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Evaluating Quality of Electronic Clinical Notes Using the Spanish Version of Physician Documentation Quality Instrument (PDQI-9) in a High-Complexity Hospital. Cross-Sectional Study

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Abstract. Introduction: There are factors inherent in Health Information Systems that, when are used improperly, can degrade the quality of the information, which may imply, among other things, the lack of integrity, inconsistency or inaccuracy of the information. **Objective**: The aim of this study is to describe the quality of electronic clinical notes using the PDQI-9 score (Spanish version). **Methods:** We evaluated the judgment on the quality of two medical auditors trained in the use of PDQI-9 tool. The unit of analysis was the 3 types of clinical notes: admission notes, progress notes and discharge summaries of adult patients admitted to general wards. Sampling type: random. Statistical analysis: continuous variables were summarized with median and interquartile range. Medians between 2 reviewers were compared using Mann Whitney hypothesis test. **Results:** 120 Electronic Health Record (EHR) were selected, the median of the overall quality of the admission notes were 33 (31-34) and 32 (32-37) for each reviewer respectively, without any statistically significant differences (p=0.729). The overall quality of progress notes and discharge summaries were 28 (27-33) vs 27 (27-32), p = 0.175 and 33 (32-34) vs 33 (31-34), p = 0.243, respectively. **Conclusions**: The quality of the clinical documents evaluated by the trained reviewers using the PDQI-9 score was good. The application of this type of tool is valuable for making a diagnosis in terms of quality that allows improving clinical documentation, as well as peer communication when reading the Electronic Health Record.

Keywords. Electronic Health Record; Documentation; Clinical Note; Quality; Instrument

1. Introduction

The implementation of the Electronic Health Record (EHR), provides benefits regarding the accessibility, availability, and communication of clinical information,

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impacting positively on the quality of patient care [1]. However, there are factors inherent in Health Information Systems that, when are used improperly, can degrade the quality of the information [2], which may imply, among other things, the lack of integrity, inconsistency or inaccuracy of the information [3]. An example of this problem is the inappropriate use of copy and paste, as well as the vast amounts of low-quality information automatically inserted in the clinical notes[2].

In this sense, it is essential to audit the quality of clinical records made by health professionals [4], the main role of medical auditors. In our country, we have a validated tool to evaluate the quality of clinical notes in the electronic medical record, but its use is not standardized. This tool, called Physician Documentation Quality Instrument (PDQI-9), evaluates three clinical notes (admission notes, progress notes and discharge summaries), through 9 items using a Likert scale. Using this tool, a higher score indicates a higher quality of the clinical notes[5][6]. The PDQI-9 was adapted and cross-culturally validated in Buenos Aires Italian Hospital so that it can be used in our healthcare context by Internal Medicine specialists [7]. For expanding the use of this tool the aim of this study was to train clinical audits to use this tool in order to evaluate quality of clinical notes.

2. Methods

A cross sectional study was performed from March to May 2018. The Italian Hospital is a center of high complexity located in the City of Buenos Aires, Argentina. It's a school hospital who covers surgical and medical specializations. The informatic development from each one has been made by its own initiative. Since 1998, the Institution designs and builds its own Health Informatic System [8]. EHRs from non-surgical adult inpatients from general wards were reviewed and admission notes, progress notes and discharge summaries were the units of analysis. They were selected by the following criteria:

Inclusion criteria:

- Adult Patients (18 years or more) hospitalized in non surgical general wards with at least 3 days and no more than 15 days from March to May of 2018.

Exclusion criteria:

- No record of admission notes, progress notes and discharge summaries.
- First or last progress note

PDQI-9 consists of 9 items scored using a 5-point Likert scale (1 -not at all- to 5 -extremely-). Responses are summed to create a total score, with higher scores indicating greater quality. The items included are up-to-date, accurate, thorough, useful, organized, comprehensible, succinct, synthesized, and internally consistent.

In our case, considering that 9 is the minimum value that a document can reach and 45 is the maximum, taking into account that these values are the results of a Likert scale, to confer better interpretability and to be able to obtain results as an opportunity for improvement , the team of researchers chose to interpret the results in 5 categories: 9-17 Poor quality, 18-26 Regular quality, 27-35 Good quality, 36-44 Very good quality and 45 Excellent quality.

Two medical auditors received an one-hour training from the research team, once a week for three months. During the training, clinical notes of inpatients were assessed

and then excluded to participate in the analysis of this work. Auditors evaluated the clinical notes applying the PDQI9 SV tool and shared their views about the quality of them. Every instance was moderated by a member of the research team previously in charge of the tool validation process.

Each reviewer individually assessed every clinical note, the corresponding EHR, and filled a Redcap form to complete the assessment.

For statistical analysis, continuous variables were summarized with median and interquartile range. Medians between 2 reviewers were compared using Mann Whitney hypothesis test. The analysis was performed using STATA 15.

The research project was approved by the institutional review board (CEPI #4092). The study was performed in full agreement with current national and international ethical regulations. The researchers declare no conflicts of interest.

3. Results

120 Electronic Health Record (EHR) were selected and reviewed. The median of the overall quality of the admission notes was 33 (31-34) and 32 (32-37) for each reviewer respectively, without any statistically significant differences (p=0.729). The overall quality of progress notes and discharge summaries were 28 (27-33) vs 27 (27-32), p = 0.175 and 33 (32-34) vs 33 (31-34), p = 0.243, respectively. (Table 1)

Table 1. Variation between reviewers about the Global Quality per clinical note (n = 240). HIBA, 2019.

	Reviewer 1	Reviewer 2	*p value*
Admission notes*	33 (31-34)	32 (32-37)	0,729
Progress notes*	28 (27-33)	27 (27-32)	0,175
Discharge summaries*	33 (32-34)	33 (31-34)	0,243

*Median (IIQ25-75%)

Regarding the quality by the domain (Table 2), most of them were around the value 3. Overall, "Organized" was the domain with the lowest value (admission notes, 3.2; progress notes, 2.9; discharge summaries, 3.2). On the other hand, the best-rated domains were "Synthesized" (admission notes and discharge summaries, 3.8), "Internally consistent" (progress notes, 3.3; discharge summaries, 3.8) and "Up-to-date" (discharge summaries, 3.8).

Table 2. Quality by ítem per clinical note (n = 240). HIBA, 2019.

	Admission notes	Progress notes	Discharge summaries
Up-to-date*	3.7 (0.50)	3.1 (0.80)	3.8 (0.43)
Accurate*	3.3 (0.54)	3.1 (0.70)	3.4 (0.51)
Thorough*	3.6 (0.60)	2.9 (0.67)	3.7 (0.50)
Useful*	3.7 (0.50)	3.1 (0.80)	3.7 (0.50)
Organized*	3.2 (0.50)	2.9 (0.64)	3.2 (0.50)
Comprehensible*	3.6 (0.60)	3.1 (0.72)	3.6 (0.50)
Succinct*	3.3 (0.52)	3.0 (0.71)	3.3 (0.50)
Synthesized*	3.8 (0.50)	3.1 (0.82)	3.8 (0.44)
Internally consistent*	3.7 (0.60)	3.3 (0.81)	3.8 (0.50)

*Media (DS)

4. Discussion

The aim of this study was to train medical auditors to use the PDQI-9 Spanish version in order to evaluate quality of clinical notes. Admission notes, progress notes, and discharge summaries from 120 EHRs were reviewed. Most of the time, the items analyzed were around the value 3. When analyzing domains, admission notes and discharge summaries were better scored than progress notes, especially in organization and completeness. This could be explained by the fact that the first two have text entry in structured fields, while progress notes is recorded in free text format. Comparing with other experiences the quality obtained in this study was satisfactory. In results reported by Hahn [9], the highest-rated note attributes were "comprehensible" (4.7) and "accurate" (4.5) and the lowest-rated attributes were "synthesized" (4.2) and "succinct" (4.2). This difference can be due to the training provided to residents in their education program. In this sense, there is evidence that this score is useful as a measure of performance of training programs to improve the quality of clinical record. As an example, in the study carried out at the Children's Hospital of Wisconsin [10] the impact of a training for residents were measured with the PDQI-9 tool. In addition, Miller et al [11], in 2017 published how from a training program they were able to improve the score of the quality above 40 points after training. The objective of the mentioned studies were not only to measure the quality of the records, but also to use the PDQI-9 results as a quality indicator, because a standard score is useful for tracing training strategies to improve the quality of records. Future studies in our setting are necessary to examine the implementation of education programs centered in improve clinical note's quality.

5. Conclusions

The quality of electronic clinical notes evaluated by trained medical auditors using the PDQI-9 SV tool was appropriate. This adapted tool has the potential to improve the documentation using the record quality level as an indicator.

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