

C.A.D. Bulletin

Issue 5

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Editor's message

Salam Sejahtera and Good day

We hope that you are all keeping well. This fifth CAD issue was prepared during the Covid-19 infection period in 2020 which had swept through Brunei Darussalam and also the rest of the world. Thankfully Brunei Darussalam is now in the Covid19 de-escalation phase. However, please continue to maintain good hand hygiene practices. In the meantime, kindly take some time to read our latest CAD bulletin issue. So, consider performing an audit in your work area, dental clinic or department. You can produce them in groups of one, 2 or 3 in your area of interest within dentistry. Audits are good for identifying strengths, weaknesses and brainstorming ways of improving our work environment and helping our department to achieve its aim of "Healthy Mouth, Healthy Nation."

Warm regards,

Jacki Keasberry
Editor-in-Chief
CAD bulletin

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Advice sheet 1: Guidelines on Planning and Conducting an Audit

Aim of auditing

To **improve the standards and clinical outcomes** of patient **care** by the **systematic review** of current practice.

1. Identify the **topic** that will review current care that is being provided. Topic should be **realistic** and **measurable** (so will allow improvement in clinical practice; increase efficiency and/or be cost effective).
2. **Check with Clinical Audit Division** (by sending email to: cadentalbn@gmail.com that someone else is not already conducting the same/ similar audit in your area of interest. However, if they are, you can either collaborate with them, change your audit sample or audit another matter. CAD may be able to provide you with further advice and suggestions on your project.
3. Conduct **literature search** at library, journals, internet e.g. <http://scholar.google.com/and> <http://www.ncbi.nlm.nih.gov/pubmed/>, <http://www.doaj.org> via RIPAS library subscriptions. Other avenues e.g. Medline or Cochrane – may require payment, unless RIPAS has access. Often, we can access abstracts for free. If the author has a contact address, you may write directly to the author and request a copy of the article from them.
4. **Set the standard** you wish to compare against. The literature search may provide the internationally accepted standards for what it is you wish to measure/ review/ compare against. If there is none, you and your team may set an acceptable standard according to current best practices. Example standard: *(a figure e.g. 80% or 90% of....(whatever you are measuring) should....(comply with whatever the ideal standard/ procedure is).*
5. **Identify the criteria** which you will use to measure your performance against the standard set.
6. Decide on **inclusion and exclusion criteria**, if appropriate.
7. Decide how you will **measure the data**, with appropriate definitions for the terms you use, so that others can understand your process.
8. Decide if the data in the audit can be collected **retrospectively** or **prospectively**.
9. **Sample size** – on average you will require 30 to 100 subjects/cases/items in your audit, so your sample size has to be appropriate. Too small a sample size means you cannot get much useful information.
10. Decide on the **time frame** for data collection – ideally audits should be completed within 6 months and at the most within one year.
11. Try to **minimize bias in sample selection**. Be aware of time bias e.g. results collected in certain calendar months may differ from another period (such as school holiday period). Operator bias may exist as well.
12. Design the **data collection sheet**. Trial it. The data collection sheet should measure what you want to measure and be easy to fill (to encourage people to participate with you).
13. Decide **who** will be involved.
14. Write your proposal and submit to as **doc/docx** document to Clinical Audit Division via email to: cadentalbn@gmail.com and titled as Audit proposal from (your name) ASAP. The Clinical Audit Division will advise on necessary improvements to your proposal, so please allow **at least** a month for this process before your planned start date.
15. Your proposal should broadly follow the headings: COVER PAGE, TITLE, INTRODUCTION, AIMS, OBJECTIVES (if appropriate), STANDARDS and MATERIALS AND METHODS, as stated in 'Guidelines on Reporting Audit Results to Clinical Audit Division'.
16. After CAD has commented on your proposal and any necessary improvements have been made, proceed with your audit. **Collect and analyse the data** – usually simple descriptive statistics will be sufficient. Audit is NOT research (but your results may lead to it).
17. **Report** on the results. Refer to **Advice Sheet 2: Guidelines on Reporting Audit Results to Clinical Audit Division**.

Advice sheet 2: Guidelines on Reporting Audit Results to the Clinical Audit Division

Audit reports need to be assessed by the Clinical Audit Division for verification before you may claim CPD points and be issued a certificate to indicate completion. The accepted audits will be regularly compiled and published for department distribution.

1. Document submission

- Submission to the Clinical Audit Division are best submitted via email in doc/docx to cadentalbn@gmail.com.
- A cover letter should accompany each submission stating the **name, clinic and contact details** of the **lead auditor and co-auditors**.
- Please ensure that all named co-auditors have read and approved the report in its entirety before submission.
- It is a good idea to ask others not involved with your audit to read through your report before submission. This can help bring to attention aspects of the audit which requires further clarification. Often what is clear/obvious to the auditor may not be clear to other readers (not involved with the project).

2. The completed audit is expected to broadly follow the following headings:

COVER PAGE: To include project title, unit/department, authors and date.

TITLE: This should be succinct and an accurate reflection of the audit.

INTRODUCTION: To include rationale and why there is a need to undertake the audit.

AIMS: This is usually reflective of the title.

OBJECTIVES: If appropriate, you may include a specific list of objectives for your audit.

STANDARD(S): Should be quoted if available. If unavailable, standards should be based on current best practices.

MATERIALS AND METHOD/ METHODOLOGY:

This should provide a clear explanation of the audit process so that readers can understand what you did. It should include the audit period, sample size, sample selection, data to be collected, any relevant definitions of terms you used, template of the data collection sheet, any inclusion or exclusion criteria as well as the method of data analysis.

RESULTS: This should logically and systematically report your findings according to your stated aims and objectives. Please avoid simply repeating findings shown by graphs/charts used, however clarification can be given if necessary.

i) **Graphs or charts** should

- a) be in Excel 2010 or earlier format;
- b) have a concise accompanying legend e.g. Figure 1. Number of mouthguards; and
- c) be easily understood and be used to provide clarity to the results where description by text would be overly complicated.

Ideally limit graphs and charts to what is necessary to provide clarity to the report. Maximum 2-3 per report.

ii) **Tables** should

- a) be in Word 2010 or an earlier format; and
- b) have a concise accompanying legend e.g. Table 1. Demographics of patients in each district.

DISCUSSION: If appropriate you should discuss the strengths and weaknesses of your audit. Discuss the results, reasons for the results, with reference to other results published/ reported elsewhere, if available. If you have failed to meet the standard set, identify reasons for this.

CONCLUSIONS: This provides a summary of your findings.

RECOMMENDATIONS/PLAN:

- If you meet the standard set, congratulations.
- If you have **failed to meet the standards** set, suggest plans to be taken to improve and/or change the practice as necessary. Decide when you will implement these changes.
- **As part of the audit cycle**, irrespective of whether you meet or do not meet the standard set, please plan to re-audit after a suitable time interval to check that you are achieving the set standard, or, you may decide to set a higher (but still realistic/ reasonable) standard to achieve.

ACKNOWLEDGEMENTS: If applicable.

REFERENCES:

- Authors are responsible for accuracy and appropriateness.
- References are not compulsory but should be used if appropriate.
- There should be no more than 15 references.
- In the text, references are by author and year of publication e.g. standards (Edwards, 2010).
- References are listed alphabetically in the Harvard format e.g.

i) For journal articles:

Rosenbaum C. H. and Barton D. H. (1978). Use of a continuing health history in dental practice: a survey. *American Society of Dentistry for Children Journal of Dentistry for Children* 45 (5):371-375.

ii) For internet accessed references:

Liverpool University Dental Hospital guidelines (2012) available from <http://www.rlbuht.nhs.uk/OurHospitals/Documents/Liverpool%20University%20Dental%20Hospital%20Referral%20Guidelines.pdf> [Accessed 8th November 2013].

British Society of Periodontology (2011). *Basic Periodontal Examination Guidance*.

Available from:

http://www.bsperio.org.uk/publications/downloads/39_143748_bpe2011.pdf
[Accessed 1st February 2014]

iii) For book reference:

Smith, S. & Webb, W. (1997). *A guide to selling*. 2nd edn. Edinburgh: Churchill Livingstone.

Williams D.M., Hughes F.J., Odell E.W., Farthing P.M. (2001). *Pathology of Periodontal Disease*. New York: Oxford University Press.

- You could also refer to the American Psychological Association for current referencing styles at <https://apastyle.apa.org/style-grammar-guidelines>.

3. NOTES:

- It is best to submit your completed audit write up as early as possible.
- If you wish to claim CPD points for your audit towards the end of the CPD year, please be aware that CAD members require time to go through your audit report. Should your initial draft require amendments or corrections, the final approval for CPD points claim may fall AFTER the CPD cycle, i.e. it can be claimed only for the next CPD cycle.
- After the final approval, please re-submit the revised final report by email and provide a bound hard copy to the Lead member of CAD. In return you will receive a certificate of audit completion via email.

GOOD LUCK and feel free to contact any member of Clinical Audit Division for further advice and help.

Audit on the practice and knowledge concerning antibiotic prescribing among dentists in Ministry of Health, Brunei Darussalam

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INTRODUCTION

Antibiotics are an effective adjunct for the treatment of dental infections with systemic involvement, provided that successful local drainage and removal of source of infection has been provided. Systemic involvement includes pyrexia, trismus, significant regional lymphadenopathy, gross facial swelling, closure of eye and dysphagia (Ellison, 2011). Multiple studies have shown problem with varying habit of prescribing amongst dentists with different types of antibiotic prescribed, dosage, duration and frequency (Palmar *et al.*, 2000, Roy *et al.*, 2000 and Yesudian *et al.*, 2000). Antibiotic resistance is a well-known global public health issue driven by the over-use of antibiotics and inappropriate prescribing (Oredope, 2012), and it is associated with morbidity, mortality and healthcare costs (Cosgrove, 2006). Though the majority of dentists are aware of the adverse effects (Cope *et al.*, 2014), antibiotics are still prescribed routinely for conditions where local measures would have sufficed (Palmar *et al.*, 2000).

Based on result from an audit on prescribing practices by dentists at National Dental Centre, there were variations in the antibiotic regimen amongst prescribers, and insufficient written evidence to support the use of antibiotic in most cases (Sulong *et al.*, 2014). Currently, there is no updated guideline on antibiotic prescribing in dentistry in Brunei. It is therefore hoped that, by conducting this clinical audit, we can identify any inappropriate prescribing and understand why antibiotic prescribing variations exist amongst dentists.

AIM AND OBJECTIVES

The aim is to explore the practice and knowledge of antibiotic use among the dentists working under Ministry of Health in Brunei Darussalam.

The objectives of this audit were to:

1. To determine the reasons for antibiotic prescribing by dentists in the dental settings.
2. To identify the antibiotic preferences of dentists in the management of dentoalveolar infection for adult patient.
3. To determine when dentists would review the patient after prescribing antibiotic in the management of dentoalveolar infection.
4. To determine which guideline dentists, follow in prescribing antibiotics.
5. To determine the level of awareness of dentists towards the importance of abscess drainage as an immediate treatment for dentoalveolar infection.
6. To determine the awareness of dentists towards antibiotic resistance.

MATERIALS AND METHOD

Questionnaire

Questionnaire was adapted from the studies done by Palmar *et al.*, 2000, Cope *et al.*, 2014 and Chate *et al.*, 2006. The initial part of the questionnaire was general information on gender, age, current post, number of years since graduated and any qualification since graduated. The main contents in the questionnaire consisted of 8 questions, focused on issues relating to the objectives. The first part required participant to answer a question on a list of circumstances when they would consider prescribing antibiotic to patients. This is followed by questions on drainage of dental abscess and appointment review. Data on the dentists' antibiotics preferences for the management of dentoalveolar infection in adult patient were collected, including dosage, frequency, duration of antibiotic course and alternative antibiotic if patient is allergic to penicillin. Information on the usage of guideline for antibiotic prescribing and antibiotic resistance were also investigated. Only questionnaires that were 75% to 100% completed were accepted for analysis.

Sample and data handling

Questionnaires were distributed by hand to all dentists including specialists working under the Ministry of Health in all four districts in Brunei Darussalam from March to May 2015. Participation was voluntary and the completed questionnaires were placed in a sealed box anonymously thereby preventing participants identification. Collection was completed within three months.

Inclusion criteria: All dentists working under the Ministry of Health in Brunei Darussalam.

Exclusion criteria: Those dentists who were not available during the data collection because they were on work or study leave.

Data analysis: Data was analysed by using Microsoft Excel 2007.

STANDARDS

In the United Kingdom, Faculty of General Dental Practitioner (FGDP, 2012) has published the Antimicrobial Prescribing for General Dental Practitioners as a recommended guideline on when to prescribe antimicrobials and choices of antibiotics to use including dose and duration. In addition to this, British National Formulary (BNF, 2015) and Scottish Dental Clinical Effectiveness Programme (SDCEP, 2011-2014) have provided almost similar information. The Dental Trauma Guidelines produced by the International Association of Dental Traumatology in 2012 has stated the use of antibiotic in dental trauma case. These guidelines were used as gold standard to compare with the results from the audit.

The standards:

- All dentists should know the indications justified for prescribing antibiotics.
- All dentists should prescribe the appropriate antibiotic regime based on guideline and know when is best to review the patient.
- All dentists should know that drainage is the immediate and principle treatment for dentoalveolar infection.
- All dentists should be aware of bacterial resistance.

RESULTS

A total of 74 questionnaires were distributed. Only one dentist failed to return the questionnaire. 65% of the dentists answered all the questions. 35% of them did not complete 1 to 2 questions, mainly on antibiotic preferences. Only 2 dentists (2.8%) failed to answer 75% of the questions, hence these were excluded from the data analysis.

Table 1: Socio-demographic characteristics of the 71 participants.

Characteristics	n	Percentage
Gender		
Male	27	38
Female	44	62
Age group		
20-30	16	23
31-40	25	35
41-50	20	28
>50	10	14
No. of years after graduation		
<10	26	37
≥10	44	62
Missing data	1	1
Current post		
• Senior Dental Officer/ Dental Officer	52	73
• Associate Specialist/ Specialist/ Consultant	19	27
Postgraduate qualification		
Yes	46	65
No	24	34
Missing data	1	1

Table 2: The clinical and non-clinical reasons of antibiotic prescribing by the dentists

Dental condition	Percentage of dentists
Gross facial swelling	94
Fever, dysphagia	80
Significant regional lymphadenopathy	85
Periorbital swelling	83
Acute Necrotising Ulcerative Gingivitis	65
Trismus	62
Unable to achieve pus drainage	52
Trauma involving teeth	52
Aggressive periodontitis	48
Prophylaxis	46
Reimplantation of teeth	46
Localised intraoral swelling	42

Fractured retained root from attempted extraction	27
Unable to achieve anaesthesia	25
Dry socket	24
Localised pericoronitis	24
Localised presence of pus	18
Pulpitis	8
Patient going abroad	7
Chronic periodontitis	6
Toothache	6
Patient uncooperative	6
Patient's request	3
Unsure of diagnosis	1
Too lazy	1
Too many patient or workload	1
Time constraint	1

Almost all the dentists (n: 64, 90%) have shown the tendency to prescribe antibiotics at least for one of the conditions when antibiotic is not necessary.

Table 3: The medical and dental conditions which the dentists would prescribe prophylactic antibiotic

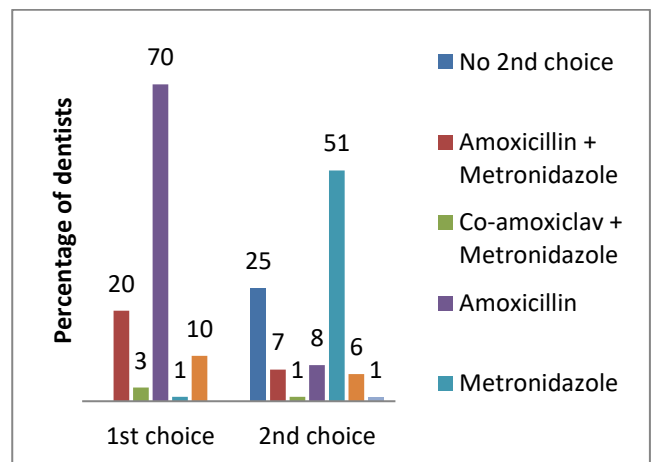
Medical and dental conditions	n	Percentage
Heart disorders, e.g. Infective Endocarditis, Heart valve disease or defect and prosthetic heart valve	28	85
Medically compromised	5	15
Prosthetic device	2	6
Hip replacement	1	3
Dental implant surgery	1	3
As advised by medical doctor	7	21
Spreading or secondary infection	1	3
Missing data	4	12

About 92% of the dentists would always consider or attempt draining dental abscess prior to giving antibiotic. Only 64% (n: 29) of those using guidelines mentioned the source of the guidelines they followed. The NICE (The National Institute for Health and Care Excellence) guideline (24%) as being the most common guideline used, followed by BNF (9%). Both SDCEP (Scottish Dental Clinical Effectiveness Programme) and University and undergraduate guidelines at 7%. All other remaining guidelines are between 2% to 4% including the Brunei Darussalam guideline*.

Table 4: The dentists' use of guideline or experience or both when prescribing antibiotic

Guideline only	Experience only	Guideline and experience	Missing data
n: 37 (52%)	n: 24 (34%)	n: 8 (11%)	n: 2 (3%)

Graph 1: Antibiotic preferences of the dentists in the management of dentoalveolar infection in adult patient



Most dentists preferred prescribing Amoxicillin with the dose of 250mg (n: 40), three times a day (n: 60) for 5 days (n: 56), either alone or in combination with Metronidazole, as shown in table 5. Whereas Metronidazole, prescribed mostly with the dose of 200mg (n:26) three times a day (n:34) for 5 days (n:27) either alone or in combination with Amoxicillin or Co-amoxiclav.

If patient is allergic to Penicillin, many dentists preferred to prescribe Erythromycin (68%), mainly with the dose of 250mg (n:34), three times a day (n:25) for 5 days (n:29) and Metronidazole (30%), with either 200mg (n:11) or 400mg (n:8), three times a day (n:17) for 5 days (n:14). Other medications stated in this audit were Co-amoxiclav (1%), Clindamycin (6%) and Azithromycin (3%). Eight percent did not identify any specific alternative antibiotics to Penicillin.

After giving the patient antibiotic for the treatment of dentoalveolar infection, about half (51%) of the dentists would review the patient after 5 days and only one dentist would review the patient the next day.

Table 5: Antibiotic preferences of the dentists in the management of dentoalveolar infection in adult patient presented with dosage, frequency of dose and duration

Choices:	Amoxicillin		Metronidazole		Co-amoxiclav		Cefuroxime			
		1st	2nd		1st	2nd		1st	2nd	
Dose (mg):	250mg: 500mg:	n: 40 n: 19	n: 4 n:5	200mg: 400mg:	n: 9 n: 4	n:26 n:16	375mg: 625mg:	n: 1 n: 8	- n: 5	500mg: n: 1
Missing data		n: 7	n: 2		n: 3	n: 2		-		-
Frequency:										
od		-	-		-	-		-	-	n: 1
bd		n: 1	-		n: 2	n: 5		n: 9	n: 5	-
tds		n: 60	n: 10		n: 12	n: 34		-	-	-
qds		n: 2	-		-	n: 1		-	-	-
Missing data		n: 3	n: 1		n: 2	n: 2		-		-
Duration:										
3 days		n: 1	-		n: 1	n: 2		n: 1	-	-
3 or 5 days		-	n: 1		-	-		n: 1	-	-
3 to 5 days		n: 2	n: 1		-	n: 2		-	-	-
3 to 7 days		-	-		-	n: 1		-	-	-
4 days		-	-		-	n: 2		-	-	-
5 days		n: 56	n: 7		n: 14	n: 27		n: 3	n: 5	n: 1
5 to 7 days		n: 1	n: 1		-	-		n: 1	-	-
7 days		n: 2	-		n: 1	n: 5		n: 1	-	-
Missing data		n: 2	n: 1		-	n: 3		-	-	-

Table 6: Different type of antibiotics prescribed by dentists if patient is allergic to Penicillin, presented with dosage, frequency of dose and duration

Choices	Erythromycin		Metronidazole		Clindamycin		Azithromycin		Co-Amoxiclav	
Dose (mg):	250mg: 500mg:	n: 34 n: 10	200mg: 400mg:	n: 11 n: 8	300mg: 600mg:	n: 4 n: 1	500mg:	n: 2	625mg:	n: 1
Missing data:	n: 5		n: 2		-		-		-	
Frequency:										
od	-		-		-		n: 1		-	
bd	n: 3		n: 2		-		n: 1		n: 1	
tds	n: 25		n: 17		n: 1		-		-	
qd	n: 16		n: 1		n: 3		-		-	
Missing data:	n: 4		n: 1		-		-		-	
Duration:										
3 days	1		1		-		1		-	
3 or 5 days	-		1		-		-		-	
3 to 7 days	-		1		-		-		-	
4 day	-		1		-		-		-	
5 days	29		14		3		-		1	
5 to 7 days	2		-		-		-		-	
7 days	4		-		1		1		-	
Missing data:	n: 12		n: 3		-		-		-	

Some dentist (17%) choose to review in 2 to 3 days whereas 1% will review in 3 to 5 days. Twenty four percent will review in one week. Only one dentist chose not to review and instead, only advise the patient to come again if infection does not resolve or patient require other or further treatment.

All dentists were aware of the bacterial resistance, with information mostly acquired from undergraduate training (80%) and journal reading (58%). Majority (n:46, 90%) of the dentists believe that antibiotic prescribing in dentistry could result in bacterial resistance.

DISCUSSION

This is the first audit to investigate the antibiotic prescribing practice and knowledge of dentists under the Ministry of Health Brunei Darussalam. The weakness of this audit is that not all questionnaires were returned immediately and participants were not supervised, which could lead to possibility of bias. However, there was a high response rate.

This audit only targeted Ministry of Health dentists (total of 74 dentists). From the 99% response rate, the participants involved were twice as many women as men, with the total number of dentists almost equal across the different age groups, with the least were those above 50 years old. More than half of the dentists have postgraduate qualification and have graduated either 10 years ago or more. There was no question on which university the participants have graduated from. This is to ensure anonymity. At least a quarter of the dentists in this audit were not practicing in primary care. This differs with the studies done by Palmer *et al.*, 2000, Roy and Bagg, 2000, Chate *et al.*, 2006, and Cope *et al.*, 2014, whereby all the participants were general dental practitioners.

Discussions below are in reference to guidelines from Antimicrobial Prescribing for General Dental Practitioners, Faculty of General Dental Practitioners (FGDP, 2012), British National Formulary (BNF, 2015) and Scottish Dental Clinical Effectiveness Programme (SDCEP, 2011-2014):

The clinical and non-clinical reasons for antibiotic prescribing by the dentists

For the management of oral infections, antibiotics should only be prescribed when there is evidence of systemic features of infection (elevated temperature and malaise) and spreading infection (cellulitis, trismus and lymph node involvement). This audit proved that the majority of the dentists know when it is necessary to prescribe antibiotics for acute oral infections. This finding is similar to the study done by Palmer *et al.* in 2000, except in this audit, fewer dentists would prescribe antibiotics even when trismus is present, and more dentists would prescribe antibiotic for localised intraoral swelling. Over 75% of the dentists were aware that antibiotic use for localised pericoronitis and localised presence of pus are not indicated, unless

systemic involvement and spread of infection are evident. About half of them would prescribe antibiotics if they are unable to drain pus immediately and only few of them would prescribe in cases when patient is uncooperative. In both these circumstances, it is justifiable to prescribe antibiotics as stated in FGDP when definitive treatment has to be delayed due to referral to specialist services.

Antibiotics for the management of periodontal conditions would depend on the type of diseases. For Aggressive periodontitis, aside from referral to the specialist, systemic antibiotic can be prescribed as an adjunct to thorough and effective mechanical debridement, and only about half of the dentists were aware of this indication. Over half of the dentists would use antibiotic for the treatment of Acute Necrotising Ulcerative Gingivitis, which concur with the guidelines from SDCEP and FGDP that advise the use of antibiotic as an adjunct to local measures, such as scaling and oral hygiene advice. However, BNF states that antibiotic is only required when there are systemic features of infection present. Almost all the dentists know that prescribing of antibiotics is not required for chronic periodontitis.

Majority of the dentists acted rationally by not prescribing antibiotics for patients with toothache and pulpitis as it is not justifiable to do so. However, for the management of dry socket, about 24% of dentists would prescribe antibiotics, when local measures along with analgesics are more appropriate. About a quarter of dentists would use antibiotics for situations when anaesthesia cannot be achieved or when fractured roots following attempted extraction are left in situ. It is not reasonable to prescribe antibiotics in the absence of infection and when local measures would have been more appropriate. In a situation when local anaesthesia has failed, a dentist should consider and try to identify the exact cause of failure, which might be due to improper technique, anatomic variations or the degradation of the local anaesthetic agent or vasoconstrictor (Yadav and Kumar, 2010). It is reassuring to know that, at least 93% of the dentists would not be inclined to prescribe antibiotics for non-clinical reasons, such as, unsure of diagnosis, too many patient or workload, time constraint, patient's request and patient going abroad. This is almost similar with the

study done by Palmar *et al.*, 2000, except that a higher percentage of dentists in that study would prescribe because of shortage of time and if they were unable to make a definitive diagnosis. Only one dentist would irresponsibly prescribe patient antibiotic due to laziness. Based on the latest guidance on standards for dental team by the General Dental Council, a dentist must put patients' interests before his or her own and ensure the patient receive good quality dental care that is appropriate for them.

For the management of dental trauma, about half of dentists would prescribe antibiotics when traumatised teeth are involved, and when a tooth is reimplanted. Based on guideline in SDCEP, the use of prophylactic antibiotics is not indicated for any dentoalveolar injuries, including reimplantation of avulsed tooth. However, International Association of Dental Traumatology had published revised dental trauma guidelines in 2012, in which it states that the value of systemic administration of antibiotics in human after replantation is still questionable as clinical studies have not demonstrated its value. Experimental studies have however, usually shown positive effects upon both periodontal and pulpal healing especially when administered topically. For this reason, antibiotics are recommended after replantation of teeth. This recommendation is also mentioned in the FGDP guideline.

Antibiotic can be used as prophylaxis and almost half of the dentists in this audit would use them in several situations, mainly for patients with heart diseases or disorders. National Institute for Health and Clinical Excellence (NICE) guideline on antimicrobial prophylaxis against infective endocarditis in adult and children undergoing interventional procedures in March 2008 recommends that antibiotic prophylaxis is not indicated for patients with acquired or congenital cardiac disease who are undergoing dental procedures. Previously, antibiotics have been offered routinely as a preventative measure to people at risk of infective endocarditis undergoing interventional procedures. However, there is little evidence to support this practice. Antibiotic prophylaxis has not been proven to be effective and there is no clear association between episodes of infective endocarditis and interventional procedures. Any benefits from prophylaxis need

to be weighed against the risks of adverse effects for the patient and of antibiotic resistance developing. This guideline has been updated in 2015 in response to a recent study suggesting that the incidence of IE may have been affected by the 2008 guidance. NICE has reviewed the evidence relating to the effectiveness of prophylaxis against IE and found that there was no need to change any of the existing guidance. In addition, NICE concludes that the longstanding increase in the incidence of IE in the United Kingdom and other countries globally is not well understood and could be due to a number of factors.

Working party of the British Society for Antimicrobial Chemotherapy stated that there is no evidence that antibiotic prophylaxis is of any benefit in patients with prosthetic joints and it is unacceptable to expose patients to the potential adverse effects. Furthermore, joint infections have rarely been shown to follow dental procedures and even rarely caused by oral streptococci. Majority of the dentists were aware of this indication. Only 15% of the dentists would use antibiotic prophylaxis for medically compromised patients. Guideline from FGDP stated that there is no clear evidence that immunocompromised patients are at risk of infections as a result of dental procedure, and therefore the routine use of antibiotic prophylaxis cannot be supported. However, BNF did mention that antibiotic may be required in immunocompromised patients, or in those with conditions such as diabetes or Paget's disease, but no further explanation was given.

Only one dentist would consider providing antibiotic as prophylaxis for patient undergoing dental implant surgery. Guideline from FGDP stated that some implant manufacturers have suggested a number of different protocols for antibiotic prescribing when implants are placed. They have suggested that their use reduces the incidence of postoperative infection, peri-implantitis and postoperative pain. However, this remains a controversial issue, with little good-quality evidence to support the use of the routine prophylactic antibiotics in the placing of implants. It has been shown that antibiotic do not provide significant advantage concerning postoperative infections in the presence of good asepsis. However, a meta-analysis including 4 randomised controlled trials concluded that there is some

evidence suggesting that the following protocol significantly reduced implant failure.

Only one dentist would use antibiotic prophylactically to prevent spreading or secondary infection. As mentioned earlier, antibiotic should not be given if there is no evidence of systemic involvement or spread of infection. Robertson *et al.*, 2015, stating that antibiotics treatment in the absence of overt signs of infection were ineffective in preventing the spread or recurrence of infection and that they should not be used in place of correct surgical management.

Almost a quarter of dentists would just follow the advice given by medical doctor in prescribing antibiotic prophylaxis. With all the indications listed in the questionnaire and the reasons for prophylactic prescribing, 90% of the dentists would prescribe antibiotics at least for one of the conditions when antibiotic is not necessary.

To identify the antibiotic preferences of the dentists in the management of dentoalveolar infection for adult patient and to determine when the dentists would review the patient after prescribing antibiotic in the management of dentoalveolar infection

The most common antibiotic preferred in the management of dentoalveolar infection in adult patient is Amoxicillin as first choice, followed by Metronidazole as the second choice. This concurs with the guidelines stating Amoxicillin as the recommended antibiotics, while Metronidazole as alternative if patient recently had a course of Penicillin for another infection, or if predominantly anaerobic infection is suspected or microbiologically proven, or as an adjunct to Amoxicillin in severe spreading infection or if oral infections have not responded to initial antibacterial treatment. Yet, several dentists would prescribe both antibiotics simultaneously as their first choice or second choice. This is higher when compared to a study done by Palmer *et al.*, 2000 which analysed the antibiotic prescriptions from general dental practitioners in England, and found only 4% of the dentists prescribe Amoxicillin and Metronidazole simultaneously.

In this audit, majority of dentists would prescribe Amoxicillin with the dose of 250mg, three times daily for 5 days and Metronidazole 200mg, three

times daily for 5 days. These are similar to the study done by Palmer *et al.* in 2000 with the dosage, frequency and the duration of the antibiotic course. However, the recommended adult dose for Amoxicillin has been doubled based on the new recommendation in the BNF 66 issue Sept 2013 – March 2014 i.e. instead of 250mg, it is now 500mg. SDCEP has also changed the Amoxicillin dose as recommended in their November 2013 update issue in order to align with the common prescribing practices within United Kingdom. The dosage is doubled in severe infection. The frequency of dose and duration of course remains the same. The reason for inadequate dose of Amoxicillin chosen in the audit is possibly because the dentists were unaware of the updates in the BNF or they are using different guideline.

As for Metronidazole, dentists in the audit conformed with the recommended dose, frequency and duration. However, the guideline in FGDP stated the duration as 3 days, instead of 5 days as recommended in BNF and SDCEP. The duration of treatment depends on the severity of the infection and the clinical response. Although drugs are usually given for 5 days, it is the responsibility of the dentist to closely follow-up the patient.

As recommended by FGDP, patient should be reviewed 2 to 3 days after starting antimicrobials as adjunct to drainage and removal of the cause to see if patient's condition improved. Matijević *et al.*, 2009 and Kurimaya *et al.*, 2005, both reported significant improvement of signs and symptoms on second and third day from the beginning of treatment. Additionally, Ellison (2011) discovered complete resolution of systemic symptoms after a three-day course of standard dose antibiotics in addition to drainage and removal of cause of infection in majority of the patients with acute dentoalveolar abscess. If there is resolution of the infection and the body temperature is normal, it is advisable to stop the antibiotic. Traditionally, patients were expected to finish antibiotics prescribed for 5-7 days to prevent emergence of resistance. Conversely, long courses evidently promote selective pressure of bacteria resulting in overgrowth of resistant bacteria (Chate *et al.*, 2010), and, short courses of antimicrobials would discourage microbial conjugation and minimised transfer of resistant

genes, hence reduces the development of resistance (Ellison, 2011 and Martin, 2010).

According to BNF (2015), if the oral infection fails to respond to antibacterial treatment within 48 hours, the antibacterial should be changed, preferably on the basis of bacteriological investigation. Failure to respond may also suggest an incorrect diagnosis, lack of essential additional measures (such as drainage), poor host resistance, or poor patient compliance. In the audit, half of the dentists would review the patient after 5 days, and 17% of them review after a week. Only 12% of the dentists would review the patient after 2 to 3 days as recommended. In this audit, there was no further question investigating the reasons as to why the dentists would review the patient after specific number of days.

Less than 10% of dentists preferred to prescribe Co-Amoxiclav as their first choice or second choice, mostly with the dose of 625mg, twice daily for 5 days. Its routine use in dentistry is unnecessary and it is mainly reserved for infection caused by Amoxicillin-resistant beta-lactamase-producing bacteria, and should be restricted to second-line treatment in cases of severe dental infection with spreading cellulitis or when dental infection is not responding to first-line antibacterial treatment. As stated in BNF and SDCEP, Co-Amoxiclav may be given as 375mg tablets every 8 hours for 5 days. Only one dentist would prescribe Cefuroxime as second choice in the management of dental infection. However, it is less susceptible to inactivation by beta-lactamases and offers no advantage over Penicillin or Metronidazole and therefore is not recommended for the routine management of dentoalveolar infections.

If the patients are allergic to Penicillin, guideline recommended Metronidazole as the first alternative to Penicillin, followed by a Macrolide, namely Erythromycin 250mg four times daily for 5 days, Clarithromycin 250mg twice daily for 5 days or Azithromycin 500mg once daily for 2 to 3 days, as the second choice.

The most preferred antibiotic as alternatives to Penicillin is Erythromycin, mainly at the dose of 250mg three times daily for 5 days, followed by Metronidazole at 200mg three times daily for 5 days. However, Erythromycin is less tolerated than

the other two Macrolides as it causes nausea, vomiting and diarrhea, and many organisms are resistant to it. Only 2 dentists would use Azithromycin with dosage and frequency as recommended, but with prolonged duration up to 7 days.

The use of Clindamycin in BNF and SDCEP guidelines states that it can be used in the management of dentoalveolar abscess that has not responded to Amoxicillin or Metronidazole or in cases of severe infection with spreading cellulitis. It may also be used as alternative to macrolides for cellulitis in penicillin-allergic patients. The recommended dosage is 150 to 300mg four times daily for 5 days. The dosage used by the dentists in this audit is similar, but the duration is either similar or prolonged up to 7 days compared to what is recommended.

To determine the level of awareness of dentists towards the importance of pus drainage as an immediate treatment for dentoalveolar infection

Pus drainage has been emphasised many times in all the guidelines the importance of early establishment of drainage and removal of the cause in the management of dental infection. About 92% of dentists would always consider or attempt draining dental abscess prior to giving antibiotic. However, it is uncertain if dentists are aware that abscess drainage and removal of the cause could also resolve most odontogenic abscess without the need of antibiotic as demonstrated by Matijević *et al.*, 2009, and supported by Robertson *et al.*, 2015.

To determine which guideline dentists follow in prescribing antibiotics

Over half of the dentists use guidelines when prescribing antibiotics, and the remaining is mostly based on experience. The Ministry of Health published the National Hospital Antibiotic Guideline a few years ago. Under dental prescribing, there was a limited guideline on the management of odontogenic infections, periodontal infections and endocarditis prophylaxis. There has been no current update since then. Only one dentist admitted using this guideline in this audit.

The guideline from National Institute for Health and Clinical Excellence (NICE) is being the most

popular guideline used amongst the dentists especially on antimicrobial prophylaxis against infective endocarditis. BNF is the second most used guideline, followed by SDCEP. Less than 10% of the dentists claimed that they acquired the guideline during undergraduate or at university, and no further details on the guideline were given. All the dentists working under the Ministry of Brunei graduated from various universities and different countries. Hence, there is a possibility that different guidelines were used on antibiotic prescribing.

To determine the level of awareness of dentists towards antibiotic resistance

It is encouraging to know that all dentists were aware of the bacterial resistance. Information on antibiotic resistance was mostly acquired during undergraduate training, and over half from reading journals. Only a small number of the dentists did not consider antibiotic prescribing in dentistry could result in bacterial resistance. This could possibly be because the question in the questionnaire did not specifically relate bacterial resistance to inappropriate prescribing which was proven to contribute to bacterial resistance (Chate *et al.*, 2006). Moreover, this audit did not ask participants in detail with regards to their knowledge on bacterial resistance.

CONCLUSION

The findings of this audit demonstrated that majority of the dentists know most conditions appropriate for antibiotic prescribing. However, there are still dentists who tend to overprescribe antibiotic unnecessarily. Not all dentists prescribe antibiotic based on guideline with different guidelines used, which could explain the varying prescribing habit amongst dentists with dosage, frequency and duration. There was also uncertainty as to when to review patients. All dentists were aware of bacterial resistance. However, not all of the dentists believed dental antibiotic prescribing could have an impact on the emergence of bacterial resistance.

Suggestions to reduce inappropriate antibiotic prescribing:

- Educate all dentists via presentation of audit, Continuous Professional Development (CPD) lecture and distribution of department memorandum or guidelines. Emphasis should

be made on the impact of bacterial resistance and drug adverse reaction.

- Educate patients during their dental visit, via media or distribution of leaflets on indications of antibiotic prescribing, bacterial resistance and adverse drug reaction, which hopefully would help resolve the patient pressure issue and encourage more of patient's acceptance on operative intervention.
- Update dental prescribing guideline with clear indications of prescribing, correct types, dosage, frequency and length of antibiotic regimes.
- Improve thorough examination and investigation by dentists to establish correct diagnosis.
- Emphasis on local drainage and operative treatment where possible.
- Repeat of audit to see improvement following introduction of guidelines and education.

It is hoped that by conducting the clinical audit, along with education and a standard, clear guideline on antibiotic prescribing can change antibiotic prescribing patterns amongst the dentists, and hence, improve the services we provide to the patient and ensure their safety.

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Re-audit on patients' waiting time attending Adult Primary Oral Care Services at the National Dental Centre during Off-peak and Peak periods

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INTRODUCTION

In the clinical settings, dental procedures take varying amounts of time depending on the complexity of the treatment procedure, which would result in long waiting time for the subsequent patient before seeing the dental officer.

There are two ways in which longer waiting time in the government dental services may be explained. First, it could be due to the large number of the population using the public oral healthcare system as it is heavily subsidised by the government. Second, oral diseases that affect the teeth and gums are among the most common chronic health problems experienced by many Bruneians (National Oral Health Survey, 1999). Consequently, there is a huge disease burden that is being placed on the Dental Services with high demands from the population for the immediate relief from their oro-facial pain and discomfort and the subsequent necessity for oral rehabilitation.

In a national study conducted in Turkey by Haydar *et al.*, 2004 on patients' satisfaction in dental outpatient clinics, it was reported that waiting time was the least satisfactory issue, with only 41.8% participants reported satisfaction with waiting time. In an earlier audit conducted by Abu Bakar and Mohamed on patient's waiting time attending Adult Primary Oral Care Services (POHC) at the National Dental Centre (NDC) during Off-peak and Peak periods in June 2012, they found that the total average waiting time was 74 minutes during Off-peak and 85 minutes during Peak periods. They also reported that the average registration time during Peak period was longer than the average time between registration and 1st called by Dental Surgery Assistant (DSA), which were 44 minutes and 36 minutes respectively. This audit was done before Brunei Darussalam Healthcare Information and Management System (Bru-HIMS) was introduced, which was only used rolled out at NDC starting January 2014.

Therefore, it would be interesting to compare the differences in waiting time of outpatients attending Adult POHC at the NDC after the implementation of Bru-HIMS.

AIM AND OBJECTIVES

The aim of this audit is to determine the Average Total Waiting Time of patients attending the POHC at the NDC during Off-peak and Peak periods after the implementation of Bru-HIMS.

The objectives of this audit are:

1. To compare the Average Waiting Time for Registration; and between Registration and when the patient is first called by the DSA, during Off-peak and Peak periods.
2. To determine the Average Total Waiting Time in relation to the number of dental officers on duty.
3. To compare the Average Waiting Time for Registration before and after implementation of Bru-HIMS.
4. To assess patient satisfaction on waiting time.

MATERIALS AND METHODS

This was a cross-sectional study using the same method used by an earlier audit conducted by Abu Bakar and Mohamed in 2012. Results from this earlier audit will be used to represent waiting times before implementation of Bru-HIMS. All patients above 16 years old attending Adult POHC at NDC was included in this audit. Patients younger than 16 years old, and patients who have appointments were excluded.

The data collection was from 6th-11th April 2015 for five consecutive working days (school holiday-Peak period) and 13th-18th April 2015 for five consecutive working days (Off-peak period). Two forms were used for the purpose of this audit. A form (Appendix 1) was filled by the receptionists for each attendee and attached to the queue number, which were then completed by the DSAs after their visit.

Times recorded by the receptionists:

1. Arrival time - the time when a patient takes a queue number.
2. Registration time - the time when the patient's name is called by the receptionist for registration fee.

Information recorded by the DSAs:

1. First called by the DSAs - the time when the DSA called the patient to be seen by the dental officer.
2. Patient leaves - the time when the patient leaves the surgery after receiving treatment.
3. Types of treatment received e.g. check-up, scaling, filling, pulp extirpation, extraction, repair denture, referral to specialist clinics and for radiograph.
4. Patient opinion on waiting time (Asked prior to receiving treatment) - Unacceptable/ Fair/ Satisfactory.

Total Waiting Time in this study is defined as the length of time (in minutes) from when the patient gets a queue number (Arrival Time) until the time the patient is first called by the DSA. A second form (Appendix 2) was filled by the co-auditor, Rusni bt Md Noor (RMN), to tally up the total number of patients and dental officers on duty at the end of each day.

Data checking and analysis

Prior to data collection, all staff involved were briefed and taught on how to fill in the required forms. At the end of each day, all data checking was done by the co-auditor (RMN) to ensure all the data were entered correctly. The forms collected were cross-checked by the main auditor with the Deputy Medical Record Officer to ensure that total number of forms collected matched the daily outpatient report from Bru-HIMS. The data were entered into a Microsoft Excel spreadsheet, and subsequently analysed.

STANDARD

At present, there is no international waiting time standard exist for comparison to this audit. However, from the earlier audit done by Abu Bakar and Mohamed in 2012, 67.1% of patients had waited 90 minutes or less which fell below the set standard of 80% in their audit. For the purpose of this audit, the same standard as the previous audit was used, i.e. **at least 80%** of patients who

do not have appointments should wait 90 minutes or less.

RESULTS

Number of forms and dental officers on duty

Four hundred and thirty-nine patients attended Adult POHC during the audit period, but only 376 were available for data analysis (19 forms were missing and 44 forms were incomplete). The 376 forms which remained represented an overall participation rate of 85.6%, and all subsequent analyses refer to these 376 forms (Table 1).

The highest number of patients attending Adult POHC was 65 a day during the Peak period, while the lowest was 19 patients a day during Off-peak period. Data by total number of dental officers are not presented in the analyses which follow, because the number of dental officers on duty was relatively constant (6-7 dental officers daily).

Overall Total Waiting Time

Three hundred and sixty-two patients (96.3%) had waited 90 minutes or less.

Comparison of Average Total Waiting Time before and after implementation of Bru-HIMS

Table 1. presents data for waiting times for before implementation of Bru-HIMS (Abu Bakar and Mohamed 2012) and after implementation of Bru-HIMS (present audit).

For this audit, the Average Waiting Time when broken down into component parts of Peak and Off-peak periods show slightly shorter waiting time during Off-peak periods. Average Total Waiting Time during Off-peak period was 46 minutes and this increased to 49 minutes during the Peak period, giving an Overall Average Total Waiting Time of 48 minutes, when data for both periods were combined. The Overall Average Total Waiting Time (48 minutes) in this audit was shorter when compared to previous audit done by Abu Bakar and Mohamed which was 80 minutes.

There is also notable difference in the Overall Average Registration Time between the two audits; 10 minutes in the present audit and 44 minutes in the Abu Bakar and Mohamed audit.

Table 1. Comparison of the Average Waiting Time for Registration before and after the implementation of Bru-HIMS (Brackets contain minimum-maximum waiting time)

Types of Treatment	Abu Bakar and Mohamed (2012)		Present Audit (2015)	
	Off-peak (292 pts)	Peak (374 pts)	Off-peak (150 pts)	Peak (226 pts)
Check up				
Check up only	25 (8.6)	33 (8.8)	7 (4.7)	8 (3.5)
Check up and radiograph	2 (0.7)	0 (0.0)	1 (0.7)	10 (4.4)
Scaling				
Scaling only	47 (16.1)	112 (29.9)	30 (20.0)	49 (21.7)
Scaling and radiograph	3 (1.0)	5 (1.3)	4 (2.7)	5 (2.2)
Scaling and filling ¹	7 (2.4)	10 (2.7)	2 (1.3)	7 (3.1)
Scaling and refer ²	0 (0.0)	3 (0.8)	0 (0.0)	0 (0.0)
Scaling and extraction ³	1 (0.3)	1 (0.3)	0 (0.0)	1 (0.4)
Filling				
Filling only	67 (22.9)	68 (18.2)	26 (17.3)	55 (24.3)
Filling and radiograph	6 (2.1)	17 (4.5)	3 (2.0)	1 (0.4)
Filling and scaling ¹	7 (2.4)	10 (2.7)	2 (1.3)	7 (3.1)
Filling and extraction	0 (0.0)	1 (0.3)	1 (0.7)	2 (0.9)
Pulp extirpation				
Pulp extirpation only	4 (1.4)	5 (1.3)	5 (3.3)	3 (1.3)
Pulp extirpation and refer ⁴	4 (1.4)	1 (0.3)	0 (0.0)	0 (0.0)
Pulp extirpation and radiographs	0 (0.0)	0 (0.0)	5 (3.3)	1 (0.4)
Extraction				
Extraction only	93 (31.8)	88 (23.5)	47 (31.3)	57 (25.2)
Extraction and scaling ³	1 (0.3)	1 (0.3)	0 (0.0)	1 (0.4)
Extraction and radiograph ⁵	8 (2.7)	7 (1.9)	4 (2.7)	9 (4.0)
Extraction and referral	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)
Extraction and repair denture	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)
Denture				
Repair denture	8 (2.7)	0 (0.0)	6 (4.0)	0 (0.0)
Referral				
Refer only	5 (1.7)	8 (2.1)	0 (0.0)	4 (1.8)
Refer and scaling ²	0 (0.0)	3 (0.8)	0 (0.0)	0 (0.0)
Refer and pulp extirpation ⁴	4 (1.4)	1 (0.3)	0 (0.0)	0 (0.0)
Refer and extraction ⁵	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)
Refer and radiograph	12 (4.1)	14 (3.7)	0 (0.0)	2 (0.9)
Radiograph				
Radiograph only	0 (0.0)	0 (0.0)	4 (2.7)	7 (3.1)

Note- the superscript indicates same data

However, the Overall Average Time between Registration and 1st call by DSA for both audits was almost similar; 36 minutes for Abu Bakar and Mohamed audit and 38 minutes for present audit respectively.

Patient satisfaction

More than half (54.2%) of patients expressed that the waiting time was satisfactory (3-64 minutes); 44.9% thought that the waiting time was fair (23-

161 minutes); while only 0.9% thought that the waiting time was unacceptable (47-100 minutes).

NDC saw fewer patients during present audit (439) compared to previous audit (666). The most common treatments carried out during Peak and Off-peak periods in both audits were extraction only, filling only and scaling only. There was no notable difference in the types of treatment done between the two audits.

Table 2. Comparison of the Types of treatment carried out during Peak and Off-peak periods before and after the implementation of Bru-HIMS (Brackets contain percentages)

Types of Treatment	Abu Bakar and Mohamed (2012)		Present Audit (2015)	
	Off-peak (292 pts)	Peak (374 pts)	Off-peak (150 pts)	Peak (226 pts)
Check up				
Check up only	25 (8.6)	33 (8.8)	7 (4.7)	8 (3.5)
Check up and radiograph	2 (0.7)	0 (0.0)	1 (0.7)	10 (4.4)
Scaling				
Scaling only	47 (16.1)	112 (29.9)	30 (20.0)	49 (21.7)
Scaling and radiograph	3 (1.0)	5 (1.3)	4 (2.7)	5 (2.2)
Scaling and filling ¹	7 (2.4)	10 (2.7)	2 (1.3)	7 (3.1)
Scaling and refer ²	0 (0.0)	3 (0.8)	0 (0.0)	0 (0.0)
Scaling and extraction ³	1 (0.3)	1 (0.3)	0 (0.0)	1 (0.4)
Filling				
Filling only	67 (22.9)	68 (18.2)	26 (17.3)	55 (24.3)
Filling and radiograph	6 (2.1)	17 (4.5)	3 (2.0)	1 (0.4)
Filling and scaling ¹	7 (2.4)	10 (2.7)	2 (1.3)	7 (3.1)
Filling and extraction	0 (0.0)	1 (0.3)	1 (0.7)	2 (0.9)
Pulp extirpation				
Pulp extirpation only	4 (1.4)	5 (1.3)	5 (3.3)	3 (1.3)
Pulp extirpation and refer ⁴	4 (1.4)	1 (0.3)	0 (0.0)	0 (0.0)
Pulp extirpation and radiographs	0 (0.0)	0 (0.0)	5 (3.3)	1 (0.4)
Extraction				
Extraction only	93 (31.8)	88 (23.5)	47 (31.3)	57 (25.2)
Extraction and scaling ³	1 (0.3)	1 (0.3)	0 (0.0)	1 (0.4)
Extraction and radiograph ⁵	8 (2.7)	7 (1.9)	4 (2.7)	9 (4.0)
Extraction and referral	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)
Extraction and repair denture	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)
Denture				
Repair denture	8 (2.7)	0 (0.0)	6 (4.0)	0 (0.0)
Referral				
Refer only	5 (1.7)	8 (2.1)	0 (0.0)	4 (1.8)
Refer and scaling ²	0 (0.0)	3 (0.8)	0 (0.0)	0 (0.0)
Refer and pulp extirpation ⁴	4 (1.4)	1 (0.3)	0 (0.0)	0 (0.0)
Refer and extraction ⁵	0 (0.0)	1 (0.3)	0 (0.0)	0 (0.0)
Refer and radiograph	12 (4.1)	14 (3.7)	0 (0.0)	2 (0.9)
Radiograph				
Radiograph only	0 (0.0)	0 (0.0)	4 (2.7)	7 (3.1)

Note- the superscript indicates same data

However, there was higher percentage of pulp extirpation done during Off-peak period in this audit (10.7%) when compared to previous audit done by Abu Bakar and Mohamed (5.2%).

DISCUSSION

The aim of this audit was to determine the Average Total Waiting Time of patients attending the Adult POHC in the NDC during Off-peak and Peak periods after the implementation of Bru-HIMS. This is the second recorded audit on waiting time in the

NDC so far, which looked into the patients' waiting time during Off-peak and Peak periods.

In considering the findings of the audit, the strength and weaknesses must first be addressed. The main strength of this audit is the favourable size of the data collected during the audit period. In additionally as the audit was carried out during Off-peak and Peak periods, comparison between with the previous audit is possible. This audit was also able to collect data on patient satisfaction, which was not recorded during the previous audit.

However, the potential weakness of this audit was that some of the DSAs did not attend the briefing on how to fill in the required form. The reason for this was because some DSAs were not available for the audit data collection briefing as they were working in peripheral clinics. This could potentially affect results of the data collected. Another potential bias was that there were fewer patients (439) seen during this audit period as compared to that in the previous audit (666) as some patients previously seen in NDC subsequently attended Rimba Gadong dental clinic for their dental needs.

The findings of the audit will be discussed according to the 3 main objectives of the audit. One objective on Average Total Waiting Time in relation to the number of dental officers on duty will not be discussed, as the number of dental officers on duty was relatively constant.

Average Total Waiting Time during Off-peak and Peak periods

The total number of patients attended Adult POHC during audit periods in June 2012 at NDC was 439. However, only 376 data were included for this study.

In this audit, Total Waiting Time is defined as the period between Arrival Time and when the patient is first called by the DSA, which included Registration Time as well as the waiting period before being called by the DSA (to be seen by the dentist). The Overall Average Total Waiting Time has exceeded the standard set for this audit, that is, 96.3% of patients waited 90 minutes or less before being seen by the dentist. This value is much higher than in the audit done by Abu Bakar and Mohamed, in which only 67.1% of patients waited 90 minutes or less before being seen by the dentist.

The Average Total Waiting Time is 46 minutes during Off-peak period compared to 49 minutes during Peak period. The reason for the slight increase during Peak period is explained by the increase in the average time required for registration, as shown in Table 1. This slight increase in waiting time during Peak period is predictable as more patients seek treatment during school holidays (259 patients compared to 180 patients during Off-peak period) which implies a longer waiting time for registration when the manpower for reception staff remains constant

throughout the two periods. However, the Overall Average Time between Registration and first call by DSA remained the same between Off-peak and Peak periods. This may be related to type of work done during peak period, i.e. less time-consuming tasks (less pulp extirpation (1.7%) done during

Peak period compared to Off-peak period (6.7%), hence the waiting times were similar to that for Off-peak period as these treatments required less time to perform. In some instances, patients left the premises after registration which further prolongs the total waiting time for that particular individuals before being seen by the dentist.

Average waiting time for registration before and after implementation of Bru-HIMS

When the results are combined for Peak and Off-peak periods, the Overall Average Total Waiting Time for this audit was 48 minutes: 10 minutes for registration, and 38 minutes between registrations and first called by the DSA. In contrast, Abu Bakar and Mohamed found that the Overall Average Total Waiting Time for their audit was 80 minutes: 44 minutes for registration, and 36 minutes between registrations and first called by the DSA. Hence, the average time taken for registration during their audit contributes more than half to the Total Waiting Time.

In 2012, Bru-HIMS was not implemented in NDC yet. The time taken for registration composed of a few processes. The receptionists had to manually look for the patients' case notes before they called the patients to pay the registration fee. With the introduction of the computerised systems (Bru-HIMS), the time taken for registration has reduced significantly (i.e. by about 30 minutes on average) and hence the patients' waiting time improved. There was little to no change to the waiting time between Registration and First called by the DSA, so any further improvement to waiting times may have to address this aspect. Future audits will need to adjust down the current standard of 90 minutes or less as this length of time was before the implementation of Bru-HIMS.

Patient satisfaction on waiting time

According to Iliyasu et al. (2010), patient waiting time in outpatient clinics is often the major reason for patients' complaints in regards to their

experiences in outpatient clinics. Therefore, patient satisfaction with waiting time plays a crucial role in the overall satisfaction with services. In the present audit, 54.2% of patients responded 'Satisfactory' for waiting time (3-64 minutes); 44.9% thought that the waiting time was 'Fair' (23-161 minutes); while only 0.9% thought that the waiting time was 'Unacceptable' (47-100 minutes).

This reveals that range for patient satisfaction varies widely and seems to overlap with one another. The overlap in time differences rest in the vagueness of what is considered 'Fair' and what is 'Satisfactory' as people can interpret it differently. For some patients, waiting 23 - 64 minutes were only fair, while others thought that waiting 47-64 minutes was unacceptable. This also shows that an acceptable waiting time ranges from 23-47 minutes, where 23 is the highest range for those who considered the waiting time to be 'Fair' and 47 minutes is the lowest range for those who considered the waiting time to be 'Unacceptable'.

Despite this, the results from the present audit are more favourable than the study conducted by Mohd Hashim and Mohamed in 2011 on clients'/patients' satisfaction regarding dental services provided by primary oral care in Brunei Darussalam. According to their study, 3.1% responded overall satisfaction on waiting time to consultation as 'Poor-Very Poor'; 15.7% responded as 'Fair'; while 81.2% responded 'Good-Excellent'. The lower overall satisfaction in their study could be due to the longer waiting time compared to the present audit, as Bru-HIMS was not implemented in 2011. However, direct comparison with the study done by Mohd Hashim and Mohamed was not possible as different grading systems and different study sample were used. Furthermore, it was a survey on general dental services and not specifically on waiting times. Likewise, direct comparison with previous audit done by Abu Bakar and Mohamed was not possible as data on patient satisfaction was unavailable.

CONCLUSION

In conclusion, the standard set has been exceeded, in that 96.3% of patients had waited 90 minutes or less before being seen by the dentist. It was also found that Average Registration Time using Bru-HIMS was only 10 minutes, which was the main

contributor to shorter Overall Average Total Waiting time in comparison with previous audit when Bru-HIMS had not been implemented. Generally, the average waiting time also increases as the number of patients increase. Almost all (99.1%) participants had responded 'Fair-Satisfactory' on the overall satisfaction on waiting time.

This audit could be used to provide a new "Tekad Pemedulian Orang Ramai (TPOR)", that is, a notice to be shown in the registration counter as to how long they have to wait before seen by the dentist in the National Dental Centre.

FUTURE RECOMMENDATIONS

1. Findings of this audit will be shared with dentists as a CPD lecture to emphasise the importance of waiting times.
2. A re-audit should be conducted every 3 years as part of the audit cycle. An increased sample size should be considered by increasing the duration of the audit. For further improvements of our service, the standards should be raised i.e. acceptable waiting time (23- 47 minutes). Other clinics should conduct similar (individual) audits to ascertain their waiting times and incorporate into their own TPOR. Additionally, data on patient satisfaction on their waiting time should also be collected and grading of patients' satisfaction should be represented on a Likert scaling system using questionnaires with items ranging from 1-10.
3. A possible way to reduce waiting times for patients during POHCS clinics could involve focusing only on dealing with patient's complaints and relief immediate pain, while delegating time-consuming tasks to be completed during appointment visits, so turnaround time for each OP patient is faster.
4. Furthermore, there must be adequate facilities and human capital in order to increase the accessibility of the Dental Services to the population of Brunei Darussalam. Some clinics encompass a huge catchment area which creates a problem in that the number of patients exceeds the capability for few numbers of staffs to provide treatment. Selectively relocating some these patients to

newer dental facilities will effectively decrease waiting times provided that treatment for patients' complaints and pain relief is prioritized during OP hours.

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The frequency and pattern of failure to attend (FTA) dental appointment in Antenatal Dental Clinic at the Sungai Besar and Bunut clinics between June to December 2014

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BACKGROUND

Pregnancy is an important time in a woman's life. It is characterised by complex physical and physiological changes that have significant impact on almost every organ system of the body, including the oral cavity (Tilakaratne *et al.*, 2000).

Adverse changes in the oral cavity during pregnancy, particularly those involving the periodontium, do not only affect the mother, but may also bring harm to the foetus if left untreated. Numerous studies had shown that maternal periodontitis increased the likelihood of adverse pregnancy outcomes such as premature deliveries, preterm low birth weight and low birth weight infants (Jeffcoat *et al.*, 2001). As the nutrients that are necessary for the foetal growth depends on the mother's food intake, poor oral health of expectant mother could result in low nutritional intake, thus affecting the growth of the foetus (Martin-Gronert and Ozanne, 2006).

In Brunei, all mothers attending the Maternal and Child Health (MCH) clinics for antenatal check-ups are given an option to be referred to the dental clinic for oral health examination and oral health education. Several of the MCH clinics, such as the Sungai Besar and Bunut clinics, have a dental clinic in-situ. These dental clinics run on the same day as the MCH antenatal check-up day. The expectant mother will be seen on the day of referral, or manually booked on another day if the schedule is busy on the day.

Failure to attend (FTA) appointments in a health care setting has an impact on the services as well as on the patient. Patient's failure to attend the appointment wastes the practitioners' time, which could be utilised for other patients. As a result, those who missed their appointment deprive other patients of an opportunity for treatment, and their own dental treatment is delayed (Schmalzried and Lyszak, 2012).

Multiple reasons contribute to failure to turn up for dental appointments. According to Rogers (1991), a major cause of high non-attendance rate was

attributed to that the mothers 'did not feel it necessary' to visit the dentist. Other factors such as ethnic, socioeconomic status and the number of children they have also contribute to the attendance behaviour during pregnancy. Laloo and McDonald (2013) reported that 21.3% of the appointments at the rural dental training faculty in Australia were affected by patients' FTA. In 2014, Ang *et al.* reported that the rate of FTA in the Orthodontic clinics at National Dental Centre (NDC) and Seria Dental Clinic were 13.4% and 25.3% respectively. Currently, there is no data available on the incidence of FTA in the antenatal clinics.

AIM AND OBJECTIVES

To determine the frequency and pattern of FTA dental appointment in antenatal dental clinics at Sungai Besar and Bunut clinics from June 2014 to December 2014.

Objectives

1. To determine and compare between Sungai Besar and Bunut antenatal dental clinics in the period between June 2014 to December 2014:
 - the total number of antenatal dental appointments given
 - the total number of antenatal mothers who were seen/treated at the antenatal dental clinics
 - the average number of walk-in patient per clinic session
 - the percentage of FTA antenatal dental appointment
 - the average number of antenatal dental appointment given per clinic session
2. To record the following parameters for the non-attenders:
 - demographic factors
 - number of children they have
 - stage of gestation

STANDARD

Currently, there is no internationally accepted gold standard with respect to patient's failure to attend appointment. According to Ang *et al.* (2014), her

audit reported to have 13.4% of non-attendance rates for orthodontic appointments at NDC. As orthodontic treatment is a more specialised and requires continual treatment compared to the oral care for antenatal, their non-attendance rates is expected to be less than that of oral care for antenatal patients. Hence, this audit will set the standard as “not more than 15% of total antenatal dental appointments given should be affected by patient’s failure to attend”.

MATERIALS AND METHOD

This retrospective study included the data from the logbook (which showed the patients who had been treated on the day), and appointment book (which recorded the identification card (IC) number and telephone number of the patients) in Sungai Besar and Bunut antenatal dental clinics from June 2014 to December 2014.

Inclusion criteria:

All antenatal patients who were seen and those who did not attend their appointments in the Sungai Besar and Bunut antenatal dental clinics between June 2014 to December 2014.

Exclusion criteria:

Antenatal patient who were seen in dental clinics other than Sungai Besar and Bunut antenatal dental clinics.

Data collection

Data were collected using 2 forms (see Appendix 1 and 2) by lead auditor.

The form in Appendix 1 recorded the following:

- i. number of booked patients
- ii. number of cancelled patients- the patients who cancelled the appointment before their
- iii. appointments were considered as cancelled patient and were not included under FTA
- iv. number of patients who attended
- v. number of ‘walk-in’ patients- the name of the patients entered into the logbook for a specific clinical session but not on the appointment book are considered as ‘walk-in’ patient
- vi. number of patients failed to attend- the names of the patients were entered into the appointment book for a specific clinical session but not on the logbook on the day, and also who did not cancel the appointment in advance of the appointment are considered as FTA
- vii. total number of patients seen on the day

The form in Appendix 2 recorded the following information for the FTA:

- i. age
- ii. ethnicity
- iii. number of dental visits in 2014
- iv. stage of gestation at the time of appointment (recorded as first, second or third trimester)
- v. number of children including the child the expectant mother is carrying

Data that could not be found in the logbook and appointment book were collected through Brunei Darussalam Healthcare Information and Management System (Bru-HIMS) by lead auditor. Data collected were entered into a Microsoft Excel Spreadsheet and then analysed.

RESULTS

Number of patients seen in Sg Besar and Bunut antenatal dental clinics (June to December 2014)

There were 22 dental clinic sessions for Sg Besar antenatal dental clinic and 19 for Bunut antenatal dental clinics during this period. The total number of appointments given at Sg Besar and at Bunut antenatal dental clinics are shown in Table 1.

Table 1. Patients in Sg Besar and Bunut antenatal dental clinics

DENTAL CLINICS	Sg Besar	Bunut
Total number of appointments given	153	74
Number of patients who attended their appointments	107	54
Number of patients who cancelled appointments	7	3
Number of patients who failed to attend	39	17
Number of ‘walk-ins’	19	3

FTAs, cancelled and attended appointments in Sg Besar and Bunut antenatal dental clinics

Sg Besar antenatal dental clinic gave a total of 153 appointments; in which 70% attended their appointment, 25% failed to attend and 5% cancelled the appointment beforehand. As for Bunut antenatal dental clinic, 74 appointments were given; in which 73% attended their appointment, 23% failed to attend and 4% cancelled their appointment. The standard set for this audit was not met as the percentage of FTA for this audit is higher than that set for the standard. The highest FTA in Sg Besar antenatal dental clinic was 49% in the month

of December, whereas in Bunut antenatal dental clinic, this was 36% in the month of June (Table 4).

Table 2: Number of clinics per month in Sg Besar

DENTAL CLINICS	Sg Besar	Bunut
Total number of clinics per month in		
June	4	4
July	3	2
August	3	2
September	0	1
October	5	4
November	4	3
December	3	3

and Bunut antenatal dental clinic

Average number of appointment and 'walk-in'

During the audit period, Sg Besar antenatal dental clinic had an average of 7 appointments and 0.9 walk-in patients per clinic session. On the other hand, Bunut antenatal clinic has an average of 4 appointments and 0.2 walk-in patients per clinic session.

FTA by demographic factors

Table 3 shows all antenatal patients seen during this period were Malay. Among the FTA in Sg Besar antenatal dental clinic, 64% were in 21-30-years-old age group, 51% were in the third trimester, and 36% had more than 4 children. On the other hand, among the FTA in Bunut antenatal dental clinic, 82% were in 21-30-years-old age group, 65% were in their third trimester, and 71% were expecting their first child.

DISCUSSION

This audit has its own limitations. As this is a retrospective audit, most of the information was based on the data that could only be found from

the logbooks and appointment books in the antenatal dental clinics.

Information such as the reason of FTA and time the appointment was made were not recorded in logbooks and appointment books; hence, it is difficult to determine whether the reason or time lapse between the time the appointment was made and the actual appointment time itself affected FTA.

Table 3. Percentage of FTA by demographic factors

	Sg Besar Frequency (%)	Bunut Frequency (%)
Age		
≤20	2 (5)	2 (12)
21-30	25 (64)	14 (82)
31-40	11 (28)	0 (0)
≥41	1 (3)	1 (6)
Ethnicity		
Malay	39 (100)	17 (100)
Others	0 (0)	0 (0)
Number of dental visit		
1	22 (56)	4 (24)
2	12 (31)	7 (41)
3	2 (5)	6 (35)
≥4	3 (8)	0 (0)
Stage of gestation		
1	1 (3)	0 (0)
2	18 (46)	6 (35)
3	20 (51)	11 (65)
Number of children		
1	10 (26)	12 (71)
2	9 (23)	4 (24)
3	6 (15)	1 (5)
≥4	14 (36)	0 (0)

Table 4. Percentage of FTA, cancelled and attended appointments by demographic factors (bracket contains percentages)

	Sg Besar			Bunut		
	FTA	Cancelled	Attended	FTA	Cancelled	Attended
June	0 (0)	0 (0)	0 (0)	9 (36)	0 (0)	16 (64)
July	1 (9)	0 (0)	10 (91)	0 (0)	0 (0)	5 (100)
August	4 (25)	0 (0)	12 (75)	0 (0)	0 (0)	3 (100)
September	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
October	7 (16)	1 (2)	37 (82)	4 (24)	0 (0)	13 (76)
November	9 (20)	6 (14)	29 (66)	2 (18)	1 (9)	8 (73)
December	18 (49)	0 (0)	19 (51)	2 (15)	2 (15)	9 (69)

Furthermore, the relation of the level of knowledge of oral health during pregnancy

and patient satisfaction with our antenatal dental services could not be assessed. Although this audit has weaknesses and cannot give insight into reasons our patients fail to attend their appointments, it is still able to provide some baseline information regarding the FTA and possible associated demographic factors. This has never been reported before in Brunei Darussalam.

The findings of the audit are discussed according to the 2 main objectives of the audit.

FTAs and appointments in Sg Besar and Bunut antenatal dental clinics

Based on the appointment book, Bunut antenatal dental clinic had clinics in June but there was no appointment given for unknown reasons. Both Bunut and Sg Besar antenatal dental clinics did not have clinics in September because the dentist who covered both clinics took an emergency leave and it was difficult to search for replacement within the short notice.

As mentioned earlier, the FTA rates for both Sg Besar and Bunut antenatal dental clinics were 25% and 23% respectively. This is much higher than the rate reported by Ang *et al.* (2014) in which the rate of FTA in the Orthodontic clinics at NDC was 13.4% (Ang *et al.*, (2014). Our audit of FTA rates in antenatal clinics had not included cancelled patients, so if cancelled patients were also included, our FTA rates would have been even higher than 23- 25 %.

As this is a retrospective audit, it is hard to know whether cancellation was done with sufficient notice to rebook another patient or it resulted in a wasted slot. The number of appointments that were cancelled and rebooked in this audit was 5% in Sg Besar antenatal dental clinic and 4% in Bunut antenatal dental clinic respectively. When compared to the audit done by Ang *et al.* (2002), this rate was quite similar to that in NDC (3.4%) but lower when compared to Lallo and McDonald (2013) at 13.7%.

Unfortunately, this audit cannot assess the reasons of FTA. A possible reason for the high FTA could be due to patients failed to remember their appointments. Both Sg Besar and Bunut antenatal dental clinics started using Bru-HIMS during the period involved in this audit. This system is used to record the patients' notes and send short message appointment reminders automatically on the day the appointment is booked into the system, and also a day before the appointment to remind the patients of their appointments. However, as the dentist who worked in both Sg Besar and Bunut antenatal dental clinics was not familiar with the Bru-HIMS appointment system, the system was not used to book-in patient and the appointments were only written on the appointment card. As a result, they would probably need to depend largely on their memory and their appointment card to remember their appointments.

Ang *et al.* (2014) showed that 48.0% of the patients from Seria dental clinic and 33.6% of the patient from NDC who had successfully attended their appointment, had depended on the appointment cards to remember their appointments. Others had used calendar/diary, mobile phone, depended on their memory or on others to help them remember their appointment.

For Sg Besar and Bunut antenatal dental clinics, all the patients were given the date on their appointment cards. Unfortunately, this being a retrospective audit, data could not be collected from the successful attendees on how they remembered their appointments. If those who had failed to attend had forgotten their appointment, reminder system such as automated short messaging system or phone call prior to appointment may help to reduce FTA rates (Chen *et al.*, 2008). On the other hand, the reason of FTA could be due to low awareness concerning oral health, as reported by Boggess *et al.* (2010) who stated that those who seldom use dental services before pregnancy are less likely to use dental services during pregnancy, compared to those who more regularly availed themselves of dental services before pregnancy.

FTA by demographic factors

The demographic factors such as age, stage of gestation and number of children are included in this audit to find whether there is any association between these factors and the FTA among antenatal mothers.

Sg Besar and Bunut antenatal dental clinics had lowest attendance rates in the months of December (49%) and June (36%) respectively. For the month of June, comparison could not be done between Sg Besar and Bunut antenatal dental clinics as there is no appointment given in Sg Besar antenatal dental clinic during that month.

FTAs is caused by many multifactorial factors. Possible factors for FTA could be the appointment time and scared of the dental treatment. AlBarakati (2009) shown that inconvenient appointment time is one of the reasons that patients did not come for their appointment. If this is the case, the antenatal mother who FTA has more school children, they are more likely to fail their appointment during school holidays as they would use more of their time with their children.

Majority of the non-attenders in both Sg Besar and Bunut antenatal dental clinics were between 21-30 years old and were in their third trimester. A possible reason for high FTA rate in this age group could be that these young antenatal mothers might need time to adapt to the changes in life or hormones (Laloo and McDonald, 2013). There is also high FTA rate in those who are in third trimester. A possible reason to this could be because those in third trimester had appointment at the time near to their due date, hence they were more likely to FTA probably due to early labour or discomfort they felt when having treatment.

CONCLUSION

In conclusion, the FTA rates for both Sg Besar and Bunut antenatal dental clinics were higher than the standard set in this audit. Highest FTA rates occurred in June for Bunut antenatal dental clinic and in December for Sg Besar antenatal dental clinic. More than half of the

women who had FTA were in the third trimester of pregnancy. The reasons for FTA could not be determined as this was a retrospective audit, it only highlights opportunities for improvement and further research. Suggested areas of improvement are listed below.

RECOMMENDATIONS

1. Future audits on FTAs to be prospective in nature so as to include reasons for FTA and time interval between when appointment is made and the actual appointment itself. Additionally, a comprehensive survey on patient satisfaction with our antenatal dental services, antenatal mothers/ oral health knowledge and the priority they place on oral health may reveal useful information to help in understanding why our patients' FTA.
2. Efforts to reduce non-attended appointments by educating the community through delivering oral health talk in the maternal health clinic on the importance of attending dental appointment.
3. Encourage expectant mothers to use dental service as early as possible by reminding maternal clinic health nurses to refer expectant mother to antenatal dental clinic as early as possible so that all required treatments are completed before the third semester.

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An audit on the effective use of time with the newly implemented dental appointment system in Adult Primary oral Care Services, Belait District

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INTRODUCTION

A new dental appointment system was implemented in June 2017 for both adult and children Primary Oral Care Services (POCS) in Belait District, whereby patients requiring non-urgent dental care are allocated a specific time slot for consultation and treatment. Before this new system, both adult and children POCS in Belait District accepted all morning walk-in outpatients before a certain cut-off time, regardless of the type of dental treatment required. Appointments were, however, given in the afternoon for more complex and longer cases. With the previous system, there was an unpredictable patient load each day. Consequently, affecting patients' waiting time to be seen, quality of care provided as well as the good rapport desired between patients and dental staff. Patients also had the tendency of not returning for follow-up treatment and instead only returned when there is pain.

Hence, the dental appointment system was introduced with the objectives of improving those setbacks. Patients are now able to arrange appointments at their own convenience. Having fixed appointment times allows them to visit the dental clinic in a timely manner which reduces their waiting time in the dental clinic (George and Rubin, 2003). This system also helps to control workload which allows more time for practitioners to provide more comprehensive care and planning in order for continuity of care. This ensures timely delivery of the treatment required, thereby improving the quality of care provided. With it, practitioners are also able to anticipate the upcoming day, reducing work stress (George and Rubin, 2003). By adopting the appointment system, we are essentially working to accomplish our Dental Services mission "to improve Oral Health through effective, equitable, affordable, accessible, safe and sustainable Oral Health Care in Brunei Darussalam" and with the aim of "Healthy Mouth, Healthy Nation".

However as with all other systems, the appointment system does have its drawbacks; a major one being failure to attend (FTA) appointments (George and

Rubin, 2003; Parikh *et al.*, 2010). FTA results in significant clinical time and resources lost which could have been spent on other patients requiring an appointment and because of this, it increases the waiting time for an appointment, causing patient dissatisfaction (Parikh *et al.*, 2010). FTA also reduces the quality of care that could have been provided (Parikh *et al.*, 2010) due to delayed presentation and treatment, and this could potentially result in a worse outcome requiring costlier treatment.

Emergency walk-in patients are very common in POCS and they are unpredictable in numbers each day, creating "extras" on top of appointment patients. This could potentially compromise other patients' quality of care as well due to shortened treatment time available for individual patient. The urgency of treatment needed is also very subjective, making it difficult to meet patient's demands to be seen as soon as possible and this again leads to patient dissatisfaction.

Up to now, there has only been one similar audit done on patient failure to attend and clinical time lost but it was only conducted within Orthodontics Unit (Ang *et al.*, 2014). Hence, it would be beneficial to carry out an audit on the effective use of time with the new appointment system in place not only because there is still no audit done in POCS setting but it would also help to identify current problems and improvements required to optimise the full benefits of the appointment system.

AIM AND OBJECTIVES

The aim of this audit was to assess the effective use of time with the new appointment system in Adult Primary Oral Care Services, Belait District.

The objectives of the audit were:

1. To determine the percentage of FTA.
2. To determine the percentage of clinical time lost as a result of FTA.
3. To determine if there is an association between FTA and the dental service type or patient demographic factors including gender and age groups.

4. To determine the percentage of total emergency walk-ins.
5. To determine the percentage of “true” emergency walk-ins.

MATERIALS AND METHODS

This was a prospective audit of the appointment system at Belait District Dental Clinics during a total period of 28 working days from 11th December to 31st December 2017 (peak period due to school holidays), and from 1st January to 20th January 2018 (off-peak period). It included dental clinics from Suri Seri Begawan Hospital (KB), Seria Health Centre, and Sungai (Sg) Liang Health Centre. The audit however only included those attending for Adult Primary Oral Care Services, and excluded patients from Children Primary Oral Care Services and specialist clinics.

The data was manually recorded daily using two data collection sheets by participating dentists and their Dental Surgery Assistants. The participating dental staffs were briefed prior to commencement of data collection and a written instruction sheet was also provided for further reference.

The attendance of appointment and emergency walk-in patients were collected. It included:

- Number of first and subsequent appointment visit attendees, both including all latecomers.
 - First appointment visit attendees include those who had not attend the particular dental clinic for over 6 months.
 - Subsequent appointment visit attendees include those who had attend the particular dental clinic within a maximum of 6-months period.
- Number of latecomers.
 - Including those who arrived more than 15 minutes after appointment time but were still treated.
- Number of FTA.
 - Including late cancellations within 24 hours prior to appointment and reappointed latecomers.
- Number of emergency walk-in patients.
- Number of “true” emergency walk-ins.
- Emergency walk-ins who are truly in need of urgent and immediate treatment based on clinical findings.
 - To determine this, the recently reviewed Scottish Dental Clinical Effectiveness

Programme (SDCEP) Dental Clinical Guidance manual on Emergency Dental Care was used as a rough guideline.

For appointment patients who failed to attend, demographic data including gender and age groups, and dental service type were also collected in a separate data collection sheet. The dental service type for failed appointments is based according to patient’s reason for requested first appointment or prioritised treatment required according to dentist for subsequent appointments. Categories for dental service type include check-up, restorative, periodontics, extraction, endodontic, prosthodontics or others (appointments solely for review, appointments for referrals to specialist).

All data collected was entered into Microsoft Excel™ 2010 spread sheet for analysis. The percentage of average clinical time lost per dentist as a result of FTA throughout this audit was estimated as follow:

Average clinical time lost was calculated as follows:

$$\frac{(\text{Total number of FTA} \times 0.5 \text{ hour}) \times 100\%}{\text{Total of 28 working days} \times 7.5 \text{ hours per working day}}$$

i.e. taking each appointment slot to be around 30 minutes and working hours per day to be around 7 hours 30 minutes.

STANDARDS

The percentage of FTA varies according to specific population and hence, there is yet to be an established gold standard for it. However, Jackson (2009) has proposed that the gold standard for FTA in an orthodontic setting to be an overall of 5% or less. Considering that the appointment system was only recently implemented in POCS setting when this audit was carried out, the general public was still gradually adapting to it. Hence, the acceptable standard for FTA was set at 10% or less in this audit.

RESULTS

This audit data was collected by 2 dentists at KB Dental Clinic, 1 dentist at Seria Dental Clinic, and 1 dentist at Sg Liang Dental Clinic. A total of 393 appointments at KB Dental Clinic, 256 appointments at Seria Dental Clinic, and 294 appointments at Sg Liang Dental Clinic were analysed in this audit. Analysed data values for KB Dental Clinic have been shown as an average of 2 dentists for even comparison.

Rate of FTA

Table 1 presents the status of attendance during peak and off-peak period at all three dental clinics.

The FTA rates for these clinics range between 26%-37% which are all higher than the maximum FTA standard set at 10% for this audit. There were no major differences in the rates of FTA at both KB and Seria Dental Clinics during both periods.

However, there was a slight increase in the rate of FTA at Sg Liang Dental Clinic during off-peak period when compared to peak period.

Clinical time lost as a result of FTA

As a result of FTA, the average percentage clinical time lost per dentist over 28 working days at all three dental clinics ranged between 13% to 22%. Sg Liang Dental Clinic lost the most clinical time with 47 hours which comprises of 22% of total working time. KB Dental Clinic lost the least with 27 hours which is 13% of total working time, and Seria Dental Clinic lost 35.5 hours which makes up 17% of total working time.

Emergency walk-ins

The total number of emergency walk-ins increased significantly during off-peak period in Seria Dental Clinic in comparison to that during peak period. For both KB and Sg Liang Dental Clinics, there were no major differences in the total number of emergency walk-ins seen during peak and off-peak period. For both KB and Seria Dental Clinics, the daily number of emergency walk-ins peaked right after New Year public holiday at 10 and 4 walk-in patients per dentist respectively. For Sg Liang Dental Clinic, the highest daily number of emergency walk-ins was during off-peak period with a total of 12 walk-in patients per dentist.

More emergency walk-in patients were seen in KB Dental Clinic when compared to the total number of appointment patients seen during both periods. In contrast, both Seria and Sg Liang Dental Clinics generally saw more appointment patients than emergency walk-in patients during both periods. Of all the emergency walk-ins, less than half of them were considered "true" emergency walk-ins at KB Dental Clinic whereas majority of those in Seria and Sg Liang Dental Clinics were "true" emergency walk-ins.

Table 1. Status of attendance during peak and off-peak period at KB, Seria and Sg Liang Dental Clinics

		KB Dental Clinic		Seria Dental Clinic		Sg Liang Dental Clinic	
		Peak	Off-peak	Peak	Off-peak	Peak	Off-peak
GENDER	Male	25 (42%)	23 (47%)	10 (29%)	17 (47%)	18 (43%)	21 (40%)
	Female	34 (58%)	26 (53%)	25 (71%)	19 (53%)	24 (57%)	31 (60%)
	Total	59 (100%)	49 (100%)	35 (100%)	36 (100%)	42 (100%)	52 (100%)
AGE GROUP	< 18	1 (1%)	1 (2%)	4 (11%)	3 (8%)	1 (2%)	3 (6%)
	18-25	11 (19%)	10 (21%)	3 (9%)	3 (8%)	2 (5%)	3 (6%)
	26-35	23 (39%)	20 (41%)	6 (17%)	9 (25%)	18 (43%)	20 (38%)
	36-55	17 (29%)	12 (24%)	15 (43%)	16 (45%)	17 (40%)	16 (31%)
	> 55	7 (12%)	6 (12%)	7 (20%)	5 (14%)	4 (10%)	10 (19%)
	Total	59 (100%)	49 (100%)	35 (100%)	36 (100%)	42 (100%)	52 (100%)
DENTAL SERVICE TYPE*	Check-up	14 (24%)	21 (44%)	5 (14%)	9 (25%)	1 (2%)	9 (18%)
	Restorative	27 (46%)	12 (24%)	7 (20%)	4 (11%)	12 (28%)	8 (15%)
	Periodontics	12 (20%)	12 (24%)	5 (14%)	9 (25%)	7 (17%)	7 (13%)
	Extractions	1 (2%)	2 (4%)	17 (49%)	9 (25%)	14 (33%)	13 (25%)
	Endodontics	2 (3%)	2 (4%)	1 (3%)	4 (11%)	2 (5%)	6 (12%)
	Prosthodontics	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (5%)	4 (7%)
	Others**	3 (5%)	0 (0%)	0 (0%)	1 (3%)	4 (10%)	5 (10%)
	Total	59 (100%)	49 (100%)	35 (100%)	36 (100%)	42 (100%)	52 (100%)

* Dental service type according to patient's reason for requested first appointment or prioritised treatment required according to dentist for subsequent appointment.

** Others – such as appointments solely for review, appointments for referrals to specialist

Table 2: Frequency distribution in FTA within parameter groups in KB, Seria and Sg Liang Dental Clinics.

	KB Dental Clinic*		Seria Dental Clinic		Sg Liang Dental Clinic	
	Peak	Off-peak	Peak	Off-peak	Peak	Off-peak
Attended appointments	75 (71%)	68 (74%)	89 (72%)	96 (73%)	112 (73%)	88 (63%)
FTA	30 (29%)	24 (26%)	35 (28%)	36 (27%)	42 (27%)	52 (37%)
Total appointments	105 (100%)	92 (100%)	124 (100%)	132 (100%)	154 (100%)	140(100%)
Total “false” emergency walk-ins	49 (54%)	46 (55%)	1 (12%)	0 (0%)	21 (29%)	26 (30%)
Total “true” emergency walk-ins	42 (46%)	38 (45%)	7 (88%)	28 (100%)	51 (71%)	60 (70%)
Total emergency walk-ins	91 (100%)	84 (100%)	8 (100%)	28 (100%)	72 (100%)	86 (100%)
Total attended appointments seen	75 (45%)	68 (45%)	89 (92%)	96 (77%)	112 (61%)	88 (51%)
Total emergency walk-ins seen	91 (55%)	83 (55%)	8 (8%)	28 (23%)	72 (39%)	86 (49%)
Total patients seen	166 (100%)	151(100%)	97(100%)	124(100%)	184(100%)	174(100%)
Ave clinical time lost over 28 working days	13% (27 hours)		17% (35.5 hours)		22% (47 hours)	

FTA demographic data

Table 2 shows the frequency distribution in FTA within parameter groups including gender, age groups and dental service type for KB, Seria and Sg Liang Dental Clinics. There were generally more female patients who FTA in all three dental clinics. Patients within the 26-55 age group were also more likely to FTA for all three dental clinics. In KB Dental Clinic, FTAs were more frequent for appointments given for check-up and restorations, whereas FTAs for extractions were more frequent at Seria and Sg Liang Dental Clinics.

Appointment attenders

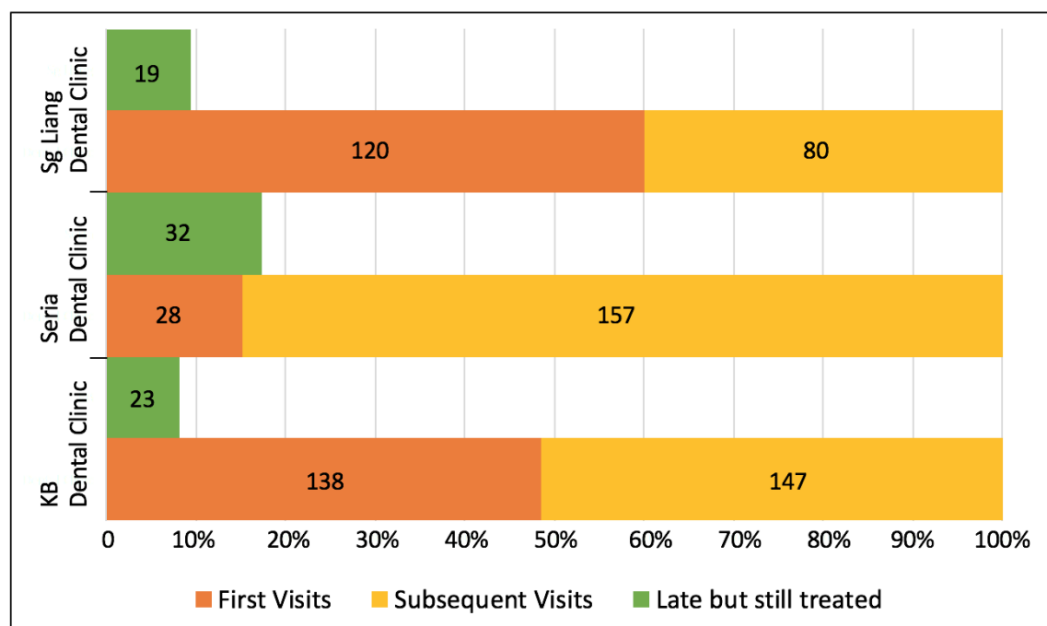
For both KB and Sg Liang Dental Clinics, there were more or less equal proportions of attended first appointments and subsequent appointments as shown in Figure 1. In Seria Dental Clinic however there were significantly more attended subsequent appointments. For all three dental clinics, less than

20% of attending appointment patients came more than 15 minutes late but were still treated.

DISCUSSION

Over the past few decades, there have been studies and audits done on healthcare appointment systems to identify challenges and understand the reasons behind FTA in order to generate potential solutions that could be effective at reducing FTA rates. A systematic review had reported that the rate of FTA in general health practices in USA ranges from 5.5% to 55% (George and Rubin, 2003). Similarly, Almog *et al.* (2003) had also cited that FTA rates can be as high as 48% among community health centres in USA. Although our FTA rates for all three dental clinics were in mid-range of 26%-37%, they were still considerably higher than our set standard for this audit. This was also reflected on the significant amount of total clinical time lost as a result of FTA.

Figure 1. Distribution of attended appointments in percentages and percentage of all late attenders who were still treated in KB, Seria and Sg Liang Dental Clinics.



There were a considerable number of emergency walk-ins especially in KB and Sg Liang Dental Clinics. This should be taken into account as the clinical time lost due to FTA may be used to see these walk-in patients. However, on days when there is high appointment attendance, the high number of emergency walk-ins may also imply that clinics are prone to run overtime. This might also affect the quality of service provided to patients with appointments due to time constraints, which would defeat the objective of having the appointment system that is to provide a more comprehensive treatment care.

Of all the emergency walk-ins, there were still significant number of walk-ins in KB and Sg Liang Dental Clinics who were not “true” emergency walk-ins and should have been given appointments within appropriate time-frame instead. However, the degree of urgency for dental treatment is very subjective so it can be challenging to control and only admit what is considered to be “true” emergency walk-ins. This may also explain for the higher total number of emergency walk-ins seen in KB Dental Clinic compared to the total number of appointment patients seen.

It is also interesting to note that there were no major differences in the rates of FTA during peak and off-peak periods for most of the Belait District Dental Clinics except for a slight increase in FTA during off-

peak period in Sg Liang Dental Clinic. Similar pattern also applied to the number of emergency walk-ins during both periods, with the exception of Seria Dental Clinic. During peak period, patients are more likely to be away or have other family commitments due to school holidays. This could potentially be the reason for the significant increase in emergency walk-ins in Seria Dental Clinic during off-peak period as patients in need of urgent care would be back from their vacations then. However, the off-peak period included in this audit was also the beginning of a new school term and parents are generally more occupied with their children at this time. This could explain for the slight increase in FTA for non-urgent care during off-peak period in Sg Liang Dental Clinic.

The actual reasons behind FTA were not identified in this audit. However, there had been reports of various factors associated with FTA including lower socioeconomic classes, lack of education, patients with larger family, payday, time of the week, travel distance and weather conditions (Almog *et al.*, 2003). Hence, work and family commitments may be potential reasons for the higher FTA rates among 26-55 age group and among females in Belait Dental Clinics. Urgency of appointments also plays a vital role in patients’ attendance (Almog *et al.*, 2003). More than often, dental symptoms do resolve on their own. Hence, some patients may then regard their appointments as unnecessary and not turn up for

them (Parikh *et al.*, 2010). This, along with the lack of oral health education, may explain for the higher rates of FTA for check-ups, restorations and extractions.

Another factor associated with FTA is patients' forgetfulness. It has been shown that the longer the waiting period for patient's appointment, the more likely it is for patient to not turn up (Parikh *et al.*, 2010). However, with the increasing demand for appointments, it is not feasible to schedule all patients within the desired time-frame. Reminder systems have been shown to play a crucial role in increasing appointment attendance as well as advanced cancellations and rescheduling (Parikh *et al.*, 2010). During this audit, only KB and Sg Liang Dental Clinics were using the BruHIMS automated short messaging system (SMS) as their reminder system. Seria Dental Clinic was not using BruHIMS yet and relied solely on telephone reminders when time permits.

SMS reminders are generally more convenient for both patients and practitioners. However, not all patients may have registered for SMS. There is also no way of knowing whether the reminders were successfully received had there been a change in number or phones being out of service (McLean *et al.*, 2016). Patients are also more likely to ignore SMS reminders or forget to contact back for advanced cancellation and rescheduling (McLean *et al.*, 2016).

On the other hand, telephone reminders ensure successful contact and they also allow for immediate rescheduling if needed (McLean *et al.*, 2016). They are however more time-consuming and labour intensive, and are also less convenient for patients as they are usually out or working during office hours as well (McLean *et al.*, 2016). Hence, multiple systematic reviews and randomised controlled trials had reported no significant difference in effectiveness between the different reminder methods (McLean *et al.*, 2016), which agrees with the results in this audit.

LIMITATIONS

1. This audit was based on data collected from dental clinics in Belait District only. FTA and emergency walk-in patterns may differ in other districts' dental clinics. Hence, audit results may not be representative of dental clinics nationwide.

2. Similarly, FTA and emergency walk-in patterns may vary with the time of the year, for example during fasting month period. This audit is only limited to the 28 working days from mid-December to mid-January.
3. There was one dentist who was away during the audit data collection so not all dentists in Seria Dental Clinic participated. Hence, the results collected may not be fully representative of Seria Dental Clinic.
4. This audit did not consider the frequency distribution in all appointments given within parameter groups. It may be that more appointments were given for a certain gender, age group or dental service type, and hence resulting in a higher rate of FTA for that particular group.

CONCLUSION

The set standard was not met in this audit. The rate of FTA for all three dental clinics in the Belait District was at least twice that of the set standard. The total number of emergency walk-ins was still fairly high, some of which were of no urgency. However, it should also be considered that this audit was carried out during the early implementation stages of the appointment system. Hence, interceptive measures could still be carried out in attempt to improve the effective use of time with this new appointment system.

RECOMMENDATION

As of now, the appointment system has been revoked. However, if it were to be reinstated, certain measures should be considered in order to improve the system. This would involve the cooperation of the whole dental team including dental officers, dental surgery assistants and nurses, as well as the receptionists, and the head of POCS should ensure that all is fully and clearly aware of the new implemented measures. Perhaps the head of respective dental clinics could follow-up after to ensure that the proposed new measures were being carried out efficiently prior to a re-audit.

Patient-centred care

- Expand patient's knowledge on oral health and explain the negative effects of delaying treatment even when there are no symptoms involved.
- However, also educate patient on what is considered true dental emergencies that would require urgent care.

- Understand the patient's reasons for FTA and plan the appointment on date and time most convenient for the patient.
- Strongly advise patient to inform in advance regarding any cancellations and rescheduling if unable to keep the initial appointment. Explain also the impact of this as it allows us to allocate this appointment slot to another patient which could reduce the overall waiting time for appointments.

Reminder system

- Automated SMS through BruHIMS should be utilised to the fullest by ensuring patient's contact details are always updated and ensuring SMS consent is activated for the patient on BruHIMS.
- SMS reminders should be sent out by booking patients into the BruHIMS appointment page at about 2 weeks prior to appointment date to allow patients to make necessary rearrangements in order to attend the appointment or to inform us of cancellations in advance if they are unable to make it.
- If time-permitting, perhaps a more intensive reminder system should be considered. On top of the repeated SMS reminders sent out via BruHIMS, perhaps a telephone call reminder should also be made closer to the appointment date.
- In the previous audit by Ang *et al.* (2014), double booking over patients with repeated poor attendance was suggested. This is also a possible alternative though it should be done with care and the unpredictable number of emergency walk-ins should always be considered beforehand.

Emergency walk-in management

- A Standard Operating Procedures for the Provision of Care for Dental Emergencies ('Walk-ins') manual has been prepared by the Primary Oral Care Services and it includes a flowchart diagram along with several example questions that can be asked to the patient. This could be used to train receptionists or assigned dental nurses in order to carry out some form of triage for better control of emergency walk-ins.

Re-audit

- A re-audit should be done over the same time period once new measures have been instigated by the head of POCS and overlooked by head

of respective dental clinics for several months, in order to determine the effectiveness of these measures at reducing FTA and non-emergency walk-ins.

- Assuming that the new implemented measures would reduce some FTAs, perhaps it would be more reasonable to have the standard set at a FTA rate of 20% for the next re-audit instead of having it set at 10%.
- In addition to the data collected in this audit, the re-audit should also consider the frequency distribution in all appointments given within the parameter groups (gender, age group or dental service type) in order to accurately determine if there is an actual trend in FTA.

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Audit on the compliance of Daily Fluoridated Toothbrushing Programme in all government primary schools and 7 private primary schools in the Brunei-Muara District

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BACKGROUND

In Brunei Darussalam, the high prevalence of tooth decay amongst both children and adults poses a major public health problem. Failure to bring this seemingly insignificant problem under control will inevitably result in further propagation of dental decay whose consequences can be quite devastating leading to an unimaginable amount of pain, suffering and misery for the individual as well as creating a significant economic burden for even industrialised countries (Petersen et al., 2005).

Therefore, to promote and maintain good oral health is a goal worth achieving for the people of Brunei Darussalam. The most effective way to reduce the incidence and prevalence of dental decay in the community is to use the protective influence of fluoride by implementing community water fluoridation (McDonagh et al., 2000; Iheozor-Ejiofor et al., 2015).

Another public health approach to use fluoride on a population basis is through individual administration, that is, the use of fluoride toothpaste with daily brushing to maintain an ambient level of fluoride in the oral cavity. A systematic review of the effectiveness of fluoride toothpaste for the prevention of dental caries in children examined in 74 studies found that, on average, a 24% reduction in tooth decay experience in the permanent dentition of children between the ages of 6 to 16 years (Marinho, 2003).

However, in order to reap the benefits of fluoride toothpaste much depends on the regular and widespread use of at least an optimum concentration of 1,450ppm fluoride toothpaste twice a day. This should be done as a normal everyday habit. There should also be adequate education of the consumer to choose an effective fluoride toothpaste and the improved commitment of parents brushing their young children's teeth or supervising their brushing.

Dental Services, Ministry of Health has implemented various measures and strategies to improve the oral health in Negara Brunei Darussalam, especially among children. One of these strategies is the Daily Fluoridated Toothbrushing (DFTB) programme which is meant to target primary schools. Due to their inclusive nature, they provide a suitable environment for dental health behavioural interventions.

The DFTB programme was first implemented in government primary schools in Brunei-Muara in 2010. By 2014, this programme had been extended to almost all government primary schools. In 2015, this programme had grown and included 18 private kindergarten and primary schools. The students under the programme brushed their teeth during recess time and were supervised by teachers or School Dental Nurses (SDN). Toothpaste used in this programme was Polypaste, which is specifically made from the Philippines and certified Halal. Polypaste contains 1,450 ppm fluoride content, thus, is a cheap and effective way to prevent tooth decay in large scale programmes.

Oral Health Promotion Unit, Dental Services, has published guidelines entitled 'Information Daily Fluoridated Toothbrushing Programme for Primary School Children' (Appendix I). The purpose of this book is to provide knowledge and guidelines to teachers and students in performing DFTB more effectively.

Cross-sectional studies have shown that while the oral health knowledge of the teachers in school may be fair, it is not enough to change improper oral hygiene practices (Alsumait et al., 2016; Sekhar et al., 2014). It has also been noted that teachers may find it difficult to comply with such teacher centred programmes as under their current conditions in schools, it may prove unrealistic and implementation at classroom level may be rather moderate (Terhart, 2013).

In the 2016-2017, Dental Services spent \$19,280 for buying 23,000 toothbrushes and \$3,900 for 650 Pollypaste bottles specifically for DFTB programme. However, not all schools carry out DFTB programme at present. Therefore, there is a need to assess the compliance of DFTB and to identify the reasons of failure to carry out this programme.

AIM AND OBJECTIVES

The aim of this audit was to assess the compliance of the DFTB programme in all participating primary schools in Brunei-Muara district of Brunei Darussalam.

The objectives of this audit were to:

1. Determine the percentage of schools carrying out DFTB programme.
2. Assess Oral Health Knowledge of the Health Promoting School Teachers (HPST).
3. Identify the reasons of failure to carry out the DFTB programme.

MATERIALS AND METHODS

For the purposes of this audit, an initial verbal discussion was done with SDN who have been involved in the programme to target the main potential issue with the DFTB programme so as to draft the pertinent questions required to gain insight to reviewing for failure or success of the programme.

This audit used a 15-items questionnaire (Appendix II), which consists of questions on **knowledge**, **compliance** and **reasons of failure** to carry out DFTB programme. The questionnaires were distributed to all government and primary schools involved in Brunei-Muara district from 1st-7th August 2017. Brunei-Muara was chosen as the sample - district as it has the highest number of schools and also in order to minimise the workload in terms of distance travelled for the staff involved in data collection.

The questionnaires were placed in envelopes which were distributed by SDN and the Oral Health Promotion team to the HPST of each school. All questionnaires were collected a week after they were distributed at each school.

To ensure that all questionnaires were taken and returned, a checklist was prepared indicating that SDN had taken the questionnaires and that they

were returned. All SDN involved in the distribution were briefed prior to distribution to improve on standardisation of the responses of the questionnaire, such as, all questions to be answered, encourage feedback comments if possible and to reassure the teachers that the questionnaire was simply a way for feedback and review so as to reduce margin for bias.

Certain questions had spaces left for the teachers to provide any further comments they wish to make concerning their responses, and general commenting spaces were also provided concerning the whole programme so as to allow general feedback.

To determine if the questionnaires were filled out appropriately, the criteria was that all the questions should have at least one box tick as an answer with the exception of those answered by HPST where the answered question (7) is a negative response. Question (7) is where the HPST indicates whether they have ever carried out the DFTB Programme in the school. If they haven't, they may skip to Question 13 which attempts to investigate what are the reasons for not carrying out the DFTB Programme in the schools.

Data was entered and analysed using Microsoft Excel™ 2010.

STANDARD

Currently, there is no existing standard for the outcomes measured; hence, for this audit 80% is taken as a reasonable measure of a desirable outcome, that is, 80% of the primary schools carry out DFTB programme and 80% of correct answers by the health promoting school teachers for each oral health knowledge question (question number 3 through 6).

RESULTS

Percentage of schools carrying out DFTB programme

Out of 55 questionnaires distributed, all questionnaires were returned and completely filled, giving an overall participation rate of 100%. Of a total of 55 participating schools, 48 (87.3%) were government schools, and 41 schools (74.5%) had attended talks on oral health.

A total of 29 (52.7%) schools conducted DFTB daily . All 7 private schools had conducted DFTB at least once a year, whereas 7 (27.1%) government schools

had never conducted DFTB. The compliance of DFTB was higher for those schools who have attended OH talks (65.5% vs 21.8%).

Further breakdown of the DFTB protocol with the schools that carry out the programme

Out of 48 schools that carried out the DFTB programme, 24 schools (43.6%) demonstrated toothbrushing techniques only once a year; 39

schools (71.0%) conducted the programme during recess period; and 45 schools (81.9%) complied with using Polypaste. Only 21 schools (38.2%) that carried out this programme daily say that it only takes 5-10 minutes to execute and carried out the programme under supervision.

Table 1. Oral Health Knowledge of HPST (brackets contain percentages)

	Frequency of toothbrushing			Time of toothbrushing			Amount of toothpaste			Need to rinse	
	Once a day	Twice a day	3 or more times a day	Morning only	Night only	Morning and night	A smear	Pea sized	The whole length of TB	Yes	No
Government											
Static	1 (2.1)	8 (16.7)	10 (20.8)	0 (0.0)	0 (0.0)	19 (39.6)	0 (0.0)	18 (37.5)	1 (2.1)	4 (8.3)	15 (31.3)
Non-Static	0 (0.0)	9 (18.8)	20 (41.7)	2 (4.2)	0 (0.0)	27 (56.3)	0 (0.0)	26 (54.2)	3 (6.3)	7 (14.6)	22 (45.8)
Private											
Static	0 (0.0)	2 (28.6)	0 (0.0)	0 (0.0)	0 (0.0)	2 (28.6)	0 (0.0)	2 (28.8)	0 (0.0)	0 (0.0)	2 (28.6)
Non-Static	0 (0.0)	4 (57.1)	1 (14.3)	0 (0.0)	0 (0.0)	5 (71.4)	0 (0.0)	4 (57.1)	1 (14.3)	1 (14.3)	4 (57.1)
Attended talks on OH											
Yes	1 (1.8)	18 (32.7)	22 (40.0)	1 (1.8)	0 (0.0)	40 (72.7)	0 (0.0)	37 (67.3)	4 (7.3)	6 (10.9)	35 (63.6)
No	0 (0.0)	5 (9.1)	9 (16.4)	1 (1.8)	0 (0.0)	13 (23.6)	0 (0.0)	13 (23.6)	1 (1.8)	6 (10.9)	8 (14.6)

Reason for failure Percentage (%)						
	Limited time	Unimportant programme	Unsuitable venue	Difficulty with storage for DFTB	Insufficient school support	No problems
Government						
Excellent	18 (32.7)	0 (0.0)	1 (1.8)	1 (1.8)	1 (1.8)	4 (7.3)
Good but needs improvement	16 (29.1)	0 (0.0)	1 (1.8)	3 (5.5)	1 (1.8)	0 (0.0)
Not good	2 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Private						
Excellent	4 (7.3)	0 (0.0)	0 (0.0)	1 (1.8)	0 (0.0)	1 (1.8)
Good but needs improvement	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.8)
Not good	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	40 (72.7)	0 (0.0)	2 (3.6)	5 (9.1)	2 (3.6)	6 (10.9)

Oral Health Knowledge of the Health Promoting School Teacher (HPST)

Data on the oral health knowledge of the HPST are presented in Table 3. There was over 90% of correct answers from all HPST in the oral health knowledge questions, except for question on “no need to rinse after brushing”. For the frequency of toothbrushing in this audit, it is taken that “twice a day” and “3 or more times a day” are both correct answers. In this audit, 54 HPST (98.2%) answered the frequency of toothbrushing correctly; 53 HPST (96.4%) got the timing (morning and night) correct; and 50 (90.9%) of HPST correctly stated the right amount of toothpaste (pea-sized) to be used for each child. However, only 43 HPST (78.2%) answered correctly that there is “no need to rinse after brushing”.

Reasons of failure to carry out the DFTB programme

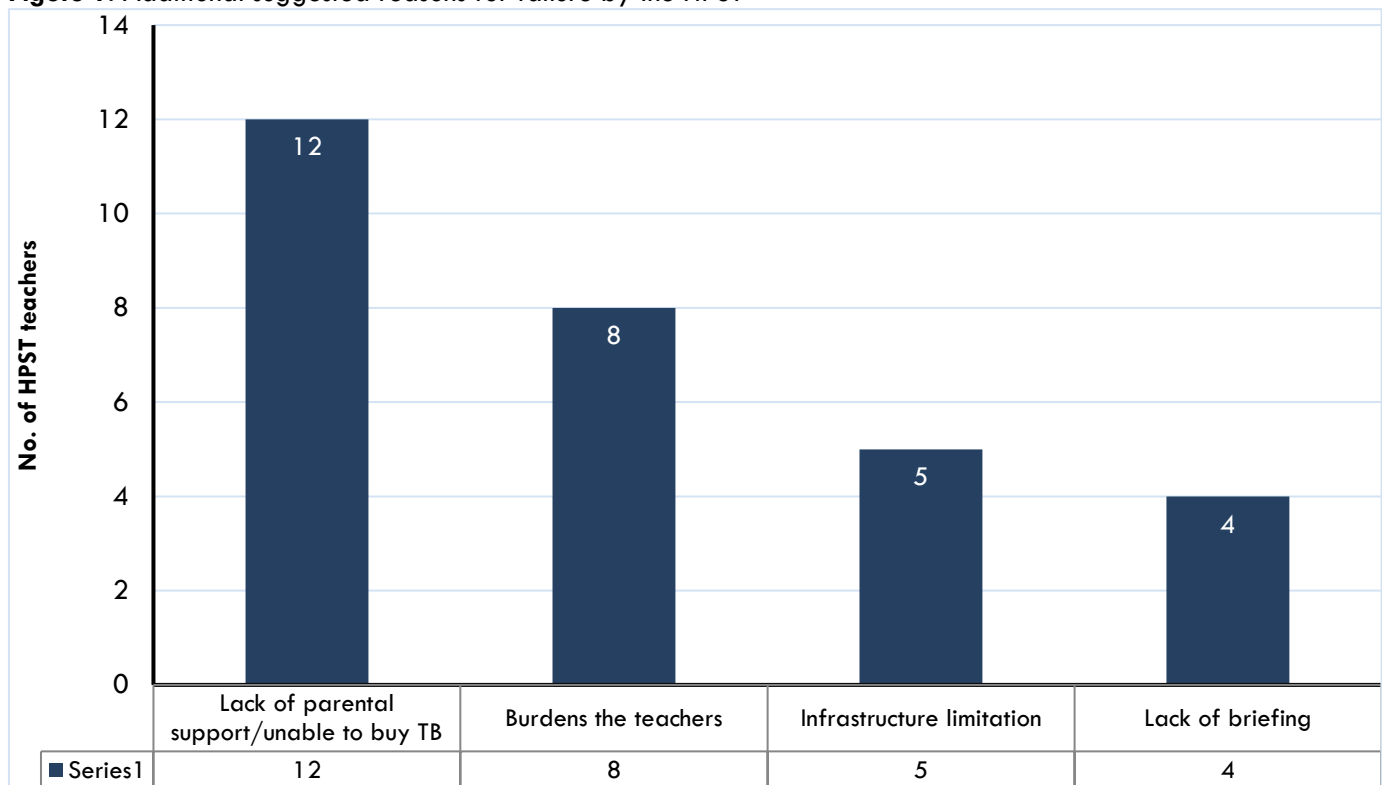
About three-quarter (72.7%) of the schools stated that the main reason for failure was due to the limited time; 5 schools (9.1%) stated difficulty with storage; and 2 schools (3.6%) stated unsuitable

venue and insufficient school support. No school stated that DFTB programme as unimportant.

Figure 1 shows the proportion of HPST who gave additional reasons for failure in the comment section. All these additional responses are categorised accordingly; and each category are not necessarily from individual responses, that is, one feedback response may contribute several reasons.

Twelve HPST have indicated in their feedback that there is a lack of parental support/awareness as well as the parents' inability to buy toothbrushes for their children which contributes to the failure of the programme as some students were not be able to participate. This is closely followed by the idea that the programme is a burden to some of the teachers and increases their workload which can make it difficult for them to carry out the programme as their primary duty is to be an educational teacher.

Figure 1. Additional suggested reasons for failure by the HPST



DISCUSSION

This audit was carried out to assess the compliance of the DFTB programme in all 48 government and 7 private primary schools in Brunei-Muara district. This is the first time the programme has been audited since the launching of this programme in 2010.

Before discussing its findings, it is appropriate to consider the strength and weaknesses of this audit. The strength of this audit is that the response rate was excellent (100%) from the chosen sample population. Only two questionnaires were not 100% completely filled in but with some enquiry with the teacher, the pertinent question of Q7 was answered, allowing for a 100% completion of all questionnaires.

However, this audit has its own limitations. Firstly, as with any self-administered questionnaire, this audit was prone to information bias. There is a possibility that although the HPST had been briefed to reduce margins of bias, they may still give socially desirable answers. The SDN recruited for the distribution may have also introduced bias due to lack of training or miscommunication.

Secondly, an interesting fact to note is that in some schools there was a lack of handover of the DFTB responsibility which meant that there were HPST that had not attended an Oral Health and DFTB lecture or briefing but were carrying out the programme. This may affect the audit's data.

Thirdly, the sample size is only of one district instead of covering the whole of Brunei giving us a smaller population sample which may not reflect the whole country. Finally, the questionnaire which was utilised in this audit was not pilot-tested. The pilot testing of the questionnaire would help to indicate areas for improvement of the questionnaire.

The findings of the audit will be discussed according to the 3 main objectives of the audit.

Percentage of schools carrying out DFTB programme

The standard for this objective was not met as only 52.7% of the schools were actually compliant in carrying out the DFTB programme daily. One of the main aims of the programme is to provide daily applications of fluoride in the form of toothpaste to maintain the ambient levels in the oral cavity. Almost 20% of the schools only carry out the programme a few times a year. This may serve as a reminder of oral hygiene importance but does not

contribute to the main aim of the programme and may also lead to the expiry of the supplies that have been given to them. One example is the Polypaste. Some schools have had the supply expired as it became difficult to assess how long it would take for the Polypaste to finish prior to requesting new supply. Stock turnover and budgeting to maintain the programme could possibly be difficult to predict.

The first objective had its standards set at 80%, to allow for the instances of schools who had an issue with compliance due to low socioeconomic status and being unable to maintain having the tools for oral hygiene upkeep even with the aid of our subsidising the programme by providing free toothbrushes once a year. In addition, the standard was set short of the idealistic 100% as there was awareness that not all schools could or would comply with the programme daily and there needed to be a realistic goal. However, it was made aware through the audit results that even so, there were 13% of the total schools which did not even participate in the programme this year. Unfortunately, the 13% was made up of only government schools (7).

In terms of the aspects of compliance, it is interesting how there is contradicting responses as almost 40% of the schools claim to only need 5-10 minutes to carry out the programme. This may contradict the results with pertains to the third objective of the study, that is, the main reason for failure to carry out the programme is due to the limitation of time. However, it must be stated that we are not fully informed as to the length of each school's blocked scheduling for recess and such.

Oral Health Knowledge of the Health Promoting School Teacher (HPST)

The results will be discussed in reference to the 4 different oral health questions provided, as the standards were not completely met for this objective.

In general, over 90% of the HPST answered 3 out of the 4 questions appropriately regardless of whether they have attended an oral hygiene talk or not. This could indicate that the basic oral health information has been handed over appropriately and has been delivered effectively in the first place. The most common correctly answered questions are on a) frequency which is 98.2%, followed by b) timing of toothbrushing (96.4%) and c) amount of toothpaste (90.9%). Only 43 HPST (78.2%)

answered correctly that there is "no need to rinse after brushing". This could mean that the delivery method of this particular piece of information may be not as impactful as required.

The audit findings could be due to oral health knowledge such as frequency, timing of toothbrushing and amount of toothpaste is appropriate for each child are well known common facts; whereas, "no need to rinse after brushing" is a less well known fact. The above discrepancy might indicate a lack of awareness and it may be because it is not taught in schools as only very little oral health information is part of the general curriculum in schools. From this, we can possibly infer that the majority of the oral health message is being conveyed well with more emphasis and clarity being required in a few areas as part of the DFTB programme.

Reasons of failure to carry out the DFTB programme

This will be discussed by categorising the suggested common reasons for failure as well as the additional reasons for failure from the HPST point of view in the order of their importance according to the results.

Suggested common reasons for failure

1. Limitations of time

This was the most common selected reason for failure of the programme. Forty (72.7%) of HPST suggested this as they feel that organising the students is time-consuming. As most of them carry out the programme during the recess period, they believe this takes part of the recess period away from the teachers and students as well as affecting class time as it can cut into the class time after the recess period.

2. Difficulty with storage

A few schools felt that they found it difficult to store the DFTB items appropriately as they would need to find the resources to create storage units. They wished for the storage units to be provided rather than having the responsibility to obtain these storage units, in which one response mentioned required looking for resources to achieve this.

3. Unsuitable venue

The lack of a venue was a minor issue with only 2 out of 55 schools stating that this was their main problem.

4. *Lack of school support*

Only 2 out of 55 schools felt this was their main issue. However, it was not elaborated as to what kind of support this meant. It is entirely possible that the school recognises the importance of the programme and supported its execution, but did not support the action of execution or made any adjustments to ensure that the programme was being carried out smoothly.

Additional reasons for failure from the HPST point of view

1. *Lack of parental support/awareness*

Several HPST felt that this was the most pressing reason for failure in addition to limitation of time. There was mention of how some parents did not have the awareness of the importance of oral health and were not reinforcing its importance at home. Also, they mention that a number of students could not participate in the DFTB programme as they did not have toothbrushes. The HPST suggested that it was possible that some parents who are from the lower socioeconomic status group could not afford to keep replacing toothbrushes and suggested that the toothbrushes in the DFTB programme were supplied and provided more than once year.

2. *Burdens of the teacher*

This was the next popular reason given for why there was difficulty with the programme. Several HPST have stated that they have their own normal duties to carry out and that the programme affects what little time they have to take a short break or it overwhelms with burdening them with more work to do. They also mention that their primary duty is for the education of their students but the programme shortens their important class time as it is difficult to organise the students of those age groups quickly and efficiently. They have suggested that it would be better that the SDNs carry out the daily duty of the DFTB instead.

3. *Lack of infrastructure*

A few of the HPST mention that the school infrastructure could not accommodate the programme as water taps were not available outside or in the venue that was available to carry out the programme.

4. *Lack of briefing*

There was some mention that there was a lack of briefing for the teachers as well as the students. One of the suggestions was to have the briefing more

often and regularly rather than sporadically as it is now.

CONCLUSION

There is just over 50% claiming to comply with the DFTB programme within the Brunei-Muara district. Several schools have issues with complying with the programme for a plethora of reasons. However, the basic oral health knowledge of the HPST, while incomplete and does not meet the standards we have set, is promising and generally sound. Nevertheless, this does not ensure that it is translated to the students and parents effectively. The audit's results have been eye-opening that the programme does require change to be more effective.

RECOMMENDATIONS

Looking at the issues, here are a few recommendations that can be made as most successful oral health programmes are labour intensive, have involved significant others and have received funding and additional support. A balance between inputs and outputs, and health care resources available will determine if the programme can be recommended for general use (Nakre & Harikiran, 2013).

1. Collaboration with Ministry of Education (MOE) and Health Promotion Centre (HPC)

Due to lack of resources and manpower which seems to be main issues of the programme; perhaps, a more structured centralised collaboration with the MOE and the HPC might be considered instead. This could continue the oral education as well as the health education of the students from a young age but in a high-quality manner in the form of regular field trips to the HPC to utilise a resource that is already available and would require fewer staff to handle the programme. It would also engage the students in a more interactive way rather than rote learning. Limitation of time could still be an issue but if it were a field trip, it would be a few planned periods rather than a daily interruption of the class time.

2. School curriculum

Suggestion 1:

Addition of oral health education as part of a subject such as science or to make its education compulsory as part of the student's education but this would require collaboration with MOE for such an undertaking. For example, pictures

to show the correct toothbrushing technique and importance of fluoride toothpaste.

Suggestion II:

Discussions with MOE for the improvement of facilities for some of the schools to improve the venue and including DFTB as part of the timetable by scheduling a period within the timetable daily to carry this programme out so that it is not taking the require break period away from the students and teachers. This may encourage the teachers and students alike for a more holistic education.

3. Use of Information Technology

The technology age could be taken advantage of by the use of interactive dental software programmes for the students; whereby, the programmes could be given to the teachers to carry out during class at the schools. Creating a programmes for the students to use at home would have another issue with the differences of the different social economic classes at the schools as not all students may have access to technology at home especially if there is an issue with the provision of toothbrushes already. However, this would require the necessary manpower to create such software programmes.

4. Oral health roadshows

This may tackle the concern of lack of parental awareness or support. Children are primarily dependent on their parents. Without parental awareness or support, it would be difficult for the optimal upkeep of their oral health. This is because children's diet and hygiene would be dictated by the parents' decisions for the provision of the appropriate foods and hygiene items. Thus, Oral Health roadshows in popular venues where families would be present during non-working hours may better address this issue.

5. Identify the lower income bracket families in the schools

A policy and system could be created whereby lower socioeconomic status families that require extra support may apply through the schools or directly to Dental Services for aid in terms of oral health items if they satisfy certain criteria. This way, it may equalise the social inequality present by targeting the families in need and

there would be less of a reason for lack of upkeep of oral health.

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