Analysis on the completeness of case records of patients with penetrating ocular trauma following a multimodal intervention

Sanira Vaghmare, Ramesh Rahul, N Venkatesh Prajna, Naveen Radhakrishnan

Purpose: To describe the process development of a multimodal intervention and the pre- and postintervention results on the completeness of case records of patients with penetrating ocular trauma in a high-volume tertiary eye care hospital in south India. Methods: A multimodal intervention including an objective-validated case sheet template, an education program, a physical template case record reminder, a continuous near-real time audit process, and a feedback system was developed. Analysis on the completeness of the case records of patients with ocular trauma from October 2020 to December 2020 (preintervention) and from January 2021 to March 2021 (postintervention) was performed. These case records and the personnel involved in the documentation, were given scores based on the scores assigned to the subsections of the validated template case sheet. The mean total score of the case records and of the personnel involved were analyzed. Results: One hundred and eleven case records of patients with ocular trauma who underwent primary wound repair were included in the study. Of these 111 case records, 46 belonged to preintervention group and 65 belonged to postintervention group. The mean total score for preintervention group during the study period was 57.93 ± 24 out of 100 and for postintervention group was 99.07 ± 4.49 out of 100. The temporal trend of postintervention group showed a consistent improvement every month (97.14, 100,100) during the 3-month study period. Postintervention improvement was noted in all the sections of case records completed by both fellows and consultants. Conclusion: A sustained improvement in ocular trauma case record documentation at all levels of medical professionals was noted following the five-component multimodal intervention.

Key words: Electronic medical record, medical record audit, ocular trauma

A well-documented medical record is the best defense for medical professionals against malpractice litigations. Medical records are also an important tool in ensuring high-quality patient care, preventing undue delays and complications, and assisting in medical research and education. Despite its significance, many studies have captured the inadequacies in medical record documentation in various medical fields. Some of the factors contributing to poor medical documentation include high patient volume, increased number of professionals involved in individual patient care, complex medical protocols, and the use of unformatted case records. A good number of strategies have been implemented to reduce the deficiencies in medical record documentation with different levels of success. These include audits, case record templates, reminders, educational training programs, and multimodal programs including some of the abovementioned strategies.

There are very few studies on medical documentation in the field of ophthalmology. There is also an increase in the number of litigations in ophthalmology in the recent past with heavy compensations being paid. Among the different subspecialities in ophthalmology, the case record of patients with ocular trauma has the highest chance for undergoing external scrutiny, especially for medico-legal purposes including insurance claims.

To bring in a mentality of discipline of accurate documentation of medical record of ocular trauma among the trainees and consultants in our department, we developed a five-component multimodal approach which included development of an objective validated case sheet template, a single intervention education program, a physical reminder, a continuous near-real time audit process, and a feedback system. In this study, we describe the process development of this multimodal intervention and the pre- and postintervention results of this approach on the completeness of medical records of patients with ocular trauma.

Methods

The study adhered to the tenets of the Declaration of Helsinki. This study was conducted in the department of cornea and refractive surgery of a high-volume tertiary eye care hospital in south India. A multimodal intervention was given and the new creations are licensed under the identical terms.

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in south India. The department consists of 8–10 consultants and trains 10–15 fellows every year and treats on an average 3–6 new penetrating ocular trauma patients every day. When a patient with penetrating ocular trauma visits our clinic, a detailed preliminary examination is performed by the fellow or consultant including documenting the history of trauma (time, place, mode, and nature), prior treatment, personal identification marks, visual acuity documentation, and anterior segment and undilated posterior segment examination if possible. The patient is subjected to X-Ray or computed tomography (CT) scan of orbit to rule out radio-opaque intraocular foreign bodies and fracture of orbit and routine preoperative blood investigations. The final examination is performed by the consultant who prescribes topical and systemic antibiotics and advises surgery, after evaluating the patient, documenting the investigations, and counseling the patient and the relatives regarding the prognosis. After obtaining an informed consent from the patient and the relatives, the patient is posted for primary wound repair for 3-months postintervention from January 2021 to March 2021 were included in this study. These results were compared with the results of 3-months preintervention audit of case records of all the ocular trauma patients who had undergone primary wound repair during October 2020 to December 2020 in our department.

The results of the audit of consecutive ocular trauma patients who had undergone primary wound repair for 3-months postintervention from January 2021 to March 2021 were included in this study. These results were compared with the results of 3-months preintervention audit of case records of all the ocular trauma patients who had undergone primary wound repair during October 2020 to December 2020 in our department.

Statistical analysis was done using statistical software STATA11.0, USA. Continuous variables were expressed as means ± standard deviation.

### Results

The audit results of 111 case sheets of patients with ocular trauma who underwent primary wound repair were included in the study. Of these 111 case records, 46 belonged to...
preintervention group and 65 belonged to postintervention group.

The mean total score for preintervention group during the study period was 57.93±24 out of 100 and for postintervention group it was 99.07±4.49 out of 100 [Table 2]. Section-wise analysis showed improvement in all the sections in the postintervention group, with maximum improvement in the preliminary examination section. Postintervention improvement was noted in the sections of case records completed by fellows and consultants [Table 3]. The temporal trend of postintervention group showed a consistent improvement every month (97.14, 100, 100) during the 3-month study period [Table 4].

**Discussion**

We noticed a consistent improvement in all the sections of medical case records of patients with ocular trauma who underwent primary repair, following a five-component multimodal intervention. Medical record is the only objective record of the patient’s condition and the care provided for malpractice litigations. Despite the increase in malpractice litigations, the ophthalmology case records in these litigations are grossly inadequate; making it difficult to defend that there was no deficiency in the service provided. Various strategies have been implemented to reduce the deficiencies in medical record documentation including audits, case record templates, reminders, educational training programs, and multimodal programs.

To cultivate the habit of complete medical record documentation among our fellows and consultants, we created a five-part multimodal intervention. We decided to stick to one diagnosis instead of including all corneal disorders, as this process will declutter the complexities in protocols and reduce further confusions. We decided to choose penetrating ocular trauma for this intervention, as the medical records of patient with ocular trauma has higher chance of medico-legal examination.

Studies have shown that a single education lecture on medical documentation did not impact the behavior of the doctors in the completeness of case record both immediately and in the long term. Hence, we decided to perform a continuous near real time audit every day to automate the habit of complete documentation. Because of this strategy, the improvement in the case record documentation in our study was sustained throughout the 3-month postintervention study period. As habits are formed over sustained periods of time, interventions designed to alter these behaviors should similarly be of long duration.

Direct involvement of all the personnel involved, in the creation of these strategies for medical record improvement have a better impact on the outcomes. We had chosen our own fellows instead of external administrators to perform the daily case-record audit, as this ensures a grass-root level penetration of the importance of case record documentation. Before implementing the intervention, the case record and the audit process underwent a separate validation with three separate fellows as observers with 10 trauma case records. The discrepancies documented during validation helped us in reducing the ambiguities involved in the process. A physical copy of the template case record was stuck just above the computer screen in all the cubicles of our department. This reminder works in the principle of “spaced repetition” to improve the rate of memorization of the parameters to be documented in the case record.

There is an increasing trend in the usage of electronic medical record (EMR) systems with a hope of improving case record documentation. However, EMR by themselves do not enhance the physician documentation completeness and accuracy. Studies have shown that though there is an increase in the quantity of data gathered in EMR, they do not impact the quality of the data documented. EMRs are user dependent and strategies to cultivate the habit of complete and comprehensive documentation in physicians/users can impact the accuracy of EMR records. Designing individual templates for each subspeciality in the EMR along with pop-up reminders in instances of inadequate documentation can assist in real-time improvement of medical documentation.

There are a few limitations to our study. We analyzed the improvement of medical record documentation for only one diagnosis to avoid confusion in the protocol development and to create a habit of good medical documentation in our fellows and consultants. Also further analysis of the long-term improvement in the quality of overall medical documentation.
and the spillover effects of this intervention on the quality of documentation of other ophthalmic diagnosis are required. Also, the auditing was performed only for documentation errors. This study does not address the errors associated with treatment.

**Conclusion**

To our knowledge, there are not many studies on the completeness of medical records in the field of ophthalmology and on the interventions used to improve the same. This study reports a sustained improvement in oculary trauma case record documentation among all levels of medical professionals using a five-component multimodal intervention.

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**Conflicts of interest**

There are no conflicts of interest.

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