

Improvement in communication during patient handoff between areas from a children's hospital

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ABSTRACT

Introduction. Patient handoff is an interactive process including data communication and responsible transfer in order to safely maintain the continuity of care. Failure in this process may result in inadequate care and favor the occurrence of errors.

Objective. To implement a standardized instrument for patient handoff from the intensive care unit (ICU) to the intermediate-medium care unit (IMCU), and compare communication between health care providers before and after the intervention.

Population and methods. Before-and-after study conducted at Hospital de Pediatría "Prof. Dr. Juan P. Garrahan." The intervention consisted in a written handoff form. The pre-intervention sample included patients transferred from ICUs to IMCUs between October 1st and October 31st, 2015. The post-intervention sample included patients transferred between March 1st and March 31st, 2016. A total of 4 IMCUs and 3 ICUs participated in the study. The main study variable was the written part of the handoff; in particular, whether it was timely and complete.

Results. A total of 50 handoffs were analyzed for each stage. With the written handoff, there was an increase in the communication of clinical data in 88 % of variables (oral communication between physicians, treating physician, therapeutic adequacy, diagnosis, course, etc.); the difference was statistically significant.

Conclusion. After implementing the tool, there was an improvement in the transfer of patient clinical data relevant to the safe continuity of care.

Key words: patient safety, patient handoff, communication.

<http://dx.doi.org/10.5546/aap.2021.eng.259>

To cite: Arpi L, Negrette C, Videla Dorna S, Cernadas C, et al. Improvement in communication during patient handoff between areas from a children's hospital. *Arch Argent Pediatr* 2021;119(4):259-265.

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This study was conducted with the support of the Safety Committee of Hospital de Pediatría S.A.M.I.C. "Prof. Dr. Juan P. Garrahan."

Funding:

Special Program Grant on Patient Safety, Hospital "Prof. Dr. Juan P. Garrahan."

Conflict of interest:

None.

Received: 11-25-2019

Accepted: 1-7-2021

INTRODUCTION

Patient handoff is an interactive process including data communication and responsible transfer aimed at safely maintaining the continuity of care. It takes place when a patient is moved from one area to another or when the staff in charge changes.^{1,2}

Effective communication between health care providers is a critical aspect of care and should be present in each handoff, given that it is one of the main factors determining safety and quality. Failure in this process may result in inadequate care and errors.³

Health-care-related adverse events are one of the leading causes of mortality in the United States, according to the Joint Commission International (JCI); communication failures contribute to 2 out of 3 sentinel events.⁴ The International Patient Safety Goals, developed in 2016, rank improving staff communication in second place, after patient identification.⁵

In the related bibliography, a study reports 52 % of oral communication errors in hospitalized patients.⁶ Other studies proved that exclusively oral communication was inadequate and that a high percentage of the information was lost. In addition, combining oral information with written information in an established form increases the amount of data retained. Therefore, the bibliography suggests using both methods.

OBJECTIVES

Primary objective

To develop and implement a specific standardized instrument

for patient handoff from the intensive care unit (ICU) to the intermediate-medium care unit (IMCU) at Hospital de Pediatría "Prof. Dr. Juan P. Garrahan."

Secondary objective

To compare communication between health care providers before and after the intervention by analyzing the data recorded in the instrument.

POPULATION AND METHODS

The study was conducted between October 1st and October 31st, 2015 and between March 1st and March 31st, 2016. Hospital de Pediatría Juan P. Garrahan is a tertiary care children's hospital in the Autonomous City of Buenos Aires, with a total of 534 beds, a 110 % occupancy rate, and 120 ICU beds. A total of 12 000 surgeries and 27 000 discharges take place at this hospital every year. It receives patients from all over Argentina and from neighboring countries. It has 519 staff physicians and approximately 2000 physicians undergoing training. There are between 70 and 100 transfers from the ICU to the IMCU per month; some of them are scheduled, while others are not because they occur during handoff.

The hospital's electronic medical records do not include a standardized handoff item, which may result in the omission of relevant data.

Design: this was a before-and-after study.

Population: patients transferred from the ICU to the IMCU. The hospital's ICU provides care to pediatric patients with highly complex conditions, including those in the postoperative period of complex congenital heart diseases, neurosurgery, and solid organ and bone marrow transplantation. The pre-intervention study sample included patients transferred between October 1st and October 31st, 2015. After the intervention, handoffs performed between March 1st and March 31st, 2016 were studied. In both cases, 4 out of the 9 IMCUs and 3 out of the 5 ICUs in the hospital participated. The selection of participating units was randomized.

Study variables

Stage 1

During June, July, and August 2015, focal groups were organized with the participation of ICU and IMCU physicians and nurses, experts from the safety committee, and members of the Hospital's Board. A written handoff form was designed, which contained the clinical data considered indispensable for managing the

patient in the first hours of stay at the IMCU after being transferred from the ICU (*Annex*).

It was agreed that the ICU physician responsible for the patient would complete the form at the time when the handoff was decided. The intervention was also to be complemented with an oral handoff to the physician who would continue providing care at the IMCU, and an agreement was reached regarding what information should be given and when.

In September 2015, the instrument was validated with its simultaneous and independent implementation by 2 ICU providers in 20 patients (apparent validity), and the level of agreement between them was measured. The required changes to the instrument were then made (adjustments proposed by the interest group for instrument reliability).

Stage 2

The diagnosis of the pre-intervention situation was done in October 2015. In relation to the written handoff, the patient summary in the electronic medical record was checked to see if it contained all the data considered indispensable (*Annex*). In relation to the oral handoff, physicians who received ICU patients were interviewed the morning after their shift and asked if they were given an oral handoff.

For the standardization of communication, the I-PASS Handoff Bundle was used as a model.^{7,8} Communication was defined as timely (2 hours before or during handoff), complete (if it included at least 14 of the 16 items agreed upon in the form), clear (the information was fully understood), and accurate (the information is communicated concisely). The last 2 characteristics are subjective.

The results of the second stage were processed in November and December.

Stage 3

During January and February 2016, ICU physicians responsible for handoffs received training. The instrument and its adequate use were disseminated through talks with the health care providers of the different shifts and weekdays.

Stage 4

The form started being used in March 2016. The data in the form were compared to those in the medical records in order to assess the written handoff. On-duty physicians at the IMCU who had received patients transferred from the ICU

were interviewed to assess the oral handoff.

Participating providers included staff physicians, residents from second year onwards (at this hospital, first-year residents are not on duty on their own in in-patient wards), and advanced fellows of post-basic specialization.

Statistical analysis

The sample size was estimated. To detect a 25 % difference in handoff improvement with a 90 % power and a 5 % type I error before and after the intervention, a *n* including 50 observations was estimated (test for paired proportions or for one proportion). The main variable was the written handoff.

The level of agreement between observers of the handoff instrument was measured using the Kappa coefficient for nominal categorical variables.

Comparisons were performed using contingency tables and differences between before-and-after proportions were done using the χ^2 test or Fisher's exact test, as applicable, and the statistical significance level was established at $p < 0.5$.

For continuous variables, parametric or non-parametric tests were used according to data distribution.

Ethical considerations

The study was approved by the Research Ethics Committee of Hospital de Pediatría Juan P. Garrahan.

RESULTS

In order to validate the instrument, a pilot test was conducted with 20 handoffs; 2 observers (ICU physicians) completed the questionnaire and the level of agreement between them was measured, with a 0.75 Kappa coefficient. The 2 items that separately showed no agreement were modified, and the agreement test was repeated, with a 0.85 Kappa coefficient for all assessed variables.

Afterwards, 50 handoffs were compared in each stage, before and after the intervention. Given that no multiplicity adjustment was performed, improvement in the most relevant items is reported.

In relation to written communication, significant improvements were observed before and after the intervention, both in timeliness (from 82 % to 100 %; $p = 0.01$) and the proportion of complete forms (from 22 % to 66 %; $p = 0.01$).

Table 1 shows improvement in some items of the written handoffs before and after the intervention. The assessment regarding clarity and accuracy is subjective; in order to reduce biases, 2 pediatricians who were not part of the team that developed the instrument assessed them using "Yes" or "No".

Before the intervention, 8 summaries were considered to be clear (16 %), while after the intervention, there were 45 clear summaries (90 %) ($p = 0.01$). Results regarding the accuracy of the handoff were similar (from 12 % to 96 %; $p = 0.01$).

TABLE 1. Information in written handoffs before and after the intervention

Variable	Before		After		<i>p</i> value
	<i>n</i>	%	<i>n</i>	%	
Age	44	88	48	96	0.08
Weight	0	0	43	86	0.01
Oral communication between physicians	11	22	33	66	0.01
Physician responsible for the handoff	4	8	16	32	0.01
Adequacy of therapeutic effort	1	2	42	84	0.01
Current diagnosis	43	86	50	100	0.01
Summary of patient's course	41	82	44	88	0.35
Underlying disease	41	82	45	90	0.19
Relevant laboratory data	5	10	25	50	0.01
Relevant imaging tests	3	6	22	44	0.01
Study or procedure with an appointment	6	12	34	68	0.01
Vascular access	8	16	43	86	0.01
Drainages	3	6	42	84	0.01
Social aspects	0	0	44	88	0.01
Eating	3	6	39	78	0.01
Indications	3	6	20	40	0.01

The presence or absence of oral communication between physicians was assessed, and an increase from 22 % to 66 % was observed ($p < 0.01$). If oral communication was present (11 before the intervention and 33 after it), its timeliness, completeness, clarity, and accuracy were compared (Table 2).

In the post-intervention stage, the recipient of the handoff was always the physician in charge of the ward. This variable was not measured before the intervention, so it is not possible to compare results.

DISCUSSION

In Argentina, in 2017, it was reported that 45 % of health care providers do not perform a handoff or, when they do, important data are omitted in the communication.⁹

This study, aimed at improving effective communication at our institution, focused on improving patient handoff from one area to another by implementing a standardized instrument.

The bibliography describes a reduction in errors after the implementation of instruments aimed at standardizing written and oral communication during patient handoff.^{7,10-14}

One of the strengths of this study was that it included the members of the health care team involved in the development of the instrument. Recent studies point out that developing specific and local instruments may reduce resistance to adopting them, given that it overcomes cultural barriers and makes health care providers feel a sense of ownership, while empowering those who take part in the process.¹⁴⁻¹⁵

In this study, implementing the form led to similar results to those published.

Significant improvements were observed before and after the intervention, both in timeliness (from 82 % to 100 %; $p = 0.01$) and the proportion of complete written handoffs (from 22 % to 66 %; $p = 0.01$).

TABLE 2. Comparison of oral information before and after the intervention

Variable	Before		After		p value
	n	%	n	%	
Timely	11	100	33	100	> 0.05
Complete	2	18	22	66	0.01
Clear	11	100	33	100	> 0.05
Accurate	11	100	33	100	> 0.05

In oral communication between physicians, an increase from 22 % to 66 % was observed ($p < 0.01$).

Although the implementation of the instrument increased the amount of data transferred, difficulties were observed in relation to providers' adherence to introduce changes in their communication modality. A change in safety culture is required to overcome such resistance to change.¹¹⁻¹⁶

It is necessary to continue working on patient safety culture and formally incorporate it to educational programs. To achieve progress, efforts must be focused on improving communication and teamwork. Our commitment to this challenge is essential, and we should bear in mind that there will be no changes in patient safety without mentors to promote them.

Another strength worth noting is that this intervention took place in a public hospital and did not require any investment to make it effective.

Limitations

Since physicians were interviewed the day after receiving the patient, some degree of objectivity was lost in the assessment of the oral handoff, which is why we only considered whether it was present or absent, and not its characteristics.

The fact that the form was to be completed by hand, when the hospital has electronic medical records, caused some resistance among the providers. If it were incorporated into the electronic medical records and were essential for handoffs, its use would probably be universal.

This study did not detect and report errors in care associated with communication failures, so it was decided to conduct a second study measuring those events.

CONCLUSIONS

It is critical to increase safety in order to provide a better care to our patients and reduce the incidence of errors.

This study demonstrates that the implementation of standardized, customized, and agreed-upon instrument for patient handoff between different areas of the hospital, in this case from an ICU to an IMCU, improves the communication of relevant patient clinical data. ■

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ANNEX

ICU-IMCU HANDOFF FORM

First and Last Name: Medical record no.: Date:

Time:

Identification wristband: Yes No

Date of admission at the hospital:

Date of admission at the ICU:

Age:

Weight:

Patient identification

Referring area: ICU

Receiving area: IMCU

Oral communication between physicians: Yes No

Physician responsible for the handoff:

Warnings:

- 1) Adequacy of therapeutic effort Yes No
- 2) Current diagnosis: (reason for ICU admission; e.g., septic shock, ALRTI with RF)
 - a)
 - b)
- 2) Summary of the patient's course at the ICU MV: (from... to...); inotropic use: (from... to...)
- 3) Underlying disease and associated comorbidity (e.g., Down syndrome with AV canal; ALL with longitudinal sinus thrombosis after L-asparaginase):
- 4) Relevant laboratory data (requiring control and correction in the next 24 h)
- 5) Relevant imaging tests (essential for patient management in the next 24 h)

Date	Study	Result

6) Studies and/or procedures with an appointment in the next 24 h

Studies and procedures	Date	Time
•		
•		

7) Vascular access: Central: Yes No Date of placement:
Peripheral: Yes No Date of placement:

Drainages:

8) Social aspects:

• Social risk Yes No Please clarify:

Physician's signature and stamp