Feedback, Workshop, and Random Monitoring as Quality Assurance Interventions in Improving Data Entries of Residents in Electronic Medical Records of UP Health Service for COVID-19 Teleconsultations

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ABSTRACT

Background. Medical records provide a repository of patient information, physical examination, laboratory findings, and the outcomes of interventions. The completeness of data contained in the electronic medical record (EMR) is an important factor leading to health service improvement. Quality assurance (QA) activities have been utilized to improve documentation in electronic medical records.

Objective. To determine the effectiveness of QA interventions (feedback, workshop, and random monitoring system) in improving completeness of data entries in the EMR of resident physicians for COVID-19 teleconsultations.

Methods. This was a before-and-after study involving EMR entries of physician trainees on health care workers (HCWs) from March to October 2022 of the COVID-19 pandemic. A chart audit was conducted against a checklist of criteria for three months before and after the interventions. QA interventions included the provision of feedback on the results of the initial chart review; conducting a QA workshop on setting of standards, chart audit, data encoding, analysis, and presentation; and random monitoring/feedback of resident charting. The change in the level of completeness from pre- to post-intervention was computed, and the percentage of charts meeting the minimum standard of 90% completeness was likewise determined.

Results. A total of 362 and 591 chart entries were audited before and after the interventions. The average percentage of completeness of medical records during initial consultation improved from 83% to 95% (p>0.05). The documentation of the reason for seeking consultation significantly increased from <1% to 84%. The reporting of past exposure and level of risk decreased to 89% (p=0.001) in the initial consult and 12% (p=0.001) in the fit-to-work, respectively. Majority of the criteria for work clearance improved after the intervention. However, the average completeness of entries did not reach 90% post-intervention for fit-to-work consultations.

Conclusion. Feedback, quality assurance workshop, and random monitoring of electronic medical records are effective in increasing documentation practices for the chief complaint and dates of illness duration but showed non-significant increasing trend on overall percentage of EMR completeness for COVID-19 teleconsultations.

Keywords: quality assurance, electronic medical records, chart audit

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INTRODUCTION

Documentation in the healthcare setting is a key safety and quality issue. Medical records provide a repository of patient information, which are used for clinical or administrative decision-making, case management reviews, and medical/epidemiologic research.[1] An accurate and complete medical record is necessary to ensure delivery of appropriate health services for the patients' safety and health.

Quality assurance (QA) activities have been utilized to improve documentation in electronic medical records (EMR) among different health professionals. Interventions used for improving medical record documentation were education, EMR optimization, monthly data feedback, clinic huddles, peer review process, and monitoring.[2,3] However, there were inconsistent results between studies on interventions reporting either positive outcomes or inconclusive results.[4]

It is important to determine which interventions would help improve the completeness of medical records of consulting physicians in the telemedicine outpatient clinics. The objective of this study is to determine the effectiveness of QA interventions (feedback, workshop, and random monitoring system) in improving completeness of data entries in the EMR of resident physicians for COVID-19 teleconsultations.

The problem on incomplete patient records in the telemedicine outpatient clinic could have been brought about by the overwhelming number of patients due to the COVID-19 pandemic, limited time for conducting teleconsultations, rapidly changing guidelines, and technological limitations in a government hospital. One strategy to improve the quality or completeness of medical records would involve increasing the knowledge and attitudes of physicians on documentation. The interventions that could improve knowledge and attitudes include giving feedback to resident physicians on their documentation performance; conducting a lecture on setting of standards, chart audit, data encoding, analysis, presentation; and random monitoring/feedback of chart entries of resident trainees.

METHODS

Study Design, Setting, and Population

This was a before and after quality assurance (QA) activity involving data entries on electronic medical records (EMR) of health care workers (HCWs) from March to October 2022 of the COVID-19 pandemic. The study was conducted at the hospital employees' clinic (UP Health Service, UPHS) of the University of the Philippines-Philippine General Hospital (UP-PGH).

All medical records of HCWs who sought consultation for COVID-19 symptoms were included; data entries of HCWs with laboratory-confirmed SARS-CoV-2 infection by RT-PCR or rapid antigen test, who sought fit-to-work certification were likewise considered. Exclusion criteria, on the other hand, were records of consultations for pre-procedure or pre-travel request for nasopharyngeal swab, fit-to-work certifications for COVID-19 symptoms or exposure without RT-PCR, and records of UP Manila employees or students who sought consultation for COVID-19 symptoms and/or exposure.

Data Collection Procedure, Tool, and Sample Size

The study population was selected based on the inclusion/exclusion criteria from a listing of COVID-19 suspects and confirmed employees from UPHS telemonitoring. All qualified medical charts were included to avoid selection bias. A chart audit was conducted by a trained research assistant against a checklist of criteria agreed upon by study investigators. Post-intervention chart audit was conducted for three consecutive months. All information collected by the research assistant were reviewed by the primary investigator to ensure completeness and accuracy of data.

The chart audit criteria were formulated based on the prevailing guidelines of the Hospital Infection Control Unit on the diagnosis and management of COVID-19. Two sets of criteria were developed for each type of COVID-19 related consult. The 6-item criteria on completeness of documentation during the initial consult included important items in the history and the diagnosis, which would affect patient management. The 9-item criteria on completeness of the medical record during return-to-work certification included salient points in the history, diagnosis, and management of the patient. A detailed discussion on these criteria may be requested from the corresponding author.

The tool for chart audit was developed based on the objectives and the variables. It was generated using Google forms and was composed of yes / no / not applicable responses. A YES indicated that there was documentation of the criteria, while a NO response indicated failure to document the needed information. A NOT APPLICABLE (NA) answer is considered for cases where the question is not pertinent to the case. The first three criteria for chart audit of consultations prior to return to work were not applicable for all cases (i.e., in cases where there is no initial consult or if there are no known exposures).

There was no sample size computation. Medical records of all HCWs who were seeking fit to work certifications three months before and three months after the interventions were screened based on the inclusion and exclusion criteria.

Study Period and Interventions

The study period was three months pre-intervention phase, two months intervention period, and three post-intervention months.

Interventions consisted of feedback on the initial chart review results; didactic lectures on quality assurance concepts, setting of QA targets, with emphasis on the importance of continuing QA activity; and hands-on audit of selected records for COVID-19 related teleconsultations or fit-to-work

certifications. These lectures and workshops were conducted for all resident trainees during a one-day QA learning activity by the research investigators who were faculty members of the research and quality assurance committee of the department. In addition, random chart check and feedback for individual resident-on-duty was done by the primary investigator during the two-month intervention period.

The minimum standards and the target percentage for chart completeness was set at 90% completeness for all chart categories. The 90% level of completeness was agreed upon by the study investigators as the reasonable target for training while ensuring patient safety. Data on completeness of data entry on medical records of employees was evaluated using essential points needed in history taking, diagnosis, and management.

Data Analysis Plan and Outcomes

Completeness of data entries was determined as the proportion of items in the audit criteria that were recorded in the medical chart (computed based on the number of yes responses) over the total number of items reviewed. The overall pre- and post-intervention ratings of EMR charts were compared using a paired t-test, while the comparison of scores for each individual criterion before and after the intervention was done using the test for two proportions.

All analyses were done in STATA 17, and p-values <0.05 were considered statistically significant. Outcomes include percentage of charts meeting the minimum standards, level of completeness of patient records based on set criteria (pre-intervention and post-intervention level of completeness), and change in level of completeness from pre-intervention to post-intervention.

Ethical Considerations

The proposal was exempted from ethical review by the Ethics Review Board of the University of the Philippines-Philippine General Hospital. The conduct of the study including data collection, data entry, and analysis was done in accordance with the Implementing Rules and Regulations of the Data Privacy Act of 2012. Waiver for documentation of consent was sought as the study design is a quality improvement process on completeness of data entries in the EMR.

The principal investigator declares no conflict of interest in the management and analysis of this research.

RESULTS

A total of 362 and 591 chart entries were audited before and after the interventions. It has a ratio of 1:2 for the charts reviewed pre- and post-intervention.

Medical Records for Initial Clinic Consultation

Only a subset of the total number of charts audited were records of initial consultation. There were 297 electronic medical records reviewed before and 416 charts after the conduct of feedback, workshop, and random monitoring.

The reason for seeking consultation was documented in less than 1% of records reviewed. It has significantly increased by 83% (95%CI -90.78, -75.88) after the intervention (Table 1). The documentation of symptoms, past exposure, risk factors, and vaccination status was above the standard of 90% before the intervention. The reporting of past exposure based on post-intervention chart audit decreased by 11% (95%CI 7.35, 14.65). There was 100% documentation of a working diagnosis before and after the conduct of interventions.

Pre-intervention, the overall average percentage of complete entries in medical records was 83%, which was below the preset standard level. The percentage of charts that fulfilled the criteria increased by 12% (95%CI -25.36, 48.80), passing the standard of 90% after feedback, workshop, and monitoring were conducted (p>0.05).

Medical Records for Fit-to-work Certification

Fit-to-work certification is requested by employees who underwent quarantine or isolation after recovering

Table 1. Pre- and Post-intervention Completeness of COVID-19 Initial Chart Records of Department of Family and Community Medicine Residents (March-October 2022)

Chart Audit Criteria for Initial Clinic Visit	Pre-intervention^ (n = 297)	Post-intervention^ (n = 416)	*p*-value
Criterion 1: Chief complaint was documented, %	0.67	84	0.001*
Criterion 2: Absence/presence and onset of COVID-19 related symptoms (if applicable) was documented, %	99	99	-
Criterion 3: Elicited inquiry on past exposure to a COVID-19 case, %	100	89	0.001*
Criterion 4: Elicited inquiry on risk factors such as hypertension, diabetes, cardiovascular or pulmonary disease, %	99	98	0.292*
Criterion 5: Vaccination status was documented, %	100	99	0.084*
Criterion 6: A working diagnosis was documented, %	100	100	-
Average percentage of completeness	83.05	94.95	0.45**

**p-value <0.05 is significant and was computed using tests of proportion; **p-value computed using paired t-test*
^Percentage of Completeness

Table 2. Pre- and Post-intervention Completeness of COVID-19 Return-to-work Chart Records of Department of Family and Community Medicine Residents (March-October 2022)

Chart Audit Criteria for Fit-to-work Certification	Pre-intervention^	Post-intervention^	*p*-value
Criterion 1: Last working impression (LWI) was documented	100% (320 / 321)	100% (341 / 342)	-
Criterion 2: Level of exposure risk was documented	96% (322 / 334)	12% (7 / 59)	0.001*
Criterion 3: Last date of contact was documented	0% (0 / 13)	100% (1 / 1)	-
Criterion 4: Date of onset of illness was documented	43% (155 / 357)	70% (267 / 380)	0.001*
Criterion 5: Date when symptom was last present was documented	22% (78 / 357)	56% (214 / 380)	0.001*
Criterion 6: RT-PCR result for SARS-CoV-2 was documented	100% (356 / 357)	100% (379 / 380)	-
Criterion 7: Date of RT-PCR specimen collection was documented	99% (355 / 357)	99% (377 / 380)	-
Criterion 8: Assessment at the time of return to work was documented	96% (341 / 357)	97% (367 / 380)	0.459*
Criterion 9: Showed plans for the employee including quarantine/isolation duration and date of return to work	97% (347 / 357)	99% (377 / 380)	0.051*
Average percentage of completeness	72.58	81.43	0.59**

**p-value computed using tests of proportion; **p-value computed using paired t-test*
^Percentage of Completeness=number of charts which met the criterion / total number of charts reviewed

from COVID-19 related symptoms. There were 357 charts reviewed before and 380 charts after the intervention based on the criteria.

The diagnosis in the last recorded consult, date of specimen collection, results of RT-PCR, assessment during the consultation, and plans for the quarantine/isolation duration were well documented to have achieved the standard (Table 2). Unfortunately, the date of illness onset was observed in only 43% of the records at baseline. After interventions, the chart documentation for the onset date increased by 27% (95%CI -33.99, -19.70) but was below the target level of 90%. The same increasing trend was evident in the documentation of the date of last symptoms in 22% of charts reviewed before the intervention and increased by 34% (95%CI -41.53, -27.40) post-intervention.

The documentation of the exposure risk level was at 96% before the intervention, and it significantly decreased by 84% (95%CI 74.32, 94.76) thereafter. The related patient information on the last date of exposure was not observed among the charts reviewed prior to intervention (Table 2).

The average overall percent of records with complete entries did not achieve the target level of 90% post-intervention (Table 2).

DISCUSSION

The overall percentage of chart completeness for both the initial clinic visit and return-to-work certification has increased after feedback, workshop, and monitoring. The improvement in completion of essential patient information during the initial consultation reached the pre-set standard of 90%. There was a significant increase in the documentation of chief complaints and dates of illness duration but did not reach the target level of 90% post-intervention.

Electronic medical records (EMRs) are used for quality assurance activities in health care settings.[5] Patients' medical record should contain all appropriate and relevant information (completeness) to capture patients' true health status (correctness) at any given point in time (currency).[6] It provides a repository of patient information, physical examination, laboratory findings, and the outcomes of interventions. Documented medical information influences management decisions and serves to facilitate communication among health care workers. Likewise, it is a legal document that can be used for clinical case management reviews, audits, and researches.[1]

Incomplete documentation can lead to problems in patient management, increased treatment costs, medication errors, disease complications, and deaths.[7,8] Likewise, it can result in administrative errors affecting disease monitoring or insurance reimbursements. Das et al. in a retrospective review showed that incomplete and inaccurate coding for *Staphylococcus aureus* bacteremia from administrative data without laboratory documentation had led to underestimation of the disease.[9] Hay et al. in another review, concurred that administrative errors were attributable to documentation issues by the medical practitioner or misinterpretation of the coded document. Incomplete and inaccurate medical record documentation therefore have potential implications on policy decisions, resource allocation, and inaccurate comparisons of disease burden across subnational or national settings.[7] The poor quality of records documentation was also noted to be the most significant factor underlying coding errors related to reimbursement.[10]

The University of the Philippines Health Service (UPHS) of the Philippine General Hospital (PGH) is the outpatient clinic for employees of PGH/UP Manila (UPM), and students. Clinic consultations were conducted on a first-come, first-served basis via face-to-face consultations. COVID-19 pandemic, however, changed the processes of daily patient encounters, and documentation had been challenging. Medical knowledge about SARS-CoV-2 and its

illness course has been limited and evolving which resulted to practice standards that were changing, and documentation practices of physicians had often lagged. However, amidst these challenges and adjustments, documentation in terms of completeness and accuracy to diagnosis and management should remain standard especially for resident trainees who must practice proper documentation and apply rational clinical management. Errors and non-compliance should be identified and intervened on to ensure patient safety and quality of care. The study results showed that feedback, workshop, and monitoring can increase the completeness level of data entries of resident physicians. It can be an effective tool to utilize during training to improve documentation practices of physicians.

The quality assurance interventions conducted with the resident physicians are examples of managerial measures to assure completeness of data entries in EMR.[11] These measures resulted in the improvement of completion of relevant patient information including chief complaints, date of illness onset, and date of last symptoms.

The documentation of reasons for seeking clinic consults improved significantly, but it did not reach the desired target despite intervention. Majority of the employees who presented at the initial clinic visit were suspected to have COVID-19 with laboratory requests for SARS-CoV-2 RT-PCR. Thus, the documentation of chief complaint may have been seen as less useful by the trainees and was included in the symptoms listed as part of the template for initial consultation.

On the other hand, external factors outside the organization such as changes in policies also affected the quality and completeness of data.[11] This is evident in the significant decrease in documenting the presence of an exposure to a COVID-19 case and the level of risk exposure observed after the interventions. It was noted that during this time of data collection, the hospital infection control policies had placed less emphasis on the presence of exposure to confirmed COVID-19 cases. Thus, eliciting this information from patients was deemed less important.

There were technical factors like electronic equipment and information technologies/systems that served to support data quality.[11] The use of low-efficiency hardware for encoding a high volume of information resulted to delays in documentation or omission of some information. The availability of the date of illness onset in the initial charting could have been the reason for omitting this information in the consult for work clearance. However, it is important to repeatedly mention certain information that could be used to indicate importance, corroboration, or confirmation of a prior finding and diagnosis.[12]

Various interventions for quality assurance activities have been utilized to improve documentation in electronic medical records among different health professionals which resulted in positive outcomes in most of the studies. An interrupted time series in a pediatric primary care setting reported improvements in immunization rates and laboratory screening with an intervention consisting of education, EMR optimization, monthly data feedback, and clinic huddles for care gap management.[2] The peer review process was also found to be successful in reducing non-compliance in electronic medical recording among primary care pharmacists, with a decrease in overall non-compliance from 31.3% to 8.3% (p-value <0.001).[3] A systematic review on interventions showed positive outcomes in majority of studies included.[4] These studies underscore the effectiveness of education, peer review or feedback, and monitoring as potential interventions to improve the quality of EMR documentation. In this study, the conduct of chart audit feedback, didactics, and random monitoring resulted in improved documentation practice of trainees.

Study Limitations

COVID-19 pandemic had posed inherent challenges in doctor-patient encounters and physicians' documentation practices. The UP Health Service operates on a fixed number of health staff. The daily changes in the number of SARS-CoV-2 infections can result in inappropriate patient load for the physicians on duty. Missteps or lack of encounter records were observed during surge of patients with COVID-19–related concerns. This was also compounded by software or internet downtimes that caused physicians' delay or failure to log patient details.

Likewise, the use of templates to document processes and entries in the EMR might have affected the results of the study. Templates were a strategy used by the hospital to ease documentation workload. The favorable levels presented might be reflective of template use rather than the actual resident physician documentation practices.

CONCLUSION AND RECOMMENDATIONS

Feedback, quality assurance workshop, and random monitoring of electronic medical records are effective in increasing documentation practices for the chief complaint and dates of illness duration but showed non-significant increasing trend on overall percentage of EMR completeness for COVID-19 teleconsultations.

Quality assurance activities with inclusion of chart audits, feedback, and monitoring for completeness of electronic medical records must be routinely done as a training strategy for residency. An updated checklist should be used during routine QA activities to ensure that continuous improvement and appropriate interventions are implemented. Documentation is crucial in every clinical encounter. EMR entries instead of paper documents may be easier to retrieve provided that high efficiency hardware and software are available. Incorporation of other QA strategies such as peer review and other continuous quality improvement activities may also be performed to improve documentation practices of trainees.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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