 14, 15, 19, 20].

Nevertheless, the implementation of a new resource or technological change must be carried out taking into consideration the workflows, and involving nursing staff to identify any difficulties and the nurses' requirements in advance. [12, 13, 16]

Studies exist that describe unsuccessful experiences relating to electronic records and / or resources, leading to frustration and resistance to the change. [20, 21, 22]

A median of 12,65 patients was established, a total time of 59,16 minutes with 4,65 minutes dedicated per patient. The results of a similar study carried out in a Toronto hospital and using electronic records were 4 or 6 patients, total time 65,2 minutes and 13,04 minutes per patient [12] . Comparing results it was apparent that the patient ratio of the unit in this study was double and the times were lower.

No similar studies in Spain were found, and so we were not able to make comparisons with other hospitals where similar situations existed. However, obtaining these results now will allow us to monitor ourselves in the future.

A clear difference in time was shown between the shifts, with the night shift demonstrating 1,33 minutes spent per patient more. This means that the evaluation of any modification to workflows would have to be done independently for each group.

Limitations of the study

There have been limitations in the gathering of the sample. Obtaining the sample through opportunity and observation has led to the same individual being studied on more than one occasion. This in turn has given little control over the differences in individuals' behaviour and the repeating of observations. It was considered that, for future studies, it would be necessary to establish a defined group of participants on each shift and carry out the same number of observations.

CONCLUSIONS

Neither of the two work methods used in the unit studied meet the nurses' needs. They are slow, cumbersome and make access to information and records difficult. They are also dated and poorly developed.

It is essential that these methods be updated and upgraded incorporating new tools like 'tablets' or programmes which allow easy transferability between systems.

With the introduction of 'tablets' working practices would be standardised between the afternoon and night shifts. Nursing staff would have available to them a lightweight system which would enable working in real time and at the patients' bedside. It would improve workflows, access to information, communication between professionals and patient wellbeing and safety. Record quality and job satisfaction would also be improved.

With these results we could form a working hypothesis that the availability of records via the use of 'tablets' at the patients' bedside would reduce time requirements and increase individual job satisfaction and fulfilment. As no similar results were found in any other hospital used for comparison, this opens a new line of investigation.

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