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AUDIT OF RECORD KEEPING BY STUDENTS AND STAFF AT WITS ORAL HEALTH CENTRE ADMISSIONS AND EMERGENCY DEPARTMENT

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A Research Report submitted in partial fulfilment of the requirements for the degree of Master of Dentistry in the branch of Orthodontics, in the Department of Orthodontics, School of Oral Health Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg

September 2020

DECLARATION

I, Keitumetse Taunyane, declare that this Research Report is my own, unaided work. It is being submitted for a degree of Master of Dentistry in Orthodontics at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



Keitumetse Taunyane

23rd day of **September 2020** in **Parktown**

DEDICATION

To my parents, siblings and son.

ABSTRACT

Introduction: Good record keeping is fundamental in clinical practice and essential for training and practising dental practitioners.

Objectives: To determine the standard, and evaluate level of compliance of clinical record keeping by undergraduate dental students and staff at Wits Oral Health Centre.

Methods: A retrospective, cross-sectional review of 257 patients' records was under taken. The CRABEL scoring system was used to evaluate 12 variables, scored according their weights to yield a score of 100. STATA® 13 was used for descriptive analysis and all tests were conducted at 5% significance level.

Results: The median CRABEL score was 87 and IQR (70 – 92). Only 7.4% of the records achieved a CRABEL score of 100. None of the variables achieved an overall full compliance of 100%. No statistical significant differences were found between the students and clinical supervisor records, $p \geq 0.05$.

Conclusion: The overall audit of the records showed poor level of compliance.

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TABLE OF CONTENTS

DECLARATION ii

DEDICATION iii

ABSTRACT iv

ACKNOWLEDGEMENTS v

LIST OF TABLES viii

LIST OF ABBREVIATIONS AND ACRONYMS ix

CHAPTER 1 1

Introduction 1

1.1. Introduction and Literature Review 1

1.1.1. Background 1

1.1.2. Importance of record keeping 1

1.1.3. Advantages and disadvantages of good and poor record keeping 2

1.1.4. The CRABEL score 5

1.1.5. Other scoring indices 5

1.1.6. Previous studies 6

1.1.7. Conclusion of literature review 7

1.2. Statement of Purpose 8

1.3. Objectives of the study 8

CHAPTER 2 9

Materials and Methods 9

2.1 Study Design and Setting 9

2.2 Study Sample 9

2.3 Data Collection 9

2.4 Data Management 10

2.5 Data analysis and Statistics 10

2.6 Ethical considerations 10

CHAPTER 3 12
Results 12
CHAPTER 4 16
Discussion and conclusion 16
4.1 Discussion 16
4.2 Limitations of the study 22
4.3 Conclusions 22
4.4 Recommendations 23
CHAPTER 5 25
References 25
APPENDICES 31
Appendix A – Records Review Form 31
Appendix B - Ethics Clearance Certificate 32
Appendix C - Permission letter from CEO: Head of School 33
Appendix D - Permission letter Head of A&E Department 34
Appendix E – Turnitin report 36

LIST OF TABLES

Table 1 The purpose of clinical records 3

Table 2 Advantages and disadvantages of good and poor clinical records.....4

Table 3 Relevant information required in clinical records.....7

Table 4 Demographic characteristics of the sample 12

Table 5 Percentage of different groups with a total on the CRABEL variables 14

Table 6 CRABEL scores variables according to group percentages.....15

Table 7 Expectations of using electronic record keeping system.....24

LIST OF ABBREVIATIONS AND ACRONYMS

ANKLe	Adjusted Note Keeping and Legibility
A&E	Admissions and Emergency
CRABEL	CRAwford – BEresford – Lafferty
CS	Clinical supervisor/staff
HPCSA	Health Professions Council of South Africa
ICD-10	International Classification of Diseases and Related Health Problems
IQR	Inter quartile range
GDP	General Dental Practice
HOD	Head of Department
KT	Keitumetse Taunyane
MM	Mpule Moshaoa
PI	Principal investigator
RCS	Royal College of Surgeons
ST	Students
STAR	Surgical Tool for Auditing Records
UD	Unidentified
WOHC	Wits Oral Health Centre

CHAPTER 1

Introduction and Literature review

1.1 Introduction and Literature Review

1.1.1 Background

Comprehensive and accurate patient record keeping is an important part of good medical and dental practice. It is fundamental for good clinical practice and is an essential skill in the training of dental students and for practicing dental practitioners. Accurate dental records are important in delivering quality patient care; they play a significant role in teaching and enable research. Clinical audits allow for quality assurance to take place in order to assess and maintain (where necessary improve) the quality of care that patients receive.[1]

1.1.2 Importance of record keeping

Accurate dental record keeping is a legal requirement and aids in forensic investigations when needed.[2,3] Patient records can be documented manually or electronically[3] utilising computer patient management system.[4] In the instance of manual records, pre-printed assessment forms have benefited clinicians by enhancing the quality and reducing the duration of initial visit and patient registry. The pre-printed forms may be edited to suit different departments, provided the fundamental clinical information is present.[5] Electronic patient records have an added advantage of being retrieved from several sites at any time. This may also facilitate clinicians in multidisciplinary units in generating warnings on high risk cases and signifying new information as it presents.[3] Clinical records are greatly beneficial with regards to refining the value of each note entry in respect to the patients overall care and treatment and the treating clinicians work.[6,7]

Dental remains are usually the last to be destroyed among body parts after death.[8] They may be useful for personal identification in cases of mass disasters and decomposed unidentified bodies. Dental records may help in the identification of suspects in criminal investigations[2,4] and in medico-legal cases. Maintenance of dental records is legally mandatory in most of the European and American countries.[8]

The General Medical Council chapter on professionalism in action affirms the importance of accurate note keeping as a vital component in good medical practice.[9] The ideal medical

record (clinical record) allows for a legal and formal account of the service that had been provided. It is advised to be recorded as soon as possible in a legible, unambiguous and accurate manner. In South Africa, the Health Professions Council of South Africa (HPCSA) has developed guidelines on good record keeping by medical and dental practitioners. Dental records should be kept for six years and in the case of children, until the child is twenty-five years old. Records in a provincial hospital or clinic shall only be destroyed if such destruction is authorised by the Deputy Director-General concerned.[10]

"A medical record is constituted by any record made by a medical practitioner at the time of or subsequent to a consultation with, an examination of, or the application of a medical or surgical procedure to his or her patient and which is relevant thereto."[11] A dental record is the detailed document of patient's personal details, including medical and dental history, history of the illness, medical alerts, precautions, current treatment and medications. It also documents the physical examination of the extra-oral and intra-oral dento-facial region, diagnosis, treatment plan, treatment and the management of a patient. Supplementary records may include intra-oral and extra-oral dental radiographs and photos.[12]

1.1.3 Advantages and disadvantages of good and poor record keeping

Good clinical records can help in the efficient running of a practice. Poor clinical records can result in time wastage and frustrations, which one may find it imperative to discern and comprehend the reason for honouring a certain level which clinical records are complied. Table 1 has been adapted from the Royal College of Pathologists,[13] HPCSA Ethical guidelines for good practice in the health care professions;[10] and Mann and Williams[6] to list some reasons clinical records are formulated. A summarised list contrasting the advantages of good clinical records and the disadvantages from poor clinical records shown in Table 2 was adapted from Mathioudakis et al.,[14]

Table 1 The purpose of clinical records

Clinical records are used for the following purposes
To perform clinical audits
For additional diagnosis or continuing clinical management of patient
To inform research
To provide evidence in medico-legal or occupational litigation instances
To allow continuity of approach in a continuing illness
To facilitate administration and miscellaneous duties
For quality assurance
For training and teaching of healthcare professionals
Epidemiology
Enables data for case reviews
Establishes a source for accreditation
To allow for proficiency in health services
Enhanced public health care

Table 2 Advantages and disadvantages of good and poor clinical records

Good clinical records	Poor clinical records
Aids in communicating imperative information in multi/interdisciplinary teams	Misinforms healthcare professionals and patients
Aids in synchronization in patient care	Increases medico-legal risks
Aids in continuity of care	Lead to unnecessary duplication of tests and special investigations
Aids in informed decision making for patient management	Prolongs hospital admission process
Aids in stating diagnostic and treatment plans without redundancy	Jeopardises patient care
Improves availability of data for risk assessment	May result in significant incidents
Improves audit capabilities	Complicates audit investigations
Improves availability of data for essential cause analysis in the investigation of crucial incidents	Compromise analysis and investigation due to lack of data
Improves time management	Time wastage due to missing records
Provides information and evidence in (medico-) legal cases	Information and evidence might be lacking due to missing records
Provides a database for future research	Compromise research database

A study in Netherlands reported on adverse events in the hospital from missing and/or incomplete medical records. They found that when files were missing, lower rates of registered adverse events were noted in the hospital during the audit. In other instances medical notes were deficient or illegible which resulted in a higher rate of adverse events in the hospital and discontinuity of patient care.[15]

Before dental treatment can commence, a valid informed consent must be given by the patient and /or guidance in case of children. Records of each dental visit should be signed and dated with notes including details of treatment with procedure/ International Classification of

Diseases and Related Health Problems (10th revision) (ICD -10) codes, drugs administered and prescribed, including local analgesia.[16]

1.1.4 The CRABEL score

The CRABEL scoring is a method for auditing medical records proposed in 2001 from CRAwford – BEresford – Lafferty.[17] It ascribes a numerical score to assessments, and evaluations can be made against a criterion of the ideal manner of medical and surgical note taking and record keeping. The CRABEL scoring has four groupings: Initial Clerking, Subsequent Entries, Consent, and Discharge Letter. Appropriate boxes are marked in accordance with compliance; points are then subtracted in order to weigh the quality of the medical notes and records. In a less than ideal manner, the CRABEL scoring may inaccurately reflect the overall status of the notes in that it can pose bias due to unequal score weightings.[18]

1.1.5 Other scoring indices

Jawaid and co-workers used the CRABEL scoring in Dow University and reported a 71% compliance rate. They also noted the necessity for frequent audits in order to enhance and sustain the quality of records more ideally in the training of junior doctors.[19] One of limitations of the CRABEL scoring became the focus points in the Adjusted Note Keeping and Legibility (ANKLe) score.[18] The ANKLe scoring system is able to assess the legibility and content of case notes, in line with the Guidelines of the Royal College of Surgeons (RCS) of England. This method allows for identification of poor documentation and of doctors with poor handwriting compared with CRABEL scoring. The ANKLe score can be modified to evaluate different specialities.[19]

Another method of auditing medical records has been the use of Surgical Tool for Auditing Records (STAR), which was established by the RCS as an adaptation of the CRABEL. Surgical notes are rated in six different categories: Initial Clerking, Anaesthetic record, Subsequent Entries, Operative record, Consent and Discharge Summary. This method has been considered an enhanced version of the CRABEL scoring because it had more information and greater precision to the quality of surgical notes.[20] It has been reported that a regular audit of case notes can result in a major improvement in record keeping. As a result, constructive habits were developed, such as the clinician's signature in the notes is automatically followed by a printed name. Proper documentation has a critical role in

medico-legal cases and correct identification of clinicians from the medical records is essential.[21,22]

1.1.6 Previous audit studies

Previous studies have reported on the audit of the actual content of medical notes, the appropriateness of management of the notes as well as the recording of results and detailed patient/treatment specific information.[23,24] The Swansea physicians audit group focused their study on the lack of attention towards quality in some of the medical note entries. It was found that the level of competency to which the medical record notes were taken failed to meet the benchmark that had been set prior to the audit.[25]

A South African study conducted by the Department of Surgery at Prince Mshiyeni Memorial Hospital reported on the use of the CRABEL score to audit case notes. The study reported 80% compliance rate for 16 out of 35 standards and 100% was achieved for eight operation sheet standards but a number of items fell short of 80% compliance. The recommendations from their results highlighted the importance of improving note taking quality and the frequency of audits and symposia on the expected guidelines with the medical staff team. Furthermore, that legible and accurate note taking should be encouraged from undergraduate level.[26]

A study was conducted at MEDUNSA Oral Health Centre, a dental teaching hospital in Gauteng, South Africa, to evaluate the prevalence of missing or incomplete clinical records of repeat patients who consulted during July 2017. The study revealed that only 3.6% of records had been fully completed and 50 percent of the records analysed were less than 80% completed.[27]

A study conducted in Cape Town to review the record keeping in anaesthetics revealed exceedingly alarming results. The anaesthetic records poorly met the degree of the standards, at 29.9%, with medical note entries and the readability of the entries. This poor compliance increased chances for medicolegal cases, and interfered with high patient care and left the medical records inadequate.[28] Some of the components of ideal clinical records that have been used in previous publications[9,29] and are shown in the Table 3.

Table 3 Relevant information required in clinical records

Clinical records should contain the following important information
Patient name on the examination page
File number on the examination page
Each entry should have the date
Initial entry should be signed for consent by the patient
At the end of each entry note, there should be the clinician's name printed
At the end of each entry note, there should be the clinician's signature
The diagnosis and treatments should be clear and present
Medical and dental history should be adequately recorded
Any and all medication prescribed should be indicated clearly
Any and all special investigation or therapy should be indicated clearly

Adapted from General Medical Council[9] and Osborn et al.,[29]

The unavailability of clinical records possessed one of many issues that enquiring parties; be it clinicians and more so researchers may be faced with when trying to complete an audit. A study by Wegner and Rhoda reported the impediments in "archival survey-research in a rural community" in Cape Town, South Africa.[30] They found that the possible issues arising from hospital files were: incorrect names, incorrect file numbers, file number and names not matching, missing folders, illegible file entries, empty folders (where duplication of files occurred). Their study concluded that inaccurate records impeded research in rural areas, thus compromising the service given to the patient and the overall work of the clinician.[30]

1.1.7 Conclusion of literature review

The importance of accurate record taking has been discussed in this section. Previous studied have used other scoring indices including CRABEL, to highlight the relevance of accurate record keeping. It is therefore imperative that each practitioner implement correct record taking as to abide by laws of HPCSA as well to lessen the chance of having legal implications.

1.2 Statement of Purpose

The purpose of this study was to assess the standards of record keeping by the students and dentists at the Wits Oral Health Centre Emergency Department using the CRABEL scoring method. We have chosen the CRABEL scoring method for this study as it can be easily incorporated to our study setting when compared to other scoring methods, ANKLe,[19] STAR,[20] which use clinical and surgical notes and scrutinize the legibility. The CRABEL scoring looked at the most critical entries in a dental setting. Furthermore, the CRABEL scoring system may be universally applied to any department and specialty including all branches of dentistry and medicine. The system is also adaptable between different dental hospitals irrespective of the different formats of record keeping. We intend to present data in the near future comparing the standard of record keeping between different specialties.

1.3 Objectives of the study

1. To assess the standard of clinical record keeping by undergraduate dental students and staff at Wits Oral Health Centre (WOHC).
2. To evaluate the level of compliance on record keeping using the CRABEL score.
3. To compare the CRABEL scores between the staff (CS) and the students (ST).

CHAPTER 2
Materials and Methods

2.1 Study Design and Setting

This was a retrospective, cross sectional study to investigate the dental records of patients seen by fifth year dental students and those seen by qualified dentists during the period 1 October 2018 to 30 September 2019. Our selected study setting was the Admissions and Emergency (A&E) section of the Wits Oral Health Centre (WOHC) as it is the entry point of all patients visiting the WOHC for the first time.

2.2 Study Sample

The A&E section had collected 5980 of records during the study period. A sample-size calculation, using 95% confidence interval with 5% margin of error estimated that 362 clinical records were required to conduct the study for the selected study period.[31] The records were selected using systematic random sampling technique. Numbers from 15-20 were mixed in a hat and a random number was picked out for sampling. In this instance, number 19 was selected and as such the counting started from every 19th record until 362 records were selected for evaluation.

2.3 Data Collection

A scoring system for this audit, (Appendix A) was modified from the CRABEL scoring system by incorporating biographical information. The first visit entry in each set of records was examined by the Primary Investigator (KT). The scoring system consisted of 12 entries in clinical records including: Patient name (5 points); Patient hospital number (5 points); Date of examination (5 points); Patient main complaint (5 points); Medical history (10 points); Dental history (10 points); Proposed treatment (10 points); Proposed procedure for next visit (10 points); Patient consent signature (10 points); Treatment and treatment codes (10 points); Student name and signature (10 points); Clinical supervisor name and signature (10 points) when supervising student and (20 points) when not supervising students. A score of 100 points was allocated to each record, and points were deducted from the initial score of each entry when records were incomplete. For example; partially completed information in

each variable with a maximum of five may get two out of five and three out of five depending on how much of the information is missing. Partially complete information in each variable with a maximum of 10 can get partial score of five out of 10. In the case when records were signed but the signature was illegible, five points were deducted. The CRABEL score was then calculated by subtracting the total deductions from 100 to give a final score for each record. Based on the findings of the study, recommendations for change will be suggested.

2.4 Data Management

Responses from the record review form were captured, cleaned in Excel, and stored on a secure computer. These responses were password protected and only the researcher and the co-investigator had access to this password. A coding sheet that facilitates analysis with STATA version 14 statistical software (STATA Corp)[32], was developed for responses.

2.5 Data analysis and Statistics

The descriptive statistics with frequency, median and interquartile were calculated and presented in numbers and percentages. Wilcoxon Rank-Sum Test and the Fischer's exact tests were used to compare the CRABEL score between the ST and CS. All statistical tests were conducted at 5% significance and 95% confidence intervals were reported.

Repeat measurements on 10% of the records randomly selected, were conducted by the principal investigator (KT) to determine intra-examiner reliability, one week after the first measurements. One of the supervisors (MM) also measured the CRABEL scores of these records to assess the inter-examiner reliability. The reliability measurements were compared using the Cohen's Kappa co-efficient.[33,34] The Cohen's Kappa coefficient scores were $\kappa = 0.89$ (intra-examiner) and $\kappa = 0.88$ (inter-examiner) indicating substantial reliability of measurements.

2.6 Ethical considerations

The Human Research Ethics Committee (Medical) of the University of Witwatersrand, Johannesburg provided ethical approval M191133 (Appendix B) for the study. Confidentiality and anonymity was maintained throughout the study. Students' and the staffs' names were not used when collecting data. Unique identity numbers were assigned to patient's records and any information that could identify the patient, students and staffs, was not used. Permission to access data for the research was obtained from the CEO of the

WOHC and the Head of Department where records are kept (Appendix C and D respectively).

CHAPTER 3

Results

The study sample was estimated for 362 records, however, 105 files were not retrieved due to poor recording, thus only 257 records were evaluated. These evaluated records accounted to 71% of the estimated sample, which could be representative of the studied population. Thirty of the 257 records had been partially completed with no indication of the clinician and they were labelled unidentified (UD), whilst 15 records had been signed by student (ST) and 212 records were signed by the clinical supervisor (CS).

The mean CRABEL score for the records was 77 and median 87. The CRABEL scores were not evenly distributed because the minimum score was zero and maximum score 100, as the data was skewed, the results were reported in median of 87 and interquartile range (IQR) of 70 to 92. Table 4 shows the demographic characteristics of the sample.

Table 4 Demographic characteristics of the sample

Characteristics	Sample size (%)
Unidentified records	30 (11.7%)
Student records	15 (5.8%)
Clinical supervisor records	212 (82.5%)
Median CRABEL score	87
Interquartile range	70-92
Standard deviation	19.2 ±2
Minimum – maximum	0-100

The Wilcoxon Rank Sum Test was computed to compare the CRABEL score between the ST and CS and showed no statistical significant difference ($p = 0.86$). Furthermore, Fischer's Exact Test was conducted, also showing $p \geq 0.05$, indicating that there was no statistical difference between the CRABEL scores of records taken by students and clinical supervisors.

Table 5 shows the percentages of the different groups (UD, ST and CS) that scored a total (100%) on each of the CRABEL score variables.

The UD's highest score was in the "patient name" variable (63.4%), and the lowest was in both "student signature" and "clinician signature" (0).

The ST scored excellent for "patient main complaint" (100%) and their lowest (53.4%) was recorded for "patient hospital number."

The CS scored highest in "patient main complaint" (97.2%) and the lowest in "student signature" (2.4%).

Table 5 Percentage of different groups with a total on the CRABEL variables

Variables	UD n = 30	ST n = 15	CS n = 212
Patient name	63.4%	93.3%	86.8%
Patient hospital number	36.7%	53.4%	51.4%
Date of examination	53.4%	80%	82%
Patient main complaint	56.7%	100%	97.2%
Medical history	36.7%	93.3%	76.7%
Dental history	23.3%	66.7%	52.9%
Proposed treatment	16.7%	93.3%	70.8%
Proposed procedure for next visit	16.7%	93.3%	74%
Patient consent signature	56.7%	80%	92.9%
Treatment and treatment codes	10%	80%	94.8%
Student's signature	0%	66.7%	2.4%
Clinical supervisor signature	0%	-	38.7%

A CRABEL score of 100 indicated a 100% compliance with record keeping. However, our study found that only 7.4% of the records audited achieved a CRABEL score of 100, showing an overall poor level of compliance. An overall full compliance (100%) was not achieved in any of the CRABEL variables as shown in Table 6. The patient main complaint (92.6%) variable fell above 90% compliance (1/12); three variables (3/12) fell above 80% compliance: - patient's name (84.4%), treatment and treatment codes (84%) and patient consent signature (87.9%). Two of the 12 variables (2/12) fell above 70%: date of examination (78.6%) and medical history (76.7%) whilst the other two (2/12): proposed treatment (65.7%), and proposed procedure for the next visit (68.5%) fell above 60% compliance. Four variables (4/12) which fell below 60% included: patient hospital number (49.8%), dental history (52.9%), student's signatures (6.2%) and clinical supervisor signature (31.9%).

Table 6 CRABEL scores variables according to group percentages

CRABEL Variable	UD n=30	ST n=15	CS n=212	Total n=257
Patient name				
0	(9) 30%	(1) 6.7%	(11) 5.2%	(21) 8.2%
(2/5) 40%	(1) 3.3%	(0)	(2) 0.9%	(3) 1.2%
(3/5) 60%	(1) 3.3%	(0)	(15) 7.1%	(16) 6.2%
(5/5) 100%	(19) 63.4%	(14) 93.3%	(184) 86.8 %	(217) 84.4%
Patient hospital number				
0	(12) 40%	(2) 13.3%	(40) 18.9%	(54) 21%
(2/5) 40%	(6) 20%	(5) 33.3%	(61) 28.8%	(72) 28.%
(3/5) 60%	(1) 3.3%	(0)	(2) 0.9%	(3) 1.2%
(5/5) 100%	(11) 36.7%	(8) 53.4%	(109) 51.4%	(128) 49.8%
Date of examination				
0	(12) 40%	(1) 6.7%	(30) 14.2%	(43) 16.7%
(2/5) 40%	(1) 3.3%	(1) 6.7%	(5) 2.4%	(7) 2.7%
(3/5) 60%	(1) 3.3%	(1) 6.6%	(3) 1.4%	(5) 2%
(5/5) 100%	(16) 53.4%	(12) 80%	(174) 82%	(202) 78.6%
Patient main complaint				
0	(13) 43.3%	(0)	(4) 1.9%	(17) 6.6%
(2/5) 40%	(0)	(0)	(2) 0.9%	(2) 0.8%
(5/5) 100%	(17) 56.7%	(15) 100%	(206) 97.2%	(238) 92.6%
Medical history				
0	(19) 63.3%	(0)	(25) 11.8%	(44) 17.1%
(5/10) 50%	(0)	(1) 6.7%	(15) 7.1%	(16) 6.2%
(10/10) 100%	(11) 36.7%	(14) 93.3%	(172) 81.1%	(197) 76.7%
Dental history				
0	(17) 56.7%	(2) 13.3%	(14) 6.6%	(33) 12.8%
(5/10) 50%	(6) 20%	(3) 20%	(79) 37.3%	(88) 34.3%
(10/10) 100%	(7) 23.3%	(10) 66.7%	(119) 56.1%	(136) 52.9%
Proposed treatment				
0	(24) 80%	(0)	(24) 11.3%	(48) 18.7%
(5/10) 50%	(1) 3.3%	(1) 6.7%	(38) 17.9%	(40) 15.6%
(10/10) 100%	(5) 16.7%	(14) 93.3%	(150) 70.8%	(169) 65.7%
Proposed procedure for next visit				
0	(23) 76.6%	(1) 6.7%	(25) 11.8%	(49) 19%
(5/10) 50%	(2) 6.7%	(0)	(30) 14.2%	(32) 12.5%
(10/10) 100%	(5) 16.7%	(14) 93.3%	(157) 74%	(176) 68.5%
Patient consent signature				
0	(13) 43.3%	(3) 20%	(12) 5.7%	(28) 10.9%
(5/10) 50%	(0)	(0)	(3) 1.4%	(3) 1.2%
(10/10) 100%	(17) 56.7%	(12) 80%	(197) 92.9%	(226) 87.9%
Treatment and treatment codes				
0	(26) 86.7%	(0)	(2) 0.9%	(28) 10.9%
(5/10) 50%	(1) 3.3%	(3) 20%	(9) 4.3%	(13) 5.1%
(10/10) 100%	(3) 10%	(12) 80%	(201) 94.8%	(216) 84%
Students signatures				
0	(29) 96.7%	(2) 13.3%	(207) 97.6%	(238) 92.6%
(5/10) 50%	(0)	(3) 20%	(0)	(3) 1.2%
(10/10) 100%	(1) 3.3%	(10) 66.7%	(5) 2.4%	(16) 6.2%
Clinical supervisor signature				
0	(31) 68.8%	-	(1) 0.5%	(32) 12.5%
(5/20) 25%	(7) 15.6%	-	(4) 1.9%	(11) 4.3%
(10/20) 50%	(7) 15.6%	-	(27) 12.7%	(34) 13.2%
(15/20) 75%	(0)	-	(98) 46.2%	(98) 38.1%
(20/20) 100%	(0)	-	(82) 38.7	(82) 31.9%

CHAPTER 4
Discussion and Conclusions

4.1. Discussion

Patient medical record keeping is essential and has been used for centuries as a means to aid in patient care. Patient medical records remain a source of permanent documentation of the interaction between the clinician and patient.[35] It has been reported that medico-legal issues may arise from inadequate record keeping.[22,36] Patient medical records have been shown to have a greater purpose in recall examinations, updating colleagues, training of students, acquiring skills and information, observing performance, performing epidemiologic investigation and in rationalising proposed interventions.[37] In order to have patient records of great quality, the data by the clinician should follow proposed guidelines which include: accurate, accessible, appropriate, legible, pertinent, precise, thorough, unambiguous and up-to-date. Lacking the proposed guidelines may result in flawed and invaluable records for fellow colleagues and patients alike.[38]

The CRABEL scoring system is a quick, simple and replicable means of measuring and assessing how clinicians obey the guidelines that are set for good quality record keeping.[22] Rai et al., showed that routine audits of patient records can help advance the standard in record keeping. They highlighted the importance of awareness for clinicians in withholding standards in their record keeping, knowing that the audit can occur at any time. Furthermore, they anticipated that clinicians would develop healthy practices of ending medical notes with a full signature and printed name (which is vital for clinician identification if the need arises).[22]

Standard of clinical record keeping

Our study examined 257 out of the calculated proposed sample of 362[31] records due to illegible handwriting of the file numbers recorded in the administration book of the A&E department. This poor handwriting resulted in 105 patients' records not being retrieved for the study and eight records excluded due to missing record forms, thus the sample size was 70% of the proposed sample. From the 257 records, 30 records that were analysed did not have the name and signature of treating clinician as proposed by Rai and co-workers.[22]

The overall standard of record keeping took into consideration the individual CRABEL variables, wherein; ST scored an excellent 100% in recording of the main complaint, which shows great care was taken for this variable. However, they lacked the most in recording of the patient hospital number (scoring 53.4%). CS scored the highest of 97.2% in recording of patient main complaint which could be acceptable but should be improved to 100%. CS scored the poorly (2.4%) in student signatures, this may imply that student did not complete or present their files to the supervisors for their signatures, or negligence in supervision.[59] With the UD group, the highest score came from patient name which is 63.4%, meaning 36.6% of unsigned records were also deficient with patient names. The lowest score for UD was the clinician signatures 0%, these files were partially completed but no clinician signed at the end of the entry.

CRABEL score compliance

Each CRABEL variable that was assessed in our study is of importance for each patient and their healthcare.[39] The HPCSA has recommended minimum information that should be available in a patient's medical record to include the following: Patient specific identifiable details; the medical, dental, socioeconomic and psychological history of the patient, including allergies and habits; each date of consultation; the examination of the patient's illness; the recommended treatment or management for the patient; the prescribed medication and dosages; if any, the specifics of a referrals to specialists; any side effects from prior treatment or medication; special investigation results (laboratory, radiology and so forth) and patients indication of informed consent.[10,39]

Our study showed that a 100% compliance with record keeping was only achieved in 7.4% of the records audited. Therefore, 92,6% of the records showed poor level of compliance as measured by CRABEL score of less than 100. A study by Ho et al., revealed their first (of three) audits was the lowest, with greater improvement in the subsequent two annual audits.[21] Myuran et al., conducted an electronic CRABEL score audits and found that their results improved for six month at monthly audits from 89-94%.[40] The majority of the records in our study were partially completed, they lacked: part of the patient names, partial entry of the date, incomplete patient main complaint, medical and dental history, incomplete entries of proposed treatment, treatment and procedures of next visit. The treatment codes were not

always completed and they were partial signatures or no signatures at all. Although all the 12 variables were computed to calculate the CRABEL score, their median (Table 2.2) were sub-optimal and are discussed below: -

Patient identification

The typical hospital file displays the "patient name" on the cover page which allows for identification of the patient and dignity[41] of being addressed by their name.[38] The "patient hospital number" also allows for identification of the patient as it is made up of letters and numbers that are linked to the specific patient. Both the patient name and the patient hospital number should appear on the front page of the file and the examination form clearly printed, because it contains all relevant and sensitive information about the patient.[42]

Regarding the overall patient identification, a study conducted by Turner et al., looked at implementing barcode patient identification system to assist in blood transfusions. They found that it did ease the transfusion process to have barcodes assigned to patients' names.[43] Our study showed that 84.4% of patient name were completed, thus 15.6% of the records were partially or completely without patient name. As "patient name" is vital in identification, it would be valuable for clinicians to strive for 100% compliance by ensuring that the full name and surname are written clearly on the examination records in future.

Our study also found that patient hospital number had the poorer compliance with only 49.8% completed, whilst 50.2% of records had missing or partial file numbers recorded. The importance of accurate file name and number is not only a law by HPCSA,[10] it is also ideal to ensure that the file and its contents are handled correctly by the clinicians so that personalized treatment occurs for the correct patient and minimize the chance of adverse events.

Date of examination

Date of examination provides medico-legal chronological identification of the appointment that occurred, should the need arise for the medical records to be reviewed.[10,39,44] Our study results showed that 78.6% of the records had the date of examination, whilst 21.4% of the

records were partially or completely without a date. In the event a patient may want to raise a grievance, the presence or absence of complete records may support or work against a clinician.

Patient main complaint

The patient presents to the clinic with a particular reason why they are seeking treatment. This is called "patient main complaint", which should be written in the patient's own words.[39] Our study showed that 92.6% of records had the "patient main complaint" written, however, 7.4% of the records did not annotate the main complaint. Because the main complaint is how patients describe their ailment or reason for the visiting the health practitioner, to serve the patient holistically and avoiding legal issues or misinterpretation, clinicians should strive for 100% compliance in this category.

Medical and dental history

"Medical and dental history" provides the clinician with information pertaining to previous illnesses, experience, diagnoses and treatment a patient may have experienced in order to gain a holistic understanding of the patient.[45] This is critical prior to making a decision on which procedure can be safely performed on the specific patient.[42,46,47] Our study findings showed that "medical history" was recorded in 76.7% of the records, whilst 23.3% of the records were partially or completely without medical history. The dental history was also written in 52.9% of the records and 47.1% were partially or completely without dental history. The deficiencies seen in this variable was incomplete information of the medical or dental history or completely blank sections. The negligence in documentation of these variable may result in life-threatening circumstances, especially in cases of allergies and contraindicated medications being administered. It is of great importance that all clinicians should show a 100% compliance to avoid severe advert effects on patients.

Treatment and treatment procedures

The "proposed treatment" and "proposed procedure for next appointment" section of the clinical form would document the communication between doctors, patient and doctor, or any party concerned with what are the possible treatment remedies for the patient.[42,45] The implementation of treatment would have to be explained to the patient and agreed upon prior to commencement of any procedure.[48] Our study showed that proposed treatment was documented in 65.7% of the records, whilst 34.3% of the records were partially or completely missing this information. Furthermore, proposed procedure for next appointment was found in 68.5%, and the remaining 31.5% of the records were not completed. The importance of these two variables allows for communication amongst the clinicians. The lack of complete and accurate records may affect treatment follow-ups to the patient, duplication and/or even absence of treatment provision.

Patient informed consent signature

The clinician has the responsibility to attain a "patients consent" for medical intervention through an ethical, legal and professional manner.[48,49] The patient has the right to make an autonomous decision about accepting or declining the treatment.[50] Informed consent is not necessarily a joint decision, neither is it passive permission given to the authoritative clinician. It involves communication of a patient's disease, severity, possible treatment and then ensuring understanding. Patient will sign informed consent when they completely understand and are in agreement with the proposed medical intervention they will receive, thereby granting the clinician permission to proceed.[42,48] This notion of informed consent is vital in building trust between patient and clinician and shows good clinical practice.[51,52]The absence of an autonomous decision results in "medical paternalism."[53]

Informed consent and its importance in dentistry for any "invasive or irreversible" procedure,[54] can be presented in three ways as adapted from Mirza et al.,[55]:

1) **Implied consent**: where a patient submissively obliged to treatment with good communication between the patient and the clinician taken place. For example, a patient opening their mouth in a dental practice following the clinician explaining the need to examine the patients mouth. Although overall consent requires signed documentation, implied consent is not signed but a mutual agreement.

2) **Verbal consent**: The patient verbalizes their consent without signing. This is commonly practised in scheduled diagnostic examinations and prophylaxis. Communication and documentation by the treating clinician will be required.
3) **Written consent**: This is a written and signed consent mainly in highly invasive procedures like surgery or anaesthesia. However, this should be obtained in all procedures before clinicians embark on treating patient. The patient will sign the documentation and it should be witnessed with a copy given to the patient.

A 2019 study by Makwakwa and Motloba on dental malpractice cases in South Africa classified "poor record keeping and failure to obtain informed consent" (among others) as unprofessional, which was found in 11.1% of the cases reported for misconduct during their study period.[56] Our study findings showed that in 87.9% of the records informed consent was signed. This showed that about 12.1% of the patients were treated without signing consent to their treatment. It can be assumed that implied consent or verbal consent might have occurred. It is paramount that informed consent is obtained at all times because patients have the right to an informed consent as stated in the South African National Health Act[57] and the HPCSA Guidelines.[58] Thus treating a patient without informed consent is considered an assault.[58]

Treatment and treatment codes

The writing of "treatment and treatment codes" following signing of informed consent is an indication of the type of treatment the clinician has performed for the patient at the time.[39,42] The treatment codes will then be accurately written down in order to send an account to the patient for treatment carried out.[16] There was 84% of the treatment and treatment codes that were correctly completed in our findings. Therefore, 16% of the records were partially or completely deficient with this variable. The lack of the correct treatment codes could result in incorrect accounts and affects revenue collection for the hospital. Furthermore, treatment codes are coupled to ICD-10 codes (International Classification System for Diseases) affecting patients. The ICD1-0 codes consist of guidelines for recording and coding of diseases using alphabets and numerical numbers to ease the classification of diseases. Our study did not assess the use of ICD-10 codes.[16]

Clinician signature

Clinicians, including students who are training, are required by the HPCSA's Rule 15 which states that: "a clinician is obligated to sign their names next to their surname and initial on official documents including medical certificates and medical records in their professional practice."[10] The importance of signing a document with a legible name and signature assist in the clinician identification when required. Our study showed alarming results with ST signatures being 6.2% and CS producing a poor 31.9% of complete signatures. It is a dental school clinical quota requirement for a clinical supervisor to append a signature to the students work at the end of the clinical session to indicate completion[59] and confirm that the supervisor had seen the procedure been carried out. The majority of the student files (93.8%), in our study findings were not completely signed, which raised concerns on whether the supervision was correctly given. Furthermore, there was 68.1% of CS records that were deficient with signatures. This could increase the likelihood of challenges when medico-legal litigations arise, and also showed increased in the lack of clinical supervisors' accountability regarding proper record keeping.

4.2. Limitations of the study

- This was an audit of one department in a dental hospital, therefore the findings would be limited to the A&E department of WOHC and cannot be generalised to other departments.
- Due to illegibility of the recording of patient file numbers in the A&E department patient attendance book, it was difficult to retrieve a number of records which affected our study sample.
- The number of files that were recorded by students was far less than those recorded by clinicians. Therefore, future studies should evaluate the student record keeping as they are taught to practise professionalism during training.

4.3. Conclusions

The findings from our study showed that there was an overall poor level of compliance of record keeping at the A&E department of WOHC. The CRABEL score was an appropriate instrument to use because of it being easy to adapt to the current audit and it can be

duplicated to other departments of the hospital. Preceding studies assessed the content of medical records,[22,25] to gauge the suitability of administration of the records[23] or the contents within the records. The CRABEL score simplifies auditing as it assesses the value of how records are captured and kept.[25]

This audit results will assist the hospital in implementing standards for proper capturing and storing records which can also augment research purposes.[20]The CRABEL scoring system has an advantage of being able to be used in various departments throughout the medicine and allied health departments.[17]

4.4. Recommendations

- Our study showed that a large number of files were irretrievable due to illegibility and/or lost files. The WOHC is currently using paper files and examination forms, it may be of consideration to change to electronic forms. Electronic system for storing records has been reported essential for consistency in noting progress and information of a patient.[15] Electronic filing system presents an alternative manner of certification of medical records. A proposal for "Oral Health Reforms in South Africa", a study by Motloba et al., had one suggestion being "Investment in infrastructure and technology" thus leaning towards training and development of oral health practitioners in the more technological based approach. This being done to bring about cohesion and uniformity across various South African oral health care practitioners.[60]

- Clinicians should be conscious of the record capturing process and they should be of great quality as they may be perceived to suggest level of care given.[3]

- Having immediate access to key information–such as patients' diagnoses, allergies, lab test results, and medications–would improve caregivers' ability to make sound clinical decisions in a timely manner.

- Results of the audit can be used as a baseline to periodically train and assess improvement of record keeping.

- Table 7 lists some of the ways in which having electronic medical records may help the clinic setting.

Table 7 Expectations of using electronic record keeping system

Expected actions	How it may help
Management of results	Quick and easy access of all medical records for multidisciplinary clinicians thus enabling safe and effective care.
Management of orders	Storing up-to-date medical prescriptions, special investigation results thus lowering redundancy.
Support of decision	Enabling reminders for regular follow ups (where necessary) and warnings. Aiding in diagnoses and listing potential drug interactions.
Communication and connectivity	Reliable, safe and easily accessible means of interaction in multidisciplinary cases to allow for sustained patient care. Allows for all clinicians to be informed at any given point.
Support of patient	Patient is able to review their medical records, clinician can communicate with patient, and home-care (in chronic illnesses) can be monitored.
Administrative processes	Bookings and appointments for efficiency in clinics.
Reporting	Can connect government to private institutions, may be able to identify and rapidly report communicable diseases following disease surveillance.
Alignment of Templates	Time saving with a ready there format for various forms required in the clinic.
Significant Templates in one screen (area).	Time saving as it may combine a number of documents to be easy to view and present a holistic view of the patient (medical and dental history, medications, special investigations, previous treatment and so forth).

CHAPTER 5

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APPENDICES

Appendix A – Records Review Form

Audit of record keeping by undergraduate dental students and staff at Wits Dental School Admissions and Emergency Department

Section 1 – General Office use

	Field	Code
101.	Clinician ☐ Student….1 ☐ Staff…..2	☐
102.	Record unique number	☐
103.	Date of review: DD/MM/YY	☐

Section 2 – CRABEL review form

	Field	Initial Mark	Minus Score	Final Mark	Code
1	Patient name	**5**			
2	Patient hospital number	**5**			
3	Date of examination	**5**			
4	Patient main complaint	**5**			
5	Medical history	**10**			
6	Dental history	**10**			
7	Proposed treatment	**10**			
8	Proposed procedure for next visit	**10**			
9	Patient informed consent signature	**10**			
10	Treatment and treatment codes	**10**			
11	Student's signature	**10**			
12	Clinical supervisor 'signature	**10 or 20**			
	Total CRABEL	**100**			

Appendix B - Ethics Clearance Certificate

R14/49 Dr K Taunyane

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M191133

NAME: (Principal Investigator)	Dr K Taunyane
DEPARTMENT:	School of Oral Health Sciences Department of Orthodontics University
PROJECT TITLE:	Audit of record keeping by students and staff at Wits Oral Health Centre, Admissions and Emergency Department
DATE CONSIDERED:	2019/11/29
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Professor P Hlongwa and Dr LM Moshaoa
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2020/01/02

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and ONE COPY returned to the Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in November and will therefore reports and re-certification will be due early in the month of November each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Dr K Taunyane	23/01/2020
Principal Investigator Signature	Date

Appendix C - Permission letter from CEO: Head of School

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FACULTY OF HEALTH SCIENCES

Department of Oral Biological Sciences, 7 York Road, Parktown, 2193. Tel: 011 717 2045 Fax: 086 553 3890 Email: Julithe.Molepo@wits.ac.za

06 December 2019

Dr K. Taunyane
Orthodontics
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg

RE: PERMISSION TO CONDUCT RESEARCH

REFERENCE: HRRC/December/11/2019

It is my pleasure to grant final approval to conduct your research at Wits Oral Health Centre titled "Audit of record keeping by students and staff at Wits Oral Health Centre Admission and Emergency Department".

The Hospital Research and Risk Committee allocated a unique reference number to this application – Kindly quote this reference number in all future correspondence regarding this research.

Please note that the Hospital Research and Risk Committee should be informed of the estimated date the research will commence, as well as regular status reports until the research has been concluded. Within a month after conclusion of the research project, a written report must be submitted to the Head of School/CEO, summarizing the final result/outcome as well as the recommendations made based on the research concluded.

Regards,

WITS ORAL HEALTH CENTRE
Faculty of Health Sciences
7 York Rd Parktown, 2193
12 DEC 2019
Sign:
CEO Prof M S Nemutandani
SCHOOL OF ORAL HEALTH SCIENCES

Prof M. S Nemutandani
CEO/Head of School
Date:

Appendix D - Permission letter Head of A&E Department

The School of Oral Health Scie
Wits Dental Hospital
Faculty of Health Sciences

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

7 York Road, Park Town, Johannesburg.
Tel: +27 11 488-4879/1
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8th floor, Area 385, Johannesburg General Hospital, Park Town
Private Bag 3, Wits, 2050

Department of Orthodontics

20 November 2019

Dr DF Kotsane

HOD: General Dental Practice (GDP)

Wits School of Oral Health Sciences

University of Witswatersrand

Dear Dr Kotsane

RE: PERMISSION TO REVIEW ADMISSIONS AND EMERGENCY DEPARTMENT PATIENT FILESS TREATED AT WITS ORAL AND DENTAL HOSPITAL FOR MY MDENT RESEARCH REPORT

I, Keitumetse Taunyane, am endeavouring to undertake a study on the standard of record keeping in the Admissions and Emergency department in Wits Oral Health Centre. This study will be supervised by Professor P Hlongwa and Dr M Moshaoa.

The proposed title of the study: **AUDIT OF RECORD KEEPING BY STUDENTS AND STAFF AT WITS ORAL HEALTH CENTRE ADMISSIONS AND EMERGENCY DEPARTMENT**

Student: Dr Keitumetse Taunyane,

Student Number: 364743

This study will assess the standard of record entries by practicing dentists and fifth year students

I am writing to you, as the the Head of the Department of GDP, to request your kind permission to access records at the Admissions and Emergency Department at Wits Oral Health Centre. I have requested the permission to access records from the CEO, Prof Nemutandani, and the permission is provisional pending your response (Se attached letter)

Only I as the Principal Investigator and my supervisor, who will evaluate10% of the records for inter-observer reliability testing, will require access to the records. At no time will records be removed from the Department and all due care will be exercised in handling the files. For purposes of confidentiality, codes will be randomly allocated to the records of the patient.

Ethical permission to conduct the study has already been obtained from the Wits Human Research Ethics Committee (M150655). I have also applied for ethics approval to me under my name..

Your consideration for this project will be greatly appreciated.

1

Kind Regards,

Dr Keitumetse Taunyane
Orthodontic Registrar
Wits Oral Health Centre
University of Witwatersrand

20/11/2019
Date

RECOMMENDED/~~NOT RECOMMENDED~~

COMMENTS.....

Professor P HLONGWA
Supervisor

25/11/2019
Date

SUPPORTED/~~NOT SUPPORTED~~

COMMENTS.....

Dr M Moshaoa
Co- Supervisor

21/11/19
Date

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COMMENTS ALL DOCUMENTS MUST BE RETRIEVED FROM PATIENT ADMIN

Dr DF Kotsane
HOD: General Dental Practice (GDP)
Wits School of Oral Health Sciences
University of Witswatersrand

25.11.19
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