

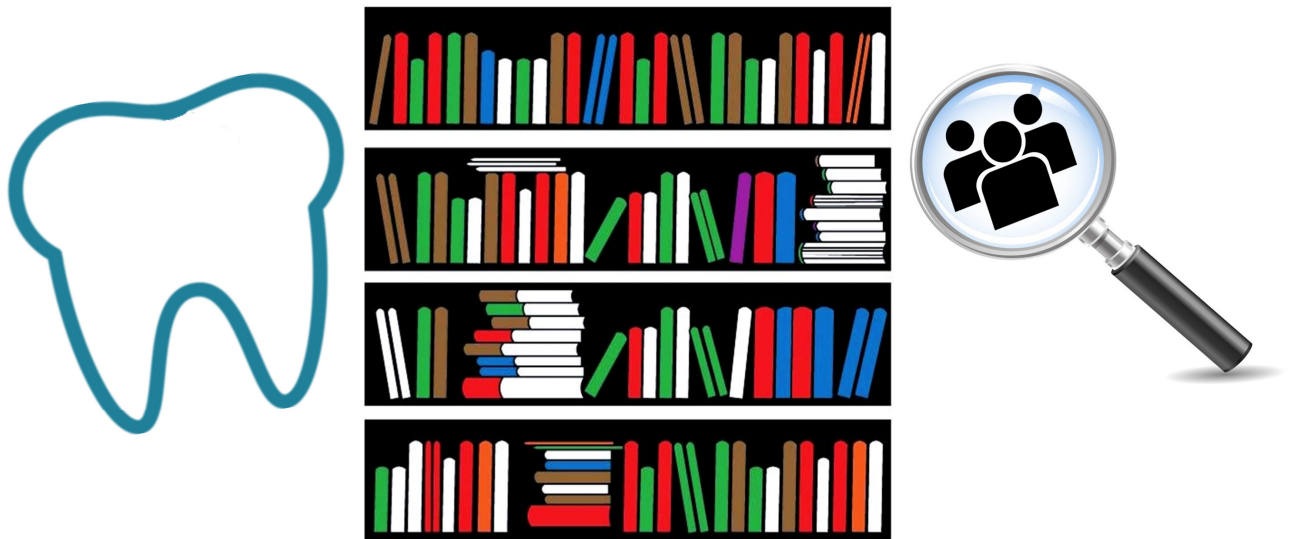


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**Hong Kong dentists’
preparedness for medical
emergency in dental clinics**



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1. ABSTRACT

Aim: The aim of this study was to investigate the Hong Kong dentists' and dental clinics' preparedness for medical emergency in the dental clinic.

Methods: Two custom designed questionnaires were developed, one for dentists and another for dental clinics, to collect the required information. The sampling frame for participants was the list of registered dentists published by the Hong Kong Dental Council on its website in January 2016. A total of 434 dentists and 143 dental clinics were selected from the list by systematic random sampling. The latter sample was supplemented by 10 randomly selected government dental clinics. The questionnaires were mailed the selected dentists together with a cover letter and a stamped return envelope. A reminder letter and another copy of the questionnaire were sent out two weeks after the first mailing.

Results: 167 (38%) completed dentist questionnaires and 53 (35%) clinic questionnaires were collected. Most of the respondent dentists had some deficient knowledge on basic life support (BLS), their mean score was 3.5 out of a maximum of 5. Most (>60%) of the respondents thought they were competent in performing medical emergency procedures except giving intravenous injection. Moreover, most (>60%) of them held positive attitude towards having immediate availability of essential medical emergency equipment and drugs in their clinic. Dentists who were more recent graduates, those with postgraduate qualifications, and those who work with accompaniment generally had higher mean BLS knowledge scores. In the dental clinics, the most commonly kept medical emergency equipment/drug was instant glucose (70%) and followed by antihistamine (62%). Only a quarter of the clinics were equipped with AED, and 45% were equipped with oxygen cylinder. For 8 out of the 11 items, a higher proportion of the bigger clinics (>2 dental chairs) than the smaller clinics had the medical emergency equipment/drug available (Chi-square test, $p < 0.05$).

Conclusion: Hong Kong dentists have a moderate level of knowledge on BLS which should be enhanced through regular attendance at CE courses. Their knowledge level is affected by a number of their background and professional activities factors. Most dental clinics in Hong Kong have only few of the essential medical emergency equipment and drugs while the larger clinics are better equipped than the smaller clinics.

2. INTRODUCTION

In the recent years, there were a number of local news reports of medical emergencies which occurred during dental treatment in Hong Kong, and in the worst cases patient died in the accident (Appendix 1). In the past decade, there were 4 incidents of sudden death or unconsciousness related to dental treatment or in a dental clinic. In 2008, a 26-year-old man nearly 200 pounds in weight experienced post-operative pain after having four wisdom teeth extracted. The pain was so severe that he was referred to the Queen Mary Hospital and was prescribed morphine. However, he experienced a cardiac arrest at home later and passed away. In 2010, a 59-year-old man with history of myocardial infarction, hypertension and diabetes suffered from cardiac arrest during dental consultation and died. Following in 2011, an 86-year-old man fell into coma after tooth extraction. More recently in 2015, a 76-year-old man had a sudden cardiac arrest after having received a local anesthetic injection in a dental clinic. Although the dentist performed cardiopulmonary resuscitation (CPR), unfortunately the patient was certified dead after being sent to the Princess Margaret Hospital.

While there is no strict definition of emergency medical care, the purpose of emergency medical care is to stabilize patients who have a life-threatening or limb-threatening injury or illness.¹ The care focuses on provision of immediate or urgent medical interventions includes two major components: medical decision-making, and the actions necessary to prevent needless death or disability because of time-critical health problems.

In Hong Kong, all registered dentists should be capable of performing appropriate emergency medical care to manage the emergency situations. As listed in domain VI (Therapy: establishing and maintaining oral health) of the “Competences for the Hong Kong dentist” published by the Dental Council of Hong Kong (DCHK),² the ability to prevent and manage medical and dental emergency situations is one of the basic competencies of a registered dentist in Hong Kong. Nonetheless, there is no local guideline about the management of medical emergencies in the dental offices in Hong Kong. Thus, the guidelines issued by authorities in overseas developed countries were used as references in this project.

In the U.K., the General Dental Council highly recommends that a dentist should acquire 10 hours of continuing professional development (CPD) in the topic of medical emergency

within each 5-year cycle.³ This is important because a dentist may encounter sudden collapse of patients at any time, whether treatment has been provided or not. Therefore, adequate training in medical emergencies is essential for dentists so that they can execute resuscitation when needed. The Resuscitation Council of the U.K. has published a guideline for quality standards of cardiopulmonary resuscitation practice and training.⁴ It includes a list of the essential resuscitation equipment applicable specifically to a dental care setting. The equipment is categorized according to its respective functions of maintaining airway, breathing and circulation. In order to further ease the prioritization of equipment, there are two levels of availability for equipment, immediate versus accessible. Immediate level means the equipment should be made available instantly from the onset of cardiorespiratory arrest and used at the start of resuscitation procedure. In contrast, the accessible level suggests that the equipment be made available upon request during the procedure. The recommended minimum equipment list includes those at the immediate level only, which should be available for use within the first minutes of cardiorespiratory arrest. For instance, this list includes automated external defibrillator (AED), used for defibrillation of heart to restore circulation, which has been found to reduce the mortality rate from cardiac arrest caused by ventricular fibrillation and ventricular tachycardia. For airway and breathing management during emergencies, pocket mask, oropharyngeal airways, oxygen cylinder and portable suction are suggested to be immediately available. Additionally, the British Dental Association has suggested a list of seven emergency drugs to be kept in a dental clinic.⁵ They are adrenaline, aspirin, glucagon, instant glucose, glyceryl trinitrate spray, midazolam and short acting beta agonist inhaler.

In the U.S.A., the American Dental Association has recommended a list of essential equipment and critical drugs in dental office to manage the acute medical emergencies, e.g. anaphylactic reactions and syncope.⁶ Regarding the equipment list, it is suggested that every dental clinic must be at least equipped with oxygen portable E cylinder as a device for administration of supplemental oxygen. In addition, nasal cannulae, readily available AED, and proper monitor equipment (e.g. stethoscope and a sphygmomanometer) are also included. As for the emergency drugs kit, it is suggested that it should include epinephrine and nitroglycerin. In addition to having the essential drugs and equipment, it also stressed that dentists must know reflexively when, how and the appropriate dosage of these specific agents are to be used in life-threatening situations. All dental personnel must be prepared to diagnose and treat medical emergencies and in turn provide effective basic life support (BLS) and seek emergency medical services in an organized manner.⁷

To achieve a high standard of basic life support, it goes beyond the bare possession of medical emergency equipment. It is essential that every staff member in a dental clinic be notified and made familiar with the list of available equipment and the respective storage locations.⁸ They should also receive sufficient training and be able to follow manufacturer's instruction to use the equipment. To minimize delay in retrieving instruments, the more commonly needed ones, such as AED, should have a specific sign posted. However, when emergency happens, it is always challenging to identify such cases and take initial measures, subsequently seeking help from colleagues. Maintaining efficient ways of communication between various people involved is crucial. Finally, regular audit and maintenance of the equipment is also very important. All of the above are essential preparations for delivering quality resuscitation in a dental clinic.

It should be reminded that taking care of patients' oral health is not the only obligation of a dentist. It must not be forgotten that as a medical care provider, patients' safety while undergoing dental treatment must also be held responsible by the dentist. The competency in handling medical emergencies is related to many factors, such as the dentist's experience and training, possession of appropriate equipment and availability of technical support. All these factors would affect the dentist's level of confidence to subsequently carrying out the appropriate measures. Since little information about the situation in Hong Kong is available, our group of students decided to conduct a project to find out how prepared the Hong Kong dentists were to handle incidences of medical emergency which may happen in their clinics.

3. AIMS AND OBJECTIVES

The aim of this study was to investigate the Hong Kong dentists' and dental clinics' preparedness for medical emergency in the dental clinic.

The objectives of this study were:

1. to describe the drugs and equipment for medical emergency in the dental clinics in Hong Kong;
2. to describe the dentists' knowledge of basic life support;
3. to describe the dentists' self-perceived competence and attitudes towards performing basic life support during medical emergency in dental clinic;
4. to identify the factors associated with dentists' knowledge of medical emergency; and
5. to identify the factors associated with clinics' possession of drugs and equipment for medical emergency.

4. MATERIALS AND METHODS

Mailed questionnaire survey was used in this study to collect the required information from the dentists and dental clinics in Hong Kong.

4.1. Study population and sampling

The target group of the study was all dentists and dental clinics in Hong Kong. There was no exclusion criteria for dentists. However, for the dental clinics, those that were located in a hospital setting were excluded because it was expected that medically emergency equipment would be readily available.

The sampling frame for the dentists was the list of registered dentists published by the Hong Kong Dental Council on its website in January of 2016. There were 2,172 dentists in the general register and they were listed according to the alphabetical order of their names. The study dentists were selected from the list by systematic random sampling. Using a random starting point chosen by drawing lot, one out of every five dentists starting from the fifth name in the list were included in the sample. Through this sampling method, a list of 434 dentists to be surveyed was obtained.

Selection of study dental clinics was carried out after the selection of dentists. The sampling frame was also the list of registered dentists published by the Hong Kong Dental Council. First, the dentists who were selected for the dentist survey were removed from the list. Then the dentists working full time in the Prince Philip Dental Hospital or the Hospital Authority were removed, as well as those working in the government Department of Health because the practice address of the latter group was not provided in the list. The remaining dentists in the list were selected by systematic random sampling. Using a random starting point, one out of every seven dentists starting from the fourth name in the list were chosen. The clinic in the first practice address of each selected dentist was to be surveyed. The addresses of the selected clinics were sorted and only one record of the clinics with the same address was used in the survey so as to avoid duplication. Finally, a list of 143 dental clinics was obtained. To supplement this list, 10 out of the 20 government dental clinics were randomly selected from the list of dental clinics posted in the website of the Department of Health.

4.2. Survey questionnaires used

Two custom-made structured questionnaire were developed to collect the required information in this study, one for the dentists and one for the dental clinics. Content of the questionnaires was constructed with reference to the published guidelines and recommendations of various overseas authorities, and to dental textbooks. The questions asked were adapted to the situation in Hong Kong. The questionnaires were printed in English because all dentists in Hong Kong should be able to read English and to avoid errors in translation of the names of the equipment and drugs.

The first page of the questionnaire was a letter to the dentists explaining to them the purpose of our study and assuring them that all information collected would be kept confidential and used for this study only. The questionnaires were anonymous and would be destroyed after the information was retrieved.

4.2.1. Dentist questionnaire

There were four sections in the dentist questionnaire (Appendix 2). The first section was on the background of the selected student. The information to be collected included age, gender, years of practice, qualifications, and chaperonage of other dentists in the clinic.

In the second section, the dentist was asked whether he/she had attended any continue education on management of medical emergency in the past 5 years. The dentist's knowledge on basic life support was assessed from the answers to 5 statements on basic life support (BLS) procedures. The dentist was asked to identify which statement(s) correctly describe(s) the procedures. Three answer options (true, false, and not sure) were provided for each question.

In third section, information on the dentist's perceived competence was collected. The dentist was asked to indicate whether he/she felt competent (yes/no) to perform the 5 different BLS action/tasks. In another question, the dentist rated his/her confidence in providing BLS to patient with medical emergencies by giving a score within a range from 1 (no confidence) to 10 (extremely confident).

The dentist's attitudes towards performing BLS during medical emergency in dental clinic

were assessed in the last section of the questionnaire. The dentist was asked to indicate his/her opinions on a list of statements using a 5-point Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). The statements were on:

- having 4 different pieces of medical emergency equipment in the clinic;
- having 4 medical emergency drugs in the clinic;
- annual maintenance of the emergency equipment;
- regular training on medical emergency management for all clinic staff; and
- attending continuing education (CE) course on medical emergency every five years.

4.2.2. Dental clinic questionnaire

There were three sections in the dental clinic questionnaire (Appendix 3). The first section was on the basic information regarding the clinic which included the usable floor area, number of dental chairs, and whether there was a hospital or medical clinic nearby (within 1 minute's walk).

In the second section, there was a question on the availability (yes/no) of a list of 11 drugs or equipment for medical emergency. Another close-ended question was on where the closest available AED was, with 3 answer options provided, namely 'in the clinic', 'within 1 minute's walk', and 'do not know/more than 1 minute's walk away'.

The question in the last section asked the followings were in place in the dental clinic:

- posted guidelines on handling medical emergency;
- written medical emergency management manual for clinic staff;
- annual maintenance of the emergency equipment; and
- regular training on medical emergency for all clinic staff.

4.3. Survey process

The questionnaire was sent by mail to the sampled dentists according to their first practice address registered with the Hong Kong Dental Council. Two rounds of the same questionnaire were mailed. In each round, to facilitate the dentist to return the completed questionnaire, a stamped and addressed envelope was also included in the pack together with the questionnaire. Two weeks after the first mailing, a reminder letter, another copy of the questionnaire, and a return envelope were sent to the same address.

4.4. Data analysis

Data collected in the questionnaires were entered into a personal computer using the software Microsoft Excel. Proofreading was performed and data entry errors were corrected. Cross-checking was carry out to eliminate logical errors in the data set. The cleaned data were analyzed using a statistical software (SPSS for Windows, version 17). Descriptive statistics such as frequency tables, and mean and standard deviation were generated for all the variables including: 1) demographic background of the respondents; 2) drugs and equipment for medical emergency available in the clinic; and 3) dentists' self-perceived competence and attitudes towards performing BLS during medical emergency in dental clinic.

Chi-square tests or chi-square exact tests were used to investigate the possible associations between selected background factors, and the dentists' knowledge and possession of drugs and equipment for medical emergency. For comparison of knowledge score and confidence score, 1-way ANOVA was adopted. The level of statistical significance for all tests was chosen to be 0.05.

5. RESULTS

5.1. Response

After the two rounds of mailing, a total of 167 completed dentist questionnaires were collected. The response rate was 38.4% (167/434). Among the 153 clinic questionnaires sent, 53 were returned, giving a response rate of 34.6% (53/153).

5.2. Dentist questionnaire

5.2.1. Background of the respondents

All of the 167 respondent dentists were in active dental practice and their background of is summarized in Table 1. There was a rather even distribution of the respondents in term of their practice experience. Two thirds of the respondents were men. Three quarters (77.2%) of them were graduated from the University of Hong Kong. While close to half (44.9%) of them possessed one or more postgraduate dental qualifications, only 28 (16.8%) were registered dental specialists.

Table 1. Background of the respondent dentists.

Background		Number	(%)
Years of practice	0 - 5	30	(18.0)
	6 - 10	23	(13.8)
	11 - 20	37	(22.2)
	21 - 30	57	(34.0)
	> 30	20	(12.0)
Gender	Male	112	(67.1)
	Female	55	(32.9)
Postgraduate qualification	Yes	75	(44.9)
	No	92	(55.1)

Regarding their practice situation, 73 (44.9%) respondents were the only dentist in the clinic most of the time while the other 94 (56.3%) respondents had the company of other dentists while they were in the clinic.

5.2.2. Attendance at continuing education course

Most (78.5%) of the respondent dentists had attended a continuing education (CE) course on management of medical emergency in the 5 years prior to this survey, 19.6% attended courses with lectures only while 58.9% had hands-on exercise in the CE courses.

Two of the dentist's background factors were found to be associated with their attendance at CE courses on managing medical emergency (Table 2). Dentists with postgraduate qualifications had a higher rate of attending these CE courses than those who did not possess a postgraduate qualification (87.7% vs 71.1%; Chi-square test, $p=0.02$). Besides, proportionally fewer of the dentists who were usually working alone in the clinic had attended these CE courses, compared with dentists working with accompaniment (65.7% vs 88.1%; Chi-square test, $p=0.002$).

Table 2. Attendance at continuing education course in the past 5 years.

	Yes, lecture only		Yes, lecture + hands-on		No	
	N	(%)	N	(%)	N	(%)
PG qualification*						
yes	15	(19.2)	51	(68.5)	9	(12.3)
no	18	(20.0)	47	(51.1)	27	(28.9)
Only dentist in clinic*						
yes	14	(18.6)	34	(47.1)	25	(34.3)
no	19	(20.4)	64	(67.7)	11	(11.8)

* Chi-square test, $p<0.05$

5.2.3. Knowledge of basic life support

Regarding the respondent dentists' knowledge on BLS procedures, while 88.6% of them knew that the best place to check the pulse is the carotid artery at the neck and 95.2% knew the correct way to open the airway should include head tilt and chin lift, only 39.5% of them knew that being supine is not the best posture to place a syncopal patient.

In constructing an overall BLS knowledge score from the 5 questions, a score of 1 was given to each correct answer while no score was given to the others. Thus, the score ranged from 0 to a maximum of 5. The mean BLS knowledge score of all the respondents was 3.5.

Table 3. Mean BLS knowledge score of the respondents.

	Mean score	Significance
Years of practice		
(a) 0 - 10	4.0	p<0.05
(b) 11 - 20	3.4	(a) > (b) or (c)
(c) >20	3.1	
PG qualification		
yes	3.7	p<0.05
no	3.3	
Attended CE course		
(a) yes, lectures only	3.2	p<0.05
(b) yes, lectures + hands-on	3.9	(b) > (a) or (c)
(c) no	2.8	

Two of the dentist's background factors were found to be related to their BLS knowledge scores (Table 3). Dentists who were more recent graduates had a higher mean score than those who had been in practice for a longer time. The mean score of the dentists who were in practice for 0-10 years was 4.0 while those of the dentists who had been in practice for 11-20 years and

>20 years were 3.4 and 3.1, respectively (ANOVA, $p<0.05$). Dentists who had a postgraduate qualification also had a higher mean score than those who had not (3.7 vs 3.3; t-test, $p<0.05$).

Furthermore, it was found that dentists who had attended CE courses on medical emergency in the past five years had higher BLS knowledge scores than those who had not (ANOVA, $p<0.05$). However, only the mean BLS knowledge score of the dentists who had attended CE course with hands-on exercise was statistically significantly higher while the mean BLS knowledge score of the dentists who had attended CE course with lectures only was not.

5.2.4. Self-perceived competence and confidence

Most of the respondent dentists thought that they were competent in performing CPR (88.0%), detection of cardiac arrest (76.4%), putting an unconscious patient in recovery position (93.3%), and the use of AED (63.9%). However, only 14.5% of them thought that they were competent in performing intra-venous injection of emergency drugs.

Two dentist background factors were found to be associated with their perceived competence in using AED (Table 4). Proportionally more of the dentists with a postgraduate qualification than those without thought they were competent to use AED during medical emergency (76.0% vs 53.8%; Chi-square test, $p=0.002$). A lower percentage of the dentists who work alone most of the time than the dentists who work with accompaniment thought they were competent in using AED (52.8% vs 72.3%; Chi-square test, $p=0.045$).

Table 4. Self-perceived competence in using AED.

	Thought competent to use AED				
	Yes		No		
	N	(%)	N	(%)	
PG qualification					
yes	57	(76.0)	18	(24.0)	p=0.002
no	49	(53.8)	43	(46.2)	
Only dentist in clinic*					
yes	39	(52.8)	34	(47.1)	p=0.045
no	58	(72.3)	26	(27.7)	

Regarding the respondent dentists' self-confidence in providing BLS during medical emergencies, on a scale from 1 (no confidence) to 10 (extremely confident), their mean score was 6.2. Dentist with a postgraduate qualification had a higher mean score than those without (6.7 vs 5.8; t-test, $p < 0.05$).

5.2.5. Attitudes

Most of the respondent dentists agreed or strongly agreed that every dental clinic should have equipment for medical emergencies, including AED (63%), oxygen cylinder (57%), large bore suction tip (65%), and pocket mask (74%). For three out of the four types of equipment, compared to the dentists who worked with accompaniment, proportionally fewer of the respondents who were the only dentist in the clinic most of the time agreed that every clinic should have the equipment (Chi-square test, $p < 0.05$).

Similar to the attitudes towards medical emergency equipment, most of the respondent dentists agreed or strongly agreed that every dental clinic should have essential drugs for medical emergencies, including salbutamol (62%), adrenaline (74%), antihistamine (70%), and nitroglycerin (68%). For all four drugs, proportionally fewer of the respondents who were the

only dentist in the clinic most of the time agreed that every clinic should have the drug (Chi-square test, $p < 0.05$).

While most of the respondents agreed or strongly agreed with the statements “annual maintenance and check of medical emergency equipment should be mandatory” (68%) and “regular training/workshop on medical emergency for all clinic staff should be mandatory” (78%), there were differences in opinion between dentists with or without a postgraduate qualification. A higher proportion of the dentists with a postgraduate qualification than those without agreed with the above two statements (Chi-square test, $p < 0.05$). Furthermore, most (81%) of the respondents either agreed or strongly agreed that dentist should attend at least one CE course on medical emergency every five years.

5.3. Dental clinic questionnaire

5.3.1. Background of the clinics

In this survey, 53 completed dental clinic questionnaires were received. Among them, 39 (73.6%) clinics were small ones with only 1 or 2 dental chairs while the other 14 (26.4%) clinics had more than 2 dental chairs. Most (79.2%) of the 53 clinics had a hospital or medical clinic nearby, i.e. within a 1-minute walk.

Table 5 shows the percentage of dental clinics in this survey with various medical emergency equipment and drugs available in the clinic. Among the items, the most commonly kept one was instant glucose or sugar packet (69.8%) and followed by antihistamine (62.3%). The least commonly kept item was laryngoscope and Magill forceps (9.8%). Only a quarter (25.0%) of the clinics were equipped with AED, and less than half (45.3%) were equipped with oxygen cylinder.

In relation to the availability of medical emergency equipment and drugs within the clinic, there were significant differences between the smaller (1-2 dental chairs) and the bigger (>2 dental chairs) clinics. For 8 out of the 11 items, a higher proportion of the bigger clinics than the smaller clinics had the medical emergency equipment/drug available (Chi-square test, $p < 0.05$). There was no statistically significant association between availability of these equipment/drugs in the clinic and whether the clinic had a hospital or medical clinic nearby.

Table 5. Percentage of dental clinics with different types of medical emergency equipment/drugs being available in the clinic according to their number of dental chairs.

Emergency equipment or drugs	1-2 chairs (n=39)	>2 chairs (n=14)	Total (n=53)
*AED	13.2%	57.1%	25.0%
*Oxygen cylinder	30.8%	85.7%	45.3%
*Oropharyngeal tube	40.5%	76.9%	50.0%
*Pocket mask	41.0%	78.6%	50.9%
Large bore suction tips	59.5%	64.3%	60.8%
Laryngoscope and Magill forceps	8.1%	14.3%	9.8%
Instant glucose or sugar packet	69.2%	71.4%	69.8%
*Salbutamol	38.9%	85.7%	52.0%
*Adrenaline	43.6%	92.9%	56.6%
*Antihistamine	53.8%	85.7%	62.3%
*Nitroglycerin	36.8%	78.6%	48.1%

* Chi-square test, $p < 0.05$

Regarding the closest available AED, 19.6% of the clinics had an AED in the clinic, 35.3% of the clinics had an AED within a 1-minute walk, while 45.1% had the equipment further away from the clinic.

As shown in Table 6, the most commonly found medical emergency related facility in the clinics was maintenance record of the medical emergency equipment (49.1%), followed by regular medical emergency training for all clinic staff (47.2%). Slightly more than one third (34-35%) of the clinics had written medical emergency management manual for clinic staff or had emergency guidelines posted. For three out of these four facilities, a higher proportion of the bigger clinics than the smaller clinics had the facility available (Chi-square test, $p < 0.05$).

Table 6. Percentage of dental clinics with different medical emergency related facilities in the clinic according their number of dental chairs.

	1-2 chairs (n=39)	>2 chairs (n=14)	Total (n=53)
*Posted emergency guidelines	26.3%	57.1%	34.6%
Written medical emergency management manual for clinic staff	35.9%	28.6%	34.0%
*Maintenance record of the medical emergency equipment	38.5%	78.6%	49.1%
*Regular medical emergency training for all clinic staff	38.5%	71.4%	47.2%

* Chi-square test, $p < 0.05$

6. DISCUSSION

6.1. Limitations of this study

A limitation of this study is the response rate. The response rates for both the dentist and the dental clinic are only slightly higher than one third, 38% and 34% respectively. As information from the majority of the sampled dentists was not obtained, the situation and views of the respondents may be able to represent the whole population. The direction of the non-response bias in this study is unknown.

Good research practice was adopted in this study. All the questionnaires used in the survey were anonymous and there was a cover letter explaining the study purpose and procedures to the dentists. They were not directly related to us or the Faculty of Dentistry, and the dentists were free to participate. Furthermore, no sensitive information was collected in this study. Thus, there should be no major ethical concern.

6.2. Dentist questionnaire

Continuing education (CE) plays a key role in a dentist's professional life for continue update and advancement of knowledge. Both the Hong Kong Dental Association (HKDA) and the Faculty of Dentistry, University of Hong Kong advocates CE and they collaborate with each other to provide various CE activities for the local dentists, such as one-day courses and hands-on workshops. Besides lectures and seminars, the HKDA also organizes monthly meetings and had hosted a number of international congresses in the recent years, such as the FDI annual world dental congress.

In this study, it was found that 88% of Hong Kong dentists who worked with other dentists in the clinic most of the time had attended CE courses on the topic of medical emergency and

59% of them had attended courses with hands-on component which may reflect a preference for active participation in these CE courses. It was also found that dentists with postgraduate qualification were more likely to have attended CE courses on management of medical emergency, compared to the dentists without such qualification. Probably, postgraduate training has a positive influence on dentist's attitude towards attending further CE courses. Moreover, with an increased capability from advanced education, dentists with postgraduate qualifications are more likely to handle patient cases with greater complexity, which in turn drives them to have further training. Indeed, some countries (including the USA and the UK) require the completion of certain hours of CE as a prerequisite for dentists to renew their practice license.⁹ In Hong Kong, the DCHK advocates voluntary participation in CPD program. Upon completion of no less than the minimum CPD credit points in CE activities organized by accredited providers, the enrolled dentists would be rewarded a certificate valid for a CPD cycle issued by the DCHK and they can display this certificate in their dental clinics, and put down the term "CPD certified" on their business card and letterhead.

Regarding the dentists' knowledge on basic life support (BLS), the older (age >30 years) group of dentists surveyed and the dentist without a postgraduate qualification had a lower mean BLS knowledge score than the other dentists. Since there is no mandatory CE requirements for the dentists in Hong Kong some of them may not have updated themselves with knowledge of the new guidelines on handling medical emergency, and the knowledge and skills of BLS procedures. As a result, older dentists may still follow the old guidelines or simply do not remember the correct procedures learned since they may not have attended CE courses on this topic for many years. On the other hand, the respondent dentists who had obtained a postgraduate qualification after having completed a training course had higher BLS knowledge scores. There are two possible reasons for this correlation. First, completion of a postgraduate training programme requires attending many CE courses and some of these may be on BLS.

Second, dentists pursuing postgraduate training in certain disciplines frequently encounter surgical procedures, e.g. in the specialties of oral and maxillofacial surgery (OMFS) and periodontics. Use of sedation and general anesthesia is also common in the practice of pediatric dentistry and in OMFS. In these circumstances, the chance of encountering medical emergency is higher than in carrying out general dental procedures. Thus, the dentists with these practices are likely to be more prepared to perform BLS procedures and to handle medical emergencies.

In this study, majority of the respondent dentists judged themselves to be competent to carry out various BLS procedures which is not too different from the findings of similar surveys on dentists in overseas countries.¹⁰⁻¹² A notable finding in this survey is that only 15% of the respondents thought they were competent to give an intravenous injection. This may be due to insufficient training in this aspect in the dental undergraduate and in the CE programs which needs to be improved.

The dentists in this survey were generally confident in providing BLS during medical emergency, in particular those with postgraduate qualifications. This finding agrees with the other findings that the respondents with postgraduate qualifications were more likely to have attended CE courses on medical emergency and had better knowledge on BLS. These taken together indicate that CE can help a dentist to reinforce and refresh the knowledge on BLS and to increase the dentist's self-perceived preparedness to handle medical emergency in the dental clinic. It should be noted that in this survey the effect of attending CE course on the dentist's BLS knowledge was significant only when there was hands-on exercise in the course. As the saying goes, "practice makes perfect", CE can equip dentist with a higher level of skills in handling medical emergencies, thus promoting their confidence in this aspect.

In a study of Australian dentists, just over half of them felt confident to perform CPR.¹⁰ Proportionally more of the Hong Kong dentists in this study were confident in performing this

procedure compared to the Australian dentists. Similar research conducted in Brazil found that only 41% of the dentists there had confidence in diagnosing a medical emergency situation during dental treatment and only 43% were confident in performing CPR.¹¹ In Saudi Arabia where all dentists in the private sector are required to have valid BLS certificate, only 55% of the dental office personnel there were prepared to handle medical emergencies.¹²

Based on the findings from this study and a similar survey conducted in Australia,¹⁰ there seems to be some differences between the dentists in the two places regarding their attitude towards having various medical emergency equipment and drugs available in the clinic. While three quarters of the Hong Kong dentists would like to have a pocket mask in the clinic, less than 10% of the Australian dentists had this view. This may be due to a better awareness among the Hong Kong dentists of the risk of infection in performing CPR. On the other hand for oxygen cylinder, 70% of the Australian dentists preferred to have it in the clinic while only 57% Hong Kong dentists thought so. Probably, the dental clinics in Australia are more spacious than those in Hong Kong clinic and this may help to explain this difference in dentists' opinions. Regarding emergency drugs, a much higher percentage of Hong Kong dentist (more than 60%) than the Australian dentists (less than 10%) deemed having nitroglycerin, bronchodilator drug and antihistamine in the clinic necessary. A possible underlying reason is the easier access to these drugs in Hong Kong.

6.3. Dental clinic questionnaire

An important finding of the survey of dental clinics in this study was that while most of the bigger clinics (>2 dental chairs) were equipped with the basic medical emergency equipment and drugs, more than half of the smaller clinics were not. It should be noted that the vast majority of dental clinics in Hong Kong are small ones with only one or two dental chairs.

This finding is in line with the finding from the dentist survey which showed that dentists who usually worked as the only dentist in the clinic were less likely to have attended a CE course, had less knowledge on BLS, and held a poorer attitude towards requiring every clinic to be equipped with various medical emergency equipment and drugs.

One of the reasons why the bigger dental clinic in this study were better equipped is that they were probably government clinics or belonged to a large chain clinic corporation. Thus they had more resources than the small dental clinics. These clinics would also have more space to store the medical emergency equipment. One can argue that clinic space alone is not a sufficient explanatory reason because there was also significant differences between the bigger and the smaller clinics in the possession of simple and non-space occupying facilities and equipment, such as drugs, posted guidelines, maintenance record of medical emergency equipment and regular medical emergency training for clinic staff. Most likely the dentists' awareness of medical emergency in dental clinic and their knowledge in this aspect are important factors in deciding on how the clinic would be equipped. In this study, the solo practicing dentists generally had a less positive attitude towards having medical emergency equipment and drugs in the clinic. An underlying cause may be the solo practicing dentist, as the owner of the clinic, was unwilling to purchase equipment and drugs which are not profit generating. Another possible reason is that the solo practicing dentists tended not to provide dental treatment to medically compromised patients and would refer these patients to hospitals so as to avoid having a medical emergency situation in their clinic.

In general, the clinics were less well-equipped than what the respondent dentists in this survey thought should be the basic requirement. Using AED as an example, 64% of the respondents agreed that every dental clinic should have instant access to this equipment but only 25% of the clinic in the survey had an AED available. Another example is that while three

quarters of the surveyed dentists thought that dental clinic should be equipped with an oxygen cylinder, less than half of the surveyed clinics were so. These findings may be taken to illustrate that many dentists in Hong Kong are working in a less than desired clinic environment in terms of its preparedness for medical emergencies. A main reason for this is the lack of related regulations for dental clinics in this aspect. Dentists or managers of the dental clinics are free to decide on what medical emergency equipment and drugs to buy for their clinics, including even none at all. This is certainly not a reliable quality assurance mechanism for the dental care services in Hong Kong.

Compared with the findings of similar surveys conducted in Australia and in New Zealand, the Hong Kong dental clinics were not as well-equipped with medical emergency equipment and drugs as the New Zealand clinics,¹³ but were better than Australian clinics.¹⁰ For example, instant glucose or sugar packets were available in 70% of the clinics in this survey, but in the Australian study only 11% of the dentists had oral glucose in their clinics. While adrenaline was available in 57% of the surveyed Hong Kong dental clinics, the respective percentages among the surveyed Australian and New Zealand clinics are 22% and 68%.

As for facilities related to management of medical emergencies, one third of the surveyed Hong Kong clinics had the emergency guidelines posted up, whereas among the surveyed New Zealand clinics, 63% and 48% of them had CPR wall charts and anaphylaxis management wall charts, respectively. On the contrary, while one third of the clinics in this study had written medical emergency management manual for clinic staff, only 11% of the clinics in the New Zealand survey had such a manual. From the results of the surveys, it is inconclusive whether or not a higher proportion of Hong Kong clinics than those overseas have medical emergency facilities in place. Notwithstanding this, facilities related to medical emergencies provided in the dental clinics in Hong Kong should be improved because in this study less than half of the

clinics provided guidelines and training to their clinic staff. Since currently in Hong Kong, there is no medical emergency guidelines for dentists and dental clinics, the published American or British guidelines, or other international guidelines, may be adopted to improve the situation and to enhance the dental professional service.

7. CONCLUSIONS

Despite the lower than satisfactory response rates, based on the results of the surveys and with reference to the study objectives, we would like to draw the following conclusions about the dentists and dental clinics in Hong Kong:

1. Most dentists in Hong Kong have some deficient knowledge on basic life support.
2. In general, the dentists in Hong Kong are confident in performing medical emergency procedures but not in the use of AED and in giving intravenous injection.
3. Most dentists in Hong Kong have positive attitude towards having immediate availability of essential medical emergency equipment and drugs in the clinic.
4. Most dentists in Hong Kong have positive attitude towards regularly attending CE courses in medical emergency and provision of training in medical emergency for all clinic staff
5. Dentists who are recent graduates, those with postgraduate qualifications, and those who work with accompaniment generally have better knowledge on management of medical emergency.
6. Most dental clinics in Hong Kong have only few of the essential medical emergency equipment and drugs.
7. The bigger clinics are better equipped for medical emergencies than the smaller clinics.

7. RECOMMENDATIONS

After conducting this study, we would like to a few recommendations to improve the Hong Kong dentists' preparedness for medical emergency. These are listed below:

1. Guidelines on medical emergency management in dental clinics should be set up jointly by the dental professional bodies, academic authorities and regulatory body in Hong Kong.
2. Dentists in Hong Kong should ensure that their clinics are equipped with the essential resuscitation equipment and necessary drugs to manage medical emergencies.
3. Dentists in Hong Kong should ensure that every staff member in their clinic has sufficient training on provision of basic life support in emergency.
4. The Faculty of Dentistry at the University of Hong Kong should provide more training on basic life support skills (including hands-on exercise) to the dental students.
5. More continuing medical/dental education course on basic life support should be provided by various organizations for the Hong Kong dentists.

9. ACKNOWLEDGEMENTS

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Newspaper reports on medical emergency cases related to dental treatment in Hong Kong

Links to the source of news:

1. <http://hk.apple.nextmedia.com/news/art/20110211/14962329>
2. <http://mingpaohealth.com/cfm/news3.cfm?File=20080625%2Fnews%2Fgfb1.txt>
3. <https://hk.news.yahoo.com/%E9%95%B7%E6%9C%9F%E7%97%85%E7%BF%81%E8%84%AB%E7%89%99-A7%E7%8C%9D%E6%AD%BB-225605540.html>
4. http://the-sun.on.cc/cnt/news/20100507/00407_014.html



【明報專訊】一名體重達200磅的壯漢，較早時出現牙痛，連續脫去4顆智慧齒後，仍然牙痛未消，經治療後要以嗎啡鎮痛。壯漢昨午突然在秀茂坪寶達邨寓所昏迷，送院搶救後不治，死因有待證實。有醫生指出，過去20多年未曾聽聞有人因牙患死亡，不排除死者因心臟病暴斃。

猝死男子馮森源（26歲），與家人同住寶達邨達翠樓一單位，體型壯健，約重200磅。現場消息稱，馮原本任職資訊科技業，但數年前因痛症停止工作。數個月前，事主開始出現牙痛徵狀，經多次求醫之下，竟然已經脫去4顆智慧齒，但痛楚未除，事主其後轉介到瑪麗醫院求診，並須以嗎啡止痛。

昨午4時許，馮在寓所牀上休息，突然不適冷汗直冒，家人誤以為他是一般舊病復發，不以為意，豈料個多小時後，馮的病況急劇轉變更陷入昏迷；其59歲姓陳母親，連忙報警求助。惜事主由救護員送往附近聯合醫院急症室搶救後，猝然而逝。

牙醫學會會長梁世民指出，一般牙患不足令人暴斃，本港過去20年來，亦沒有類似個案。梁指出，事主先後脫除數顆智慧齒，之後又曾多次求醫，若因牙科手術導致細菌感染，會出現明顯發炎及面部腫脹，理應早被發現，以抗生素治療，故推測事主因牙患暴斃的機會微乎其微。

3至5%心臟病患者會牙痛頸痛

香港心臟專科學院會董謝德富表示，肥胖人士容易患上心臟血管堵塞、或心絞痛等病症，患者會胸口痛及心弱，當中一成患者會感到背痛，只有3%至5%病者，會患上牙痛及頸痛。因情況罕見，部分病者可能在不知患有心臟病的情況下猝死。謝提醒市民，運動期間出現痛症，或兩個牙齒痛楚，不宜掉以輕心，應盡快檢驗身體。

2010年05月07日(五) 星期四

中年漢剃牙猝死手術椅 1 上一則 下一則



死者屍體由職工移往醫院。

中年漢剃牙猝死手術椅

本文重點
· 警方不排除緊張過度
· 躺椅上突然全身抽搐

中年病漢離奇猝死在親人的牙醫診所！患有各種高風險疾病的中年漢，昨午到上水光顧任職牙醫的外甥，進行剃牙和鑲牙手術時，他被外甥發現在手術椅上突然抽筋昏迷，急送醫院搶救，惜抵院後不治。警方到診所了解治療經過，請查病人曾否接受麻醉劑注射，抑或是過度緊張致心臟病發，其死因有待驗屍確定，而死者牙醫外甥兩事登時「乜嘢都未做！」

死者姓徐（五十九歲），據家人透露，他生前患有心臟病、高血壓和糖尿病，其外甥曾福華為牙科醫生，在上水和粉嶺開設診所。據悉，徐患有牙患，且日趨嚴重，痛楚難當，於是向外甥求診，打算剷除壞牙和重新鑲牙。



牙醫曾福華離院時表示「乜嘢都未做」。



區大衛片

警方不排除緊張過度

昨午五時許，徐到連外甥曾福華位於上水龍珠路龍豐花園商場地舖的牙科診所，他進入診症室後，坐上手術椅接受檢查和接受醫生詢問其病歷，據報徐突然全身抽搐，其後陷入昏迷，曾醫生急忙通知姓柯女職員（三十三歲）報警召救護車。救護員到場，發覺徐已經沒有呼吸，心跳和脈搏亦停頓，立刻替其作心外壓急救，並送往北區醫院急症室搶救，但送抵急症室後證實不治。

警方其後到診所調查，查問徐是否曾接受藥物注射及接受治療的程序，僅多小時後收隊離開，且認為事件無刑事成分。由於徐生前患有各種疾病，警方亦不排除因緊張過度致病發猝死，但真正死因需待法醫官剖驗才可確定。

死者妻子、女兒和親友接到消息趕至醫院了解，驚聞噩耗，悲傷痛哭，他們隨即由一輛私家車接載離開。至於目睹舅父出事的曾福華，至傍晚七時許才離開診所，只有記者等候採訪，一度直跑入商場的先手間避避，過了一會見記者仍在守候，才步出洗手間。

躺椅上突然全身抽搐

記者問他其舅父當時是否正在接受剃牙或者鑲牙，曾回答：「乜嘢都未做！」他又說，當時其舅父躺在手術椅上，他拿著病歷核對資料，突見舅父全身抽搐，他懷疑是心臟病發，於是立刻致電報警召救護車。而診所則於晚上八時關門，護士離開時不發一言。

近日亦曾發生病人到私家診所求診昏迷事件，上周五姓梁（二十三歲）女子到佐敦嘉實商業大廈著名婦產科醫生黃嘉謨醫務所，接受胸部小手術，據報梁女接受麻醉針注射後，疑對藥物過敏，出現呼吸困難和抽筋，未幾陷入昏迷，至今在伊利沙伯醫院深切治療病房留醫已七日，情況仍危殆。

2015年6月17日(三)

76歲翁剃牙昏迷死亡 1 上一則 下一則

76歲翁剃牙昏迷死亡

【本報訊】打麻醉針剃牙，七旬翁昏迷死亡。昨午五時許，姓林（七十六歲）老翁在女傭陪同下，到荔枝角寶輪街九號一間牙醫診所剃牙，醫生符林打麻醉針後，林突感心臟不適及呼吸困難，醫生見狀，即時停止替其剃牙，並替林急救及報警。現場消息指，林心跳一度停頓，送院時陷入昏迷。

要聞 2017年12月11日 85歲老翁拔牙昏迷危殆

心跳紊亂 逐漸失去知覺 86歲老翁拔牙昏迷危殆

12,206



Facebook 0 0 0 0 0

AA

老翁昨日在銅鑼灣恩平中心一家牙科診所拔牙後不適，送院後情況危殆，幸未送院。

【本報訊】一名86歲老翁昨晨在銅鑼灣一家牙科診所拔牙後，突感暈暈及心跳紊亂不穩，診所護士立即報警將他送院急救，老翁現時情況危殆。有執業牙醫指，不少長者害怕拔牙，手術前會血壓急升，牙醫應要問清楚長者有無藥物敏感，若發現其由藥急升便不宜動手術。

拔牙後命危老翁姓陳，已屆86歲高齡，與家人住銅鑼灣區，據稱他近日感到牙患不適，昨晚10時許，陳伯由51歲的女兒陪同前往恩平道恩平中心一家牙科診所檢查，牙醫認為有需要將壞牙拔除，經陳伯同意後便開始替他拔牙。約一小時後，拔牙手術完成，陳伯在診所內突然感到暈眩，心跳紊亂，女兒見狀向診所護士求助，據知當時陳伯仍然清醒，稍後救護員到場將他送院，其期間怕漸漸失去知覺陷入昏迷，經治理後需要留醫，現時情況危殆。

害怕手術或致血壓升

香港牙醫學會會長周世民稱，替長者拔牙要特別小心，牙醫一般會在替患者注射麻醉藥前詢問其病歷，例如有無藥物敏感及是否患心血管毛病或血壓高，若病者稱紅日血壓不穩，便有需要量度血壓。

另外，執業牙醫亦指，個別長者可能害怕手術致血壓上升，有經驗的牙醫見到長者病人「面紅紅」心神不定，便要自行替病者量血壓，若發現血壓過高便不宜動手術，他會建議長者找西醫再詳細檢測血壓，或待情緒平復血壓回復正常水平才動手術。

過去曾發生長者在拔牙前後猝死事件，去年5月6日，患心臟病59歲男子在上水靚人樓牙科診所拔牙期間，突然抽搐暈倒，送院證實不治。

Questionnaire used in the survey of dentists



16th February, 2016

Dear Dentist,

We are a group of BDS IV students in the Faculty of Dentistry, The University of Hong Kong. As part of our curriculum, we are currently conducting a community health project which involves a questionnaire survey on **"Hong Kong dentists' and dental clinics' preparedness for medical emergency in dental clinics"**. The aim of this survey is to investigate Hong Kong dentists' and dental clinics' preparedness for medical emergency in dental clinics.

We sincerely invite you to take part in this survey and complete the attached questionnaire. Your time and effort in completing the questionnaire will be highly appreciated. If possible, please complete the questionnaire and return it to us by **11th March, 2016** using the stamped addressed envelope provided. You can be assured that the questionnaire is anonymous, and the collected information will be treated as confidential and use for the purpose of this survey only. The questionnaires will be destroyed after we have retrieved the necessary information.

We expect to write up a report on our project by July this year. We are happy to send you a copy of the report on request. If you would like to have more information regarding our project or this questionnaire, please feel free to contact our group representative Miss Chan Tin Yee by phone at 9535 2502 or via e-mail at <bd4a.1@gmail.com>. We look forward to receiving your response. Your support is vital to the success of this survey.

Yours sincerely,



Chan Tin Yee
BDS IV student
Representative of Group 4a.1



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Survey on Hong Kong dentists' and dental clinics' preparedness for medical emergency in dental clinics

A. Background of dentist

1. Are you in active dental practice (treating ≥ 1 patient per week in the past 6 months)?
 - Yes
 - No

2. For how many years have you been in practice?
 - 0-5
 - 6-10
 - 11-20
 - 21-30
 - 31+

3. What is your gender?
 - Male
 - Female

4. Did you obtain your first dental degree from the University of Hong Kong?
 - Yes
 - No

5. Do you have any postgraduate dental qualifications?
 - Yes
 - No

6. Are you a dental specialist?
 - Yes
 - No

7. Are you the only dentist in the dental clinic most of the time?
 - Yes
 - No

B. Knowledge on basic life support

8. Have you attended any continue education on management of medical emergency in the past 5 years?
 - Yes, lectures only
 - Yes, with hands-on exercise
 - No

9. Basic life support questions:

Please indicate whether the statements are true or false by checking the appropriate box.

Statement	True	False	Not sure
1) In an emergency, the best place to check the pulse of a syncopal person is the carotid artery at the neck.			
2) The best posture to place a syncopal person is supine.			
3) In one CPR cycle, the ratio of cardiac compressions to respiratory breathes is 20 to 2.			
4) The depth of cardiac compression should be less than 5 cm.			
5) The correct way to open the airway should include head tilt and chin lift.			

C. Self-perceived competence

10. Do you think you are competent to perform the following 5 action/tasks?

Action/task	Yes	No
1) CPR (Cardiopulmonary resuscitation)		
2) Detection of cardiac arrest		
3) Put an unconscious patient in recovery position		
4) Use an AED (Automated External Defibrillator) in emergency		
5) Perform intravenous injection of emergency drugs		

11. How confident are you in providing basic life support to your patient during medical emergencies?

Please tick the appropriate box in the scale below (1: no confidence, 10: extremely confident)

1	2	3	4	5	6	7	8	9	10

D. Attitudes towards performing basic life support during medical emergency in dental clinic

12. Please indicate whether you agree or disagree with the following statements by checking the appropriate box.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1) Every dental clinic should have instant access to the following medical emergency equipment:					
a) AED (Automated External Defibrillator)					
b) Oxygen cylinder					
c) Large bore suction tip					
d) Pocket mask*					
2) Every dental clinic should have the following medical emergency drugs:					
a) Albuterol / salbutamol					
b) Epinephrine / adrenaline					
c) Antihistamine (e.g. diphenhydramine)					
d) Nitroglycerin					
3) Annual maintenance and check of medical emergency equipment should be mandatory					
4) Regular training/workshop on medical emergency for all clinic staff should be mandatory					
5) Every dentist should attend at least one CE course on medical emergency every 5 years					

*An example of pocket mask



*This is the end of the questionnaire.
Thank you very much.*

Questionnaire used in the survey of dental clinics



16th February, 2016

Dear Dentist,

We are a group of BDS IV students in the Faculty of Dentistry, The University of Hong Kong. As part of our curriculum, we are currently conducting a community health project which involves a questionnaire survey on **“Hong Kong dentists’ and dental clinics’ preparedness for medical emergency in dental clinics”**. The aim of this survey is to investigate Hong Kong dentists’ and dental clinics’ preparedness for medical emergency in dental clinics.

We sincerely invite you to take part in this survey and complete the attached questionnaire. Your time and effort in completing the questionnaire will be highly appreciated. If possible, please complete the questionnaire and return it to us by **11th March, 2016** using the stamped addressed envelope provided. You can be assured that the questionnaire is anonymous, and the collected information will be treated as confidential and use for the purpose of this survey only. The questionnaires will be destroyed after we have retrieved the necessary information.

We expect to write up a report on our project by July this year. We are happy to send you a copy of the report on request. If you would like to have more information regarding our project or this questionnaire, please feel free to contact our group representative Miss Chan Tin Yee by phone at 9535 2502 or via e-mail at <bds4a.1@gmail.com>. We look forward to receiving your response. Your support is vital to the success of this survey.

Yours sincerely,



Chan Tin Yee
BDS IV student
Representative of Group 4a.1



Edward C.M. Lo
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Survey on Hong Kong dentists' and dental clinics' preparedness for medical emergency in dental clinics

The following questions ask for information about the dental clinic at the address to which this questionnaire is sent (i.e. the address on the envelope)

A. Background of the dental clinic



1. Usable floor area: _____ sq. ft
2. Number of dental chairs: _____
3. Is there a hospital/medical clinic nearby (within 1 minute's walk)?
 - Yes
 - No

B. Drugs and equipment for medical emergency in the dental clinic

4. The following equipment/drugs are available in the dental clinic:
Please tick the appropriate box.

Item	Yes	No
a) Automated External Defibrillator (AED)		
b) Oxygen cylinder		
c) Large bore suction tips		
d) Instant glucose or sugar packet		
e) Albuterol / salbutamol		
f) Epinephrine / adrenaline		
g) Antihistamine (e.g. diphenhydramine)		
h) Nitroglycerin		
i) Oral airway (examples shown below) <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;"> <p>A</p> </div> <div style="text-align: center;"> <p>B</p> </div> <div style="text-align: center;"> <p>C</p> </div> </div>		

4. The following equipment/drugs are available in the dental clinic:
Please tick the appropriate box.

Item	Yes	No
j) Pocket mask (an example shown below) 		
k) Laryngoscope and Magill forceps (an example shown below) 		

5. Where is the closest available AED (Automated External Defibrillator)?
- In the dental clinic
 - Within 1 minute's walk
 - Don't know / >1 minute's walk away

C. Facilities in clinics

6. Are the following item/procedures in place in the dental clinic?
Please tick the appropriate box.

Item / Procedure	Yes	No
Posted guidelines on handling medical emergency		
Written medical emergency management manual for clinic staff		
Maintenance record of the medical emergency equipment		
Regular training on medical emergency for all clinic staff		

**This is the end of the questionnaire.
Thank you very much.**