

ORIGINAL ARTICLE

Evaluation of Dental Students' Medical History Records on Hypertension and Diabetes Mellitus at The National University of Malaysia

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ABSTRACT

Introduction: A thorough medical history ensures safe dental practice. A good medical history guides clinicians in risk stratification to avoid medical emergencies and improve preparedness to prevent patient morbidity and mortality. This clinical audit aims to analyse the medical history taken by the dental students in patients with hypertension and/or diabetes mellitus (DM) and subsequently, recommend improvements in history-taking components in the dental practice. **Methods:** Hundred and two patients' folders from the Faculty of Dentistry were examined by two independent auditors using a validated history-taking evaluation form. Six components of the medical history were classified as good or bad practices. Sociodemographic factors and distribution of the American Society of Anesthesiologists (ASA status) were described. The level of completeness of medical history records with years of study was assessed using the Chi-square test. **Results:** None of the students met 100% of the components required in medical history taking. Year three undergraduates performed poorly in the completeness of diagnosis and control of the medical condition whereby none of them had a good level of practice. The completeness of records did not differ between years of study except for diagnosis ($p=0.026$), control ($p<0.001$) and updating medical history ($p=0.009$) whereby the postgraduates had the best practice. **Conclusion:** This study highlighted marked deficiencies in taking a thorough medical history. Adaptation of the European Medical Risk Related History (EMRRH) form is recommended to be implemented in dental schools.

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INTRODUCTION

Diabetes mellitus type II (DM) and hypertension are the most common non-communicable diseases (NCD) worldwide, with many unknowingly living with the disease (1). These medical conditions significantly affect dental treatment of which patients with DM have a greater prevalence of periodontal disease and increased

risk of tooth loss (2, 3). Meanwhile, anti-hypertensive medications such as calcium channel blockers can cause gingival hyperplasia, which leads to aesthetic and functional concerns (4). The bidirectional association between general and oral health reflects the role of dental practitioners in screening for medical diseases (5). A detailed medical history is a cornerstone for safe dental practice. A patient's risk assessment is required to anticipate any complications during treatment to improve preparedness for any medical emergency (6). Therefore, continuous dental education should emphasize applying medical sciences knowledge during history taking (7).

Dental record keeping by undergraduate students worldwide showed significant improvement after clinical audit training (8, 9). Despite that, improvement in the medical history component of record keeping did not achieve 100% compliance. Electronic records further help to improve the standard of record keeping compared to handwritten records (10). However, merely asking for the presence of disease is insufficient to generate individual risk assessment. Instead, a systematic, detailed medical history regarding the disease’s diagnosis, severity and control is required. The risk stratification system is widely recognized by the American Society of Anaesthesiologists (ASA) classification and has been modified to determine the patients’ risk concerning dental treatment under local anaesthesia (Table I) (11-13).

Table I: Risk Stratification System Based on Modified American Society of Anaesthesiologist (ASA) Classification for Dental Treatment Under Local Anaesthesia (11)

| Class | Physical status | Therapy modifications |
|-------|--|--|
| I | Healthy patient | None |
| II | Patient with mild systemic disease not interfering with daily life | Possible stress reduction and other modification as indicated |
| III | Patient with severe systemic disease that limits activity but is not incapacitating | Possible strict modifications; stress reduction and medical consultation are priorities |
| IV | Patient with severe systemic disease that limits activity and is a constant threat to life | Minimal emergency care in office; hospitalize for stressful elective treatment; medical consultation urged |
| V | Moribund patient not expected to survive 24 hours with or without an operation | Treatment in the hospital is limited to life support only |

The medical curriculum is integrated into the dental undergraduate program at the National University of Malaysia (UKM), whereby the students learn basic medical sciences during pre-clinical years. After that, skills in history taking and the relevance of medical conditions in dentistry are acquired from hospital attachments and clinical exposure. Meanwhile, the postgraduate students at UKM are required to undergo one year of Applied Medicine and Oral Sciences during the first year of which application of medicine in dentistry was emphasized through case-based learning and clerking patients at the hospital. The medical records at UKM are still handwritten but are transitioning to a computerized format in line with the latest record-keeping trend. Evidence demonstrating a lack of skills in taking a thorough medical history by dental students should not be taken lightly, and a relook of the dental curriculum should be conducted.

Therefore, this study aims to evaluate the integrality of medical history taking of undergraduate and postgraduate dental students in the Faculty of Dentistry, National University of Malaysia (UKM). The research

will focus on commonly diagnosed illnesses, which are hypertension and DM. The secondary aim is to provide recommendations for history-taking components in dental practice based on the results obtained from this study.

MATERIALS AND METHODS

This clinical audit was designed to analyse the medical history-taking records of the undergraduates in clinical years (UG) and year two postgraduate (PG 2) students at the Faculty of Dentistry, UKM. The folders of patients attending students’ outpatient clinics were collected between January 2012 and January 2018. This study included all the folders of patients diagnosed with DM Type II and/or hypertension. No ethical approval was sought as the project was deemed a clinical audit exercise.

Following previous studies, an evaluation form (Fig. 1) was designed as a compact and objective tool to evaluate medical record-keeping (14-16). Items in the evaluation form were ticked as present if they were documented in each folder to assess the medical history clerking by each student. Several items in the evaluation form were identified to be of paramount importance in line with good medical record-keeping practice. These items were weighted for clinical importance in assessing the diagnosis, control, compliance, and complications of DM Type II and/or hypertension by an expert opinion with training in both medical and dental fields (RK). Both history taking of allergies and medical history updates were also required components of a complete medical history. The student record was considered ‘Good Practice’ if all the above components were in the patient’s folder. ‘Poor Practice’ of medical history-taking was defined as the absence of any stated items. The evaluation form was piloted on ten medical history records that were not included in the study. Any discrepancies were discussed among all the authors and modified according to a consensus before use.

Two auditors (FA, AY) were trained to evaluate the medical history records. The folders were then randomly allocated to the auditors to assess the medical history records independently. The folders were then cross-checked by a third independent person (RK) to ensure consistency in analysis between both auditors. The record was reviewed if RK disagreed with the analysis (Fig. 2).

Data were analyzed using Statistical Package for the Social Science (SPSS) version 23. Descriptive statistics were used to state the patients’ socio-demographics, distribution of ASA status and medications taken. A chi-square test for association was conducted to test for statistically significant differences between the level of completeness of medical history records and the year of study. Statistical significance was set at p<0.05.

| Auditor | | | | | |
|---|------|------|------|--------|---|
| Student details | | | | | |
| 1. Gender | Male | | | Female | |
| 2. Year of Study | UG 3 | UG 4 | UG 5 | PG 2 | |
| Patient details | | | | | |
| 1. Registration number | | | | | |
| 2. Gender | Male | | | Female | |
| 3. Age | | | | | |
| 4. ASA classification | I | II | III | IV | V |
| 5. Presence of allergies | Yes | | | No | |
| 6. Medical conditions | | | | | |
| 7. Medication List | | | | | |
| Diagnosis of medical condition | | | | | |
| 1. When | | | | | |
| 2. Where | | | | | |
| 3. How | | | | | |
| 4. Current status and follow up location | | | | | |
| 5. Relevant risk factors (family and social history) | | | | | |
| Control of medical condition | | | | | |
| 1. Presence/absence of symptoms | | | | | |
| 2. Patient's appointment/measurement book checked | | | | | |
| 3. Today's measurement of blood pressure/blood sugar | | | | | |
| Compliance of medical condition | | | | | |
| 1. Medication | | | | | |
| 2. Follow up | | | | | |
| 3. Lifestyle modification advice | | | | | |
| Complications of medical condition | | | | | |
| 1. History taking of target organ damage (TOD) | | | | | |
| -Diagnosis, severity, residual effect | | | | | |
| 2. Signs and symptoms of TOD | | | | | |
| -Chest pain, shortness of breath, palpitation, lethargy, reduced effort tolerance, blurring of vision | | | | | |
| 3. History of hospitalization/surgery/hemodialysis | | | | | |
| 4. Referral to medical | | | | | |
| Medical history update | Yes | | | No | |

Figure 1: History-Taking Evaluation Form

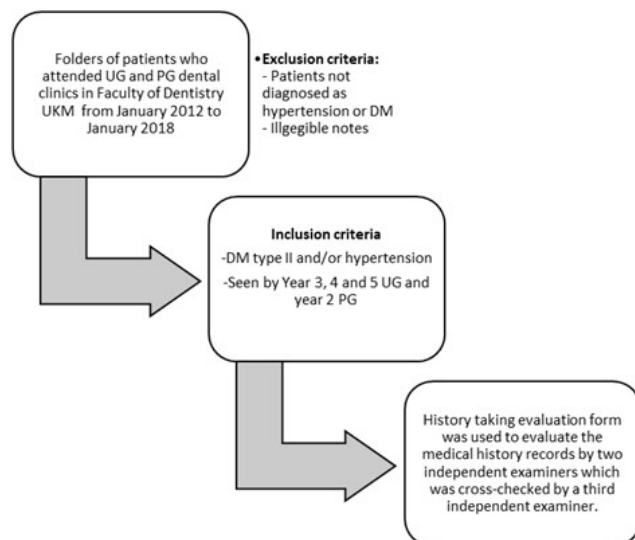


Figure 2: Overview of Research Methodology

RESULTS

Demographics

One hundred and two (102) students' medical history records of patients seen in the Faculty of Dentistry UKM were selected and inspected for completeness. Table II depicts the demographic data of the inspected patients' clinical folders. The patients' gender was equally distributed; their ages ranged from 26 to 90 years, with

Table II: Socio-demographics Characteristics of Patients (n = 102)

| Socio-demographic characteristics | Number of patient, N (%) |
|-----------------------------------|--------------------------|
| Age | |
| 30 years and below | 4 (3.9) |
| 31 – 40 years | 3 (2.9) |
| 41 – 50 years | 14 (13.7) |
| 51 - 60 years | 31 (30.4) |
| Above 60 years | 50 (49.0) |
| Gender | |
| Male | 51 (50.0) |
| Female | 51 (50.0) |

49% in the above 60 years age group.

The majority of the patients seen were hypertensive (53.9%), whereas 18 (17.6%) of them were diabetic (Table III). About 28% of the patients had both hypertension and DM. The distribution of patients according to the ASA physical status classification system is tabulated in Table III. About eighty-five percent of the patients fall under the ASA II category, remaining in ASA III. No ASA IV category patients were reported. Table IV summarizes the types of medication the patient uses to manage their medical conditions. For hypertension, a combination of hypertensive drugs tops the list with 32.4%. The same is seen for diabetic patients (22.5%). Interestingly, 18.6% and approximately 2% of the folders did not record the intake of any hypertensive and diabetic drugs, respectively, despite the patients having those medical conditions.

TABLE III: Distribution of Patients According to Medical Condition and ASA Classification (n=102)

| Distribution of patients | Number of patient, N (%) |
|---|--------------------------|
| Medical condition | |
| Hypertension | 55 (53.9) |
| Diabetes mellitus | 18 (17.6) |
| Both hypertension and diabetes mellitus | 29 (28.4) |
| ASA classification | |
| ASA II | 87 (85.3) |
| ASA III | 15 (14.7) |
| ASA IV | 0 (0.0) |

TABLE IV: Medication List According to Medical Condition (n=102)

| Medication list | Number of patient, N (%) |
|-------------------------------------|--------------------------|
| Hypertension | |
| ACE inhibitor/angiotensin inhibitor | 11 (10.8) |
| Beta blocker | 4 (3.9) |
| Calcium channel blocker | 13 (12.7) |
| Combination | 33 (32.4) |
| Not on any medication | 4 (3.9) |
| Not specified | 19 (18.6) |
| Other type of drugs | 18 (17.6) |
| Diabetes mellitus | |
| Biguanides | 8 (7.8) |
| Sulfonylureas | 1 (1.0) |
| Insulin | 10 (9.8) |
| Combination | 23 (22.5) |
| Not on any medication | 3 (2.9) |
| Not specified | 2 (2.0) |
| Other type of drugs | 55 (53.9) |

Assessment of dental students' level of practice

The results highlight that the standard (100%) still needs to be met in any section. Most of the students were poor in all medical history-taking components. A high percentage (90.2%) of the students did not take a complete history of control of their medical conditions. In contrast, only 12.7% of them took a full history of the complications of hypertension and/or diabetes mellitus. Assessment of dental students' level of practice according to the year of study can be seen in Table V.

Completeness of medical history record

Regarding completing medical history, the year three undergraduates (UG 3) performed poorly in the completeness of the two components, which were diagnosis and control of the medical condition, whereby none of them had a good level of practice. Comparatively, among all the dental students, fifth years performed better in diagnosis (42.1%) and complications (15.8%) components, while the PG 2 fared higher in control (46.2%) and updating medical history (61.5%) components. Overall, the level of practice of the various medical history components did not differ between years of study except in the level of diagnosis ($p=0.026$), control ($p<0.001$) of the medical condition and updating medical history ($p=0.009$), whereby the PG 2 had the best practice.

DISCUSSION

A thorough medical history of patients seeking dental treatment is fundamental to safe practice. A dental practitioner should be able to risk stratify patients to prevent medical emergencies and improve preparedness in handling them. This study aims to evaluate the completeness of medical history taking by dental students in patients with hypertension and/or diabetes mellitus. Differences between medical history taking of undergraduate and postgraduate students were compared with a focus on the presence of criteria in key categories: diagnosis, control, compliance and

complication of the disease, allergies and updating of medical history. The key finding was that most patients had good control of their disease (ASA II) with medications. However, our study highlighted marked deficiencies in taking a thorough medical history.

In dentistry, the ASA classification is used to summarize and provide an overview of patients' general health conditions (17). In this study, 85.3% were classified as ASA II, which has a mild risk in dental care. In contrast, the remaining patients in ASA III are often best treated in a hospital-based clinic where expert medical support is available (18). A study by Clough and co-workers showed that many dental practitioners did not use or are unfamiliar with ASA (19, 20). Moreover, some general dental practitioners had referred patients to inappropriate settings for dental treatment under conscious sedation (19, 20). Therefore, education on the use of ASA classification among dental practitioners is needed, considering its use in clinical risk assessment, communication with other medical specialities, research, and service development.

Our study found that 32.4% of the patients were under a combination therapy to treat hypertension. This in a way raises a red flag to a dental practitioner because combination therapy is given to those with poorly controlled hypertension (19). At the first consultation, assessing a patient's risk is important. This is to anticipate complications that may happen during and after treatment and hence, be able to take preventive measures. However, this study found that undergraduate students were significantly poorer in taking a history of the control level of the patient's medical condition than postgraduate students. This may be due to a lack of awareness of the importance of those histories, and they have lesser clinical experience than postgraduate students (20).

Generally, the dental students at UKM had marked deficiencies in completeness of medical history records

TABLE V: Assessment of Students' Level of Practice According to Year of Study (n=102)

| Medical history components | Level of practice | Year of study, N (%) | | | | N (%) | p-value |
|--|-------------------|----------------------|-------------|-------------|-------------|-----------|---------|
| | | UG 3 (n=12) | UG 4 (n=39) | UG 5 (n=38) | PG 2 (n=13) | | |
| Allergies | Good | 4 (33.3) | 6 (15.4) | 9 (23.7) | 4 (30.8) | 23 (22.5) | 0.480 |
| | Poor | 8 (66.7) | 33 (84.6) | 29 (76.3) | 9 (69.2) | | |
| Diagnosis of hypertension and/or diabetes mellitus | Good | 0 (0.0) | 13 (33.3) | 16 (42.1) | 2 (15.4) | 31 (30.4) | 0.026* |
| | Poor | 12 (100.0) | 26 (66.7) | 22 (57.9) | 11 (84.6) | | |
| Control of hypertension and/or diabetes mellitus | Good | 0 (0.0) | 2 (5.1) | 2 (5.3) | 6 (46.2) | 10 (9.8) | <0.001* |
| | Poor | 12 (100.0) | 37 (94.9) | 36 (94.7) | 7 (53.8) | | |
| Compliance of hypertension and/or diabetes mellitus | Good | 3 (25.0) | 10 (25.6) | 9 (23.7) | 3 (23.1) | 25 (24.5) | 0.996 |
| | Poor | 9 (75.0) | 29 (74.4) | 29 (76.3) | 10 (76.9) | | |
| Complications of hypertension and/or diabetes mellitus | Good | 1 (8.3) | 5 (12.8) | 6 (15.8) | 1 (7.7) | 13 (12.7) | 0.843 |
| | Poor | 11 (91.7) | 34 (87.2) | 32 (84.2) | 12 (92.3) | | |
| Updating medical history | Good | 1 (8.3) | 16 (41.0) | 23 (60.5) | 8 (61.5) | 48 (47.1) | 0.009* |
| | Poor | 11 (91.7) | 23 (59.0) | 15 (39.5) | 5 (38.5) | | |

*Significant level ($p<0.05$)

especially the undergraduates. Despite the presence of basic medical sciences in the dental curriculum during pre-clinical training years, the undergraduate students have difficulty integrating the knowledge into dental practice (21). Furthermore, a study by Ahmed suggested that the possible causes for poor history-taking are poor questioning skills and miscommunication that occurs when the interviewer uses jargon or does not clarify their questions (18). Meanwhile, the lack of compliance in updating the patient's medical history concurs with other studies (9, 10). Dental procedures often take multiple visits in a short time, or the follow-ups may be recurring monthly, leading to the assumption that the patient's medical history did not differ at each visit. Prompts have been shown to improve compliance in this component (10).

The increasing number of medically compromised patients significantly affects dental practice, education, and curriculum design. Hence, the evidence showing a lack of comprehensive evaluation of the patient's medical condition among dental students in UKM should raise the alarm bell that more targeted medical training should be incorporated into the dental students' curriculum and continuing dental education for dental practitioners in Malaysia. Skills to obtain comprehensive medical records allow dental practitioners to have more control over the patient and the underlying disease and are the basis of making the right decisions (22). Constantly updating the patient's medical history is important for the dentist to be better able to provide care to their patient, and they can alert their medical counterparts regarding any possible issues.

The limitation of this study is that the ASA score needs to be included in the examination form. Thus, it was not written in the folder by the students. Instead, the patients were classified by the auditors based on the information recorded by the students. Another limitation in this study is that folders are purely assessed based on what is written. The students may have enquired further about the patient's medical history (e.g., medical history updates and drug allergies) but did not write down the negative history. Besides, the samples were census sampled, providing more accurate information about the student's medical records. However, an unequal number of these records were selected from different years of study, and all the folders that were included in this study were undeniably smaller compared to the general population. Hence, the data collected may not be representative of the level of completeness in medical history taken with the year of study. Despite the study has various limitations, our focus is narrowed to the two most common medical diseases in Malaysia: DM and hypertension. This is because patients in the primary dental setting frequently present with these conditions, and controlling their diseases greatly affects their dental management. Therefore, it is imperative to determine the students' performance in obtaining the medical

history of these two common diseases.

Based on the current findings, we suggest adapting the European Medical Risk Related History (EMRRH) form in dental schools. The EMRRH, a validated patient-administered questionnaire, has 23 questions, and this tool can aid in determining ASA scores for the patient (12). Furthermore, frequent, continuous dental education programs on medical problems in dentistry should be held, including practical sessions, especially for undergraduate pre-clinical students. This will improve their knowledge of the importance of history-taking in dentistry and up-level their skills to perform a complete history-taking task.

CONCLUSION

There are marked deficiencies in taking a thorough medical history among the undergraduates and postgraduate dental students in the Faculty of Dentistry, UKM. Although most patients have good control of their disease (ASA II), there is a further need to improve the quality of medical history taking for the safer practice of dentistry.

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