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Clinical Documentation of Dental Care in an era of EHR Use

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Abstract

Background—Although complete and accurate clinical records do not guarantee the provision of excellent dental care, they do provide an opportunity to evaluate the quality of care provided. However, a lack of universally accepted documentation standards, incomplete record-keeping practices, and unfriendly EHR user interfaces are factors that have allowed for persistent poor dental patient record keeping.

Methods—Using two different methods – a validated survey, and a two round Delphi process – involving two appropriately different sets of participants, we explored what a dental clinical record should contain, and the frequency of update of each clinical entry.

Results—For both the closed-ended survey questions and the open-ended Delphi process questions, respondents had a significant degree of agreement on the ‘clinical entry’ components of an adequate clinical record. There was however variance on how frequently each of those clinical entries should be updated.

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COMPETING INTERESTS

The author(s) declare that they have no competing interests.

AUTHORS' CONTRIBUTION

OT conceptualized the project along with EK and RR. OT drafted the manuscript and with EK has primary responsibility for final content. MP and JR critically reviewed the manuscript; RR and EK reviewed the manuscript for scientific content. All authors have read and approved this final draft.

Summary—Dental providers agree that complete and accurate record keeping is essential and that items such as histories, examination findings, diagnosis, radiographs, treatment plans, consents, and clinic notes should be documented. There, however, does not seem to be universal agreement how frequently such items should be recorded.

Clinical Implications—As the dental profession moves towards prevalent use of EHRs, the issue of standardization and interoperability becomes ever more pressing. Settling issues of standardization, including record documentation must begin with guideline-creating dental professional bodies who need to clearly define and disseminate what these standards should be, and; everyday dentists who will ultimately ensure that these standards are met and kept.

Keywords

dentistry; dental record; documentation; standardization; record keeping

INTRODUCTION

Accurate and complete clinical dental records have the potential to serve a variety of important purposes; they allow for effective communication between health care providers, enable quality of care assessments, provide a database for dental research, aid in the defense of malpractice claims, assist forensic identification of victims and, of course, optimize the safety and effectiveness of patient care.^{1–4} However, these admirable goals for patient records may be thwarted by significant issues: a lack of universally accepted documentation standards, incomplete or inaccurate record-keeping practices, unfriendly EHR user interfaces, and a lack of easy and consistent access to patient records. Research consistently shows that these problems are pervasive, ongoing and occur in many patient care fields.^{5–10}

Although there are some published guidelines for content, quality and accessibility of dental records, most notably by the American Dental Association^{11–14} and the American Association of Pediatric Dentistry in 2012¹⁵, it is not at all clear that most dentists and dental institutions are aware of, or have adopted these guidelines in everyday practice. And while there might be a general understanding about the components of an “ideal” record (examination findings, diagnoses and risk assessments, treatment and prevention plans, treatment notes, patient communications including informed consent and dissent, dental laboratory communications, pharmacy communications, provider identification, patient information, medical and dental histories, radiograph, medical laboratory results, communications with specialists and physicians, waivers and authorizations, photographs and study models), there is no clear guidance about how information ought to be represented, and how often this information ought to be updated.

Regardless of any true consensus on the ideal content of a ‘good’ dental record, patient care is clearly not served if practitioners and allied health professionals do a suboptimal job of documenting and maintaining records. Studies conducted in Australia, the UK and Scandinavian countries show clinical dental record keeping practices that fall well below basic standards.^{16–20} For example, in one study, completed medical histories were present in only 44.6% of the patient charts and periodontal screening had been recorded in only 20.7%.²¹ Here in the United States, very little attention has been paid to the topic.²² The

solitary paper we found investigating the adequacy of clinical dental records revealed several documentation flaws in those records. Patient clinical information was reported to be absent anywhere from 9.4% to 87.1% of the time.²³

In a preliminary work in which we looked at clinical dental records at one U.S. dental school, our observations were consistent with the conclusions of these other studies; fundamental clinic entries that either impact directly on quality of care provided or serve as a surrogate for measuring quality of dental care (e.g., the patient's dental diagnosis) were missing from many records. Although complete and accurate clinical records (or 'good records' for short) do not guarantee the provision of excellent dental care, they do provide an opportunity to evaluate quality of care, which incomplete and/or inaccurate records (poor records) do not allow.²⁴

While there is little question that good record keeping is a fundamental professional obligation of the dentist and, in most states, it is a legal obligation as well, these obligations seem to lack the power to persuade practitioners to be more meticulous and consistent in this area of their practice. This study seeks to: (1) understand what is important to include, what is not important to include, and how frequently each entry should be updated; and (2) investigate practitioner attitudes towards record keeping and consider reasons that might undermine these obvious obligations in practice.

MATERIAL AND METHODS

IRB approval was obtained from our Institution's Human Research Protection Program.

This work is based on two studies involving two appropriately different groups of dentists. The *first group* included dentists with extensive clinical and teaching experience from around the country who have a special interest and expertise in clinical dental records. Participants in this group were invited to participate in a two-round Delphi process²⁵ that is commonly used to obtain consensus among experts in a field. They provided feedback on what a typical dental clinical record should contain, and the frequency of update of each clinical entry. The *second group* included faculty dentists and dental students at an academic dental institution and also dentists from a medium-sized private group dental practice (PDP) not affiliated with the school. The participants in this group gave us insight into practitioner attitudes towards record keeping, and the reasons that dental clinical record keeping is not often completely and/or accurately executed.

First Group

The first group of dentists was invited to participate in a two-round Delphi-method study. The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method that relies on a panel of experts.²⁶ The experts answer questionnaires in two or more rounds. After each round, the researcher provides an anonymized summary of the experts' responses from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of the panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the

"best" answer, based on the principle that decisions from a structured group of individuals are more accurate than those from unstructured groups.

In the first round of our electronic Delphi survey (Appendix 1), invitees were asked three *open-ended* questions: (1) what should constitute minimum clinical documentation in dentistry for the typical dental patient; (2) how often the documentation needs to occur; and (3) what are the justifications for their responses. The responses they provided allowed us to frame closed-ended questions for the second round of the Delphi process. It was decided a priori that identical free-text responses from 20% of participants would automatically be included in the second round. After results from the first round were collated and analyzed, a second round of closed-ended questions were sent to participants (Appendix 2). In the second survey, we incorporated summaries of the results of the first round so that respondents could compare those results with their own thoughts, and revise their earlier response. The results from both rounds of this Delphi process are presented and discussed here.

Second Group

For this second group, we sent a survey questionnaire (Appendix 3) that was designed by the research team and tested for reliability using Cronbach's alpha, and face/content validity. Some of the survey questions were derived from a similar national survey instrument administered to medicine/surgery residents in 2012.²⁷ Most responses were graded on a 5-point Likert scale (Strongly Disagree/ Disagree/ Neither Agree nor Disagree/ Agree/ Strongly Agree). A paper version of the questionnaire was administered at the academic site whereas the same survey was electronically administered at the PDP using the Qualtrics electronic data capture tool. Data from the paper and electronic based survey were combined for analyses. Overall proportions are reported and further analyses by subgroup were also conducted. Quantitative results are presented mostly as percentages and expressed in tables and charts, while qualitative responses are reported verbatim as obtained from the respondents. Between-group comparisons were evaluated using chi square tests, Fisher's exact tests, and z-tests for population proportions, as appropriate. The level of significance was set at 0.05. Analyses were completed using Stata version 12 (StataCorp 2011) and Microsoft Office Excel 2010 package (Microsoft Corporation, USA).

The survey asked respondents for their opinions on six different topics: (1) The relative importance of thirteen dental record components; (2) The frequency that each of these components ought to be updated; (3) The qualities of a good dental record; (4) The reasons dental care providers should keep good dental records; (5) The relative importance of each of these reasons; and (6) The reasons that dental care providers may have for not fully completing their dental records. In addition to these items, the survey also asked the respondents about their general attitude toward record keeping. Lastly, the survey asked respondents about the amount of time they spend on documentation as part of a complete patient interaction, the ideal amount of time they thought they should be spending on documentation, and what their suggestions were for improving dental record documentation. Opportunities were given throughout the survey for respondents to add free text to the pre-prepared questionnaire items.

RESULTS

First Group Results

Of the 55 participants who were invited to take part in the Delphi process, 20 indicated interest; all 20 completed round 1, and 19 of them completed the second Delphi round. Mean years of practice was 18 years; the range, 2 – 40 years. Seven respondents currently work at private clinics and 13 at hospitals/dental schools. Nine are general dentists, three pedodontists, two prosthodontists and one each from the following specialties: public health, radiology, oral surgery, periodontics, implant prosthodontics.

Round 1 of the Delphi Survey—Table 1 shows a summary of the responses from the first round of the survey to the open-ended questions: “What should constitute minimum clinical documentation in general dentistry for the typical dental patient and how often the documentation needs to occur?”

Other clinical documentation components (mentioned by <20% of respondents, and not shown in the Tables) include: prognosis, post-operative instructions, tobacco and alcohol history, presence of pain, study casts, treatment/appointment goals, patient contact information, caries risk assessment, next appointment, insurance updates, domestic violence, oral hygiene practices, oral photographs, COE, POE, oral hygiene instructions, referral/patient communication, and dental occlusion.

Round 2 of Delphi Survey—There was 100% agreement on the inclusion of each of the 14 items listed below. Percentages of agreement about the *frequency* for which each of the 14 items should be updated are presented in the Table 2.

Second Group Results

The overall Cronbach’s alpha for the survey instrument was 0.90 indicating excellent internal consistency. Of the 63 paper surveys sent out, 46 were returned to give a response proportion of 73%. The link to the electronic version of the same survey was sent to 54 PDP members, and 19 responses were obtained, to give a response proportion of 35%. Consequently, the overall response proportion (paper and electronic) was 56%.

Of the thirteen dental record items offered in the survey as to what should be included in a dental patient record, eleven had over 89% agreement among respondents. One item, “basic occlusion” had only 75% agreement. Additional write-in items that some respondents thought should be added to the list were: “BMI”, “past dental history”, “diet and habits” and “patient compliance”. There was no majority consensus on these four items.

There was significant variance in respondent views on how often each of the thirteen items should be updated. About 75% of respondents think the medical history should be updated at every visit, whereas, 13% think it should be updated every six months and the remaining 13% expects the medical history to be updated *only* when there is a new medical condition. The question on how often a patient’s alcohol or tobacco use history should be updated produced an even wider spread: 11% responded ‘at every visit’; 28%, every month; 20%, annually; 39%, when there is a change; and 2%, only at the first visit. There was a majority

consensus (over 61% of respondents) on four items that should be updated at every visit: medical history, medications and allergies, current blood pressure and progress notes.

There was a high degree of consensus (over 89%) regarding the five items offered in the survey regarding the necessary qualities of a good dental patient record. One write-in item was offered: “editable/revisable”. We found a similarly high degree of consensus (over 86%) for the seven items offered in the survey regarding the reasons dentists should keep good patient records. There were no additional write-in answers. There was a significant variance in responses to the survey question about the reasons for incomplete patient records though there was a consensus (over 74%) for four of the seven items offered: workflow issues, forgetfulness, time pressure and clunky EHR interfaces.

Finally, respondents on average felt that an ideal amount of time updating records during patient interactions should be around one-fifth of the total time spent interacting with the patient. This is in contrast to the time on average they actually report spending on record keeping, one-third.

DISCUSSION

Our two survey results indicate that there is a high degree of consensus among respondents as to the component items of a complete and accurate (“good”) clinical dental record and that there is agreement on the importance of clinical record keeping in general. However, there is considerable variability on how often respondents think certain clinical indices should be updated. This is not surprising given the fact that accepted guidelines for updating patient records do not exist at this time. Although the American Dental Association and the American Association of Pediatric Dentistry provide a list of what should be included in a dental record, they do not at this time provide guidance as to how often those should be updated. It appears that frequency of updates is driven more by institutional idiosyncracies, practitioner preferences and the varying demands of patient care. Our results indicate that finding consensus on update frequency will be a challenging process due to a wide variance of practice perspective and preference. And yet, as we move towards further implementation of electronic health care records (EHR), little could be more important than finding consensus among practitioners, institutions, researchers and other professionals who depend upon standardized records.

We believe that the Delphi survey conducted in our study is a good first step towards establishing a guideline/standard for both items and update frequency, for patient records. It was remarkable to achieve consensus on fourteen chart items identified by expert respondents from a variety of backgrounds in dentistry. Certainly, additional Delphi surveys on these issues with a greater number of experts would move us closer to establishing universal standards for patient records. Ultimately, standards developed by expert panels will need to be validated by engaging the general practicing population.

Documenting clinical care understandably challenges healthcare providers.^{28–31} Our survey of the second group of participants shows a variety of reasons for this and also shows that respondents were generally spending more time than they would like to during each patient

interaction in order to properly document. Clinical documentation typically occurs in busy settings in which providers must simultaneously balance multiple information sources and competing tasks (e.g. patient examination, taking radiographs and managing patients. As such, healthcare providers resent forces that decrease the amount of time available for patient care or for other needs³¹. The challenge may therefore be how to make the documentation process efficient, complete, accurate and as least disruptive to patient care and the overall workflow as possible. Knowing the specific reasons that clinical records are less than ideal, as we did with the second group, ought to help us plan ways of recording data that is less onerous. One example of such will be to utilize dental assistants as documenters, as suggested by a survey respondent and experimented with by our medical colleagues. Another suggestion that came out of the study was that patients should fill out forms electronically prior to appointments so the doctor only needs to review, update and pull the information into the EHR.

Many others commented on the need to improve the user interface of the EHR systems, designing them in such a way as to help and not hinder expedient data entry. One important aspect of the EHR that needs to be considered is the user-interface. EHR interfaces also require constant improvement in order to facilitate easier entry of clinical information and minimize redundancy. It was clear from our study that this is a prevalent issue and one that will need to be addressed as we move forward with standardization. The competing goals of collecting accurate clinical information and spending quality time with patients will need to be balanced.

Overall, survey response proportions are invariably influenced by the manner in which the survey is administered. Electronic surveys have been shown on the average to have response proportions of 33% and paper-based surveys have been reported to have an average response proportion of 56%.³² While higher response proportions generally do not indicate representativeness,³³ we received a response proportion of 35% and 73% respectively which are above the averages generally reported. As the second survey was carried out at only two dental centers, our survey results may not be generalizable to the entire US dental population. Future studies will need to expand the number respondents and the geographic distribution of those who receive surveys.

As more and more dental care facilities move to electronic health records (EHR) and as the hope for the enormous potential benefits of having shared computerized data grows, the issue of standardization and inter-clinic compatibility becomes a ever more pressing issue. Our goal with these studies was to contribute to the discussion of standardization by asking practitioners directly about the items that they believe are the most important to include in the patient record and how often each should be updated. It seems reasonable that if practitioners believe recording a piece of information in the dental record is unimportant or not valuable they will be less likely to do so and the problem of incomplete data entry will persist. Settling issues of standardization, and design of EHR interfaces, we feel, must begin with the people who will ultimately carry the burden of data entry.

CONCLUSIONS

Dental providers agree that complete and accurate record keeping is essential to patient care and that items such as histories, examination findings, diagnosis, radiographs, treatment plans, consents, and clinic notes should be recorded. There, however, does not seem to be universal agreement how frequent such items should be recorded in the dental record. Before mechanisms are put in place to ensure that important clinical information is documented accurately and consistently, it is essential to have an understanding, and consensus on what makes up a good clinical record. This work is foundational to such an effort.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Summary of responses from the first round of Delphi process

	Every visit (%)	When needed (%)	Biannually (%)	Annually (%)	First visit (%)	Total
Medical History	72	0	17	11	0	18
Dental history	33	22	0	11	33	9
Informed consent	44	44	11	0	0	9
Soft tissue exam/ Oral cancer screening	75	0	25	0	0	8
Review radiographs	13	63	0	13	13	8
Medications and allergies	75	13	13	0	0	8
Extra-oral exam	71	0	29	0	0	7
Chief complaint	86	0	0	0	14	7
Perio charting/ screening	20	0	40	20	20	5
Vitals	80	0	0	20	0	5
Tooth charting	20	0	40	0	40	5
Treatment plan	100	0	0	0	0	4
Dental diagnosis	50	25	0	0	25	4
Treatment notes	50	25	0	25	0	4

Table 2

Summary of responses from the second round of Delphi process

Minimum Clinical Documentation Checklist	Frequency (from round 1)	New Agreed Frequency	Round 2 Agreement (%)
Update Medical History	Every Visit	Every Visit	100
Update Dental History	Every Visit	Every Visit	89
Perform an Intra-oral examination and Oral Cancer Screening	Every Visit	Bi-annually	84
Perform an extra-oral examination	Every Visit	Bi-annually	79
Record Chief Complaint	Every Visit	Every Visit	89
Update Medication and Allergy History	Every Visit	Every Visit	89
Review radiographs	When Needed	When Needed	100
Record vital signs	Every Visit	Every Visit	84
Obtain informed consent	When Needed	When Needed	100
Review treatment plan	Every Visit	Every Visit	95
Record a dental diagnosis	Every Visit	Every Visit	89
Record treatment/clinic notes	Every Visit	Every Visit	100
Update odontogram (tooth chart)	Bi-annually	Bi-annually	100
Update periodontal chart	Bi-annually	Bi-annually	100