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MANUAL

SCHOOL BASED FLUORIDE MOUTH RINSING PROGRAMME

Oral Health Programme
Ministry of Health Malaysia
2018

FOREWORD BY
THE PRINCIPAL DIRECTOR OF ORAL HEALTH
MINISTRY OF HEALTH MALAYSIA

Dental caries is a preventable chronic disease that affects children across all age groups. It is the most common chronic disease of childhood. The use of fluoride is the most important reason for the decline in the prevalence and severity of dental caries. People at high risk for dental caries often require additional fluoride. Fluoride Mouth Rinsing is one of the additional sources of fluoride that can help reduce dental caries.

Fluoride Mouth Rinsing is recommended as a community-based caries preventive programme for primary schoolchildren. This Fluoride Mouth Rinsing programme utilises a strategy of targeting high-risk primary schoolchildren, in areas with low or without access to fluoridated water supply to reduce the prevalence and severity of dental caries. Successful implementation of this programme will further contribute in controlling dental decay in children from deprived areas.

The purpose of this manual is to guide oral health personnel on the implementation, monitoring and evaluation of the Fluoride Mouth Rinsing programme for primary schoolchildren.

I take this opportunity to express my sincere appreciation for the commendable effort of the committee involved in the preparation of this manual.

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ACKNOWLEDGEMENT

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Members of the Working Committee welcome comments and constructive suggestions pertaining to any aspect of this manual

CONTENTS

MANUAL FOR A SCHOOL BASED FLUORIDE MOUTH RINSING PROGRAMME

1. INTRODUCTION

This manual is to provide guidance on the implementation, monitoring and evaluation of the school based fluoride mouth rinsing (FMR) programme for primary schoolchildren Year 1 to Year 6. It is an additional guide for the implementation of Guidelines on Oral Healthcare for Schoolchildren in Malaysia[1]. Extensive literature review is also provided for referral (Addendum). Fluoride mouth rinsing is a recognized means of controlling and preventing dental caries among school children, particularly in fluoride-deficient/non fluoridated areas.

2. OBJECTIVES OF THE MANUAL

2.1 General Objective

To establish a standardised, comprehensive and systematic school based fluoride mouth rinsing programme as part of the Oral Healthcare for Schoolchildren residing in fluoride-deficient/non fluoridated areas.

2.2 Specific Objectives

- To implement a school-based FMR programme as part of the Oral Healthcare for Schoolchildren
- To increase the proportion/number of schoolchildren in fluoride-deficient/non fluoridated areas participating in FMR annually
- To monitor and evaluate the performance of the FMR programme
- To reduce the prevalence of dental caries among schoolchildren in fluoride-deficient/ non fluoridated areas

3 TARGET POPULATION

For best use of resources in the public health sector, FMR programme will focus on high-risk primary schoolchildren, in areas with low or without access to fluoridated water supply. The programme may be carried out at identified primary schools.

4 TRAINING

4.1 Training for Oral Health Personnel

All dental officers and dental therapists must be trained and updated periodically on relevant subjects which include:

- Current knowledge on fluoride mouth rinsing programme (e.g. indications for FMR, identification of high risk communities, FMR procedures)
- Data collection and reporting
- Monitoring and evaluation

4.2 Training for School Teachers

- A briefing session on the FMR programme should be organized for the selected school. The headmaster, senior assistant and all teachers involved in the FMR programme should be included in this briefing session.
- The objective of this session is to familiarize the participants with the FMR programme so as to ensure smooth implementation of the programme.
- An instruction leaflet on the preparation of the sodium fluoride solution and the rinsing procedure will be given to the school (Appendix 3).

5 IMPLEMENTATION

5.1 Identification of High-Risk Primary Schools (Appendix 1)

The State Deputy Director of Health (Oral Health)/District Dental Officer and Officer-in-charge shall identify high-risk primary schools based on caries prevalence and caries experience of 12-year old schoolchildren in the state/district.

A school shall be considered as high risk if all of these criteria are met:

- *Caries prevalence of 12-year-olds is more than 40%, and
- *Mean DMFT at 12 years old is more than 2, and
- Located at **fluoride-deficient/non fluoridated area

** based on national caries prevalence and mean DMFT of 12-year-old schoolchildren in Malaysia*
***places with suboptimal fluoride exposure*

5.2 Selection of children

Year 1 to Year 6 schoolchildren in the selected schools would be involved in the programme and are required to rinse once a week.

5.3 Fluoride Mouth Rinsing Procedure (Appendix 2 & 3)

Following WHO recommendations [2], the weekly rinse regime using 0.2% sodium fluoride (NaF) solution would be adopted.

5.3.1 Consent

A signed informed consent must be secured from the parent/guardian of the child; refer to 'Pengurusan Kebenaran 'Rawatan Pergigian Kementerian Kesihatan Malaysia' [3].
Parents/guardian should receive explanation on the benefits and safety of FMR.

5.3.2 Medical/Dental/Social History

A thorough medical history, including known allergies, shall be obtained prior to participation in fluoride mouth rinsing programme. Children with a known history of renal disease should be excluded.

5.3.3 Instruments and Materials (Appendix 4)

i. Storage of supplies

Sodium fluoride powder should be kept in a locked, dry storage area where extremes of hot and cold can be avoided. Other supplies such as plastic containers, measuring cups and mugs, should be stored in a clean and dry place [4].

.

ii. Packing of sodium fluoride powder (by oral health personnel)

- A sensitive digital weighing scale, such as those used by the pharmacy department, should be used to weigh out 10 grams of sodium fluoride powder.
- Personnel involved should use disposable latex gloves, disposable plastic aprons and face masks when weighing the sodium fluoride.

- Each packet of sodium fluoride should be labeled (sodium fluoride powder, 10 grams), and sealed.

- All packets of sodium fluoride should be kept in a closed container, in a locked dry storage area.

5.3.4 Trial run

The following procedure would be adopted to ensure that the children can expectorate fully:

i. Give each child 10 ml of plain water

ii. Ask the children to rinse with the plain water for one minute

iii. Ask the children to spit out the rinse into a plastic measuring cup

iv. The expectorate of each child is measured using the plastic measuring cup

v. If the expectorate exceeds 10 ml, the child will participate in the programme

vi. If the expectorate is less than 10 ml, another attempt is made. In the event that the child continues to be unable to expectorate fully after four attempts, the child will be excluded from the programme.

5.3.5 Preparation of Sodium Fluoride Solution

A fresh solution of neutral 0.2% sodium fluoride is prepared by mixing a pack of ten (10) gram sodium fluoride in five (5) litres of plain water in a five (5) litre plastic container (The packets of sodium fluoride powder will be supplied to the schools at monthly intervals by oral health personnel from the nearest dental clinic). The mixture is shaken until all the powder has dissolved. The solution would be prepared by the school teachers (or oral health personnel) just before the fluoride mouth rinsing procedure begins.

5.3.6 Tooth Brushing Drill (Appendix 5)

A tooth brushing drill can be conducted prior to rinsing with sodium fluoride solution (optional) [5].

5.3.7 Rinsing Procedure

The following procedure would be adopted [6]:

i. 10ml of 0.2% sodium fluoride solution is dispensed into disposable cup of each child.

ii. Each child would then rinse for one minute under the teacher's (or oral health personnel's) supervision after which the solution is expectorated/spit back into the disposable cup.

iii. Instruct the child to wipe their mouth with tissue/napkin and then put it into the used disposable cup in order to absorb the access solution and discard it into the trash.

iv. A whistle would be used to signal when to start and stop the rinsing process. A stop watch would be used to time the rinsing process.

v. The children would be instructed not to eat, drink and rinse with water for the next 30 (thirty) minutes.

vi. The class teacher (or oral health personnel) would record the weekly attendances of all children participating in the programme using format FMR 1 (Appendix 6).

Note:

i. This weekly rinsing would be carried out throughout the school year, ceasing temporarily only during school holidays. If the fluoride rinsing day happens to be a public holiday or an occasional holiday, then the children should rinse on another day, but in the same week. Do not skip any rinse.

ii. For maximum benefit each child should rinse at least 40 times per year.

iii. In cases of accidental swallowing of the fluoride solution, the child should be given a cup of milk immediately. All schools participating in this programme should keep a supply of milk powder in the school for this purpose. The milk would combine with the sodium fluoride solution and thus reduce the unpleasant side-effects caused by accidental ingestion. (For details of fluoride over dosage refer to Appendix 10 [7, 8])

iv. Any remaining solution should be discarded and not stored for future sessions. This is to avoid accidental consumption of the sodium fluoride solution.

6 MONITORING AND EVALUATION

6.1 Responsibilities

A state coordinator shall be appointed by the respective State Deputy Director of Health (Oral Health) to monitor and evaluate the outcome of the programme at state and district levels.

6.2 Monitoring

Data shall be collected manually using formats as follows:

i. **Reporting from Class Teacher to Headmaster (or by oral health personnel)**

At the end of the month, the respective class teacher (or oral health personnel) would total up the attendances and number of times the fluoride mouth rinsing was carried out in form FMR 1 (Appendix 6). He/She would then transfer this information to form FMR 2 (Appendix 7). One copy of form FMR 2 is then submitted to the headmaster concerned.

ii**. Reporting from Headmaster to District Dental Officer.**

The respective Headmaster would submit copy of FMR 2 to the respective District Dental Officer monthly.

iii. **Reporting from District Dental Officer to State Deputy Director of Health (Oral Health)**

The respective District Dental Officer would compile format FMR 2 from the respective schools and submit format FMR 3 and FMR 4 (Appendix 8 and 9) to the State Deputy Director of Health (Oral Health) yearly.

iv. **Reporting from State Deputy Director of Health (Oral Health) to Oral Health Programme, MOH**

The State Coordinator would compile format FMR 3 and FMR 4 from the respective districts and submit the compiled format FMR 3 and FMR 4 (Appendix 8 and 9) to Oral Health Programme, MOH yearly.

Table 1
A Summary on levels of Reporting

Level	Originator	Receiver	Frequency	Format Used	Appendix
1.	Class Teacher (or Oral Health Personnel)	Headmaster	Monthly	FMR 1	6
2.	Headmaster	District Dental Officer	Monthly	FMR 2	7
3.	District Dental Officer	State Deputy Director of Health (Oral Health)	Yearly	FMR 3 & 4	8 & 9
4.	State Deputy Director of Health (Oral Health)	Oral Health Programme Ministry of Health	Yearly	FMR 3 & 4	8 & 9

6.3 Evaluation

Evaluation of the FMR programme shall be carried out regularly at district and state levels. Performance indicators to be used for evaluation include process indicators and outcome measures.

6.3.1 Process indicators shall be measured using format FMR 3.

The indicators to be used are:

i. Percentage of schools in areas with low/without fluoridated water supply participating in FMR

Formula:

= Total no. of schools in area with low/without fluoridated water supply participating in FMR (FMR 3a) x 100
Total number of schools with high risk status in area with low/without fluoridated water supply (Appendix 1l)

ii. Percentage of schoolchildren (Year 1 to Year 6) participating in FMR

Formula:

= Number of schoolchildren (Year 1 to Year 6) participating in FMR (FMR 3i) x 100
Total number of new attendees of schoolchildren (Year 1 to Year 6) (FMR 3d)

6.3.2 Evaluation of outcome measures shall be carried out using service/survey data (FMR 4)

Outcome indicators to be used are:

i. Percentage of 12-year-olds who are caries free in the respective schools after implementation of FMR

Formula:

= Total no. of 12-year-olds who are caries free in schools participated in FMR (FMR 4c *Tahun* 6) x 100
Total number of new attendees of 12-year-olds schoolchildren (FMR 4b *Tahun* 6)

ii. Mean DMFT of 12-year-olds in the respective schools after implementation of FMR

Formula:

= Total number of DMFT among 12-year-olds in schools participated in FMR (FMR 4e *Tahun* 6)
Total number of new attendees of 12-year-olds schoolchildren (FMR 4b *Tahun* 6)

iii. Percentage of 12-year-olds maintaining orally fit status (no treatment needed; NTR) in the respective schools after implementation of FMR

Formula:

= Total no. of 12-year-olds maintaining orally fit status in schools participated in FMR (FMR 4g *Tahun* 6) x 100
Total number of new attendees of 12-year-olds schoolchildren (FMR 4b *Tahun* 6)

7 RESEARCH

Research activities can be carried out during implementation of this programme at state and district levels.

8 CONCLUSIONS

The oral health status of primary schoolchildren in Malaysia will continue to be the main priority of the Oral Health Programme, MOH. This manual will facilitate the standardisation and systematic implementation of a school based FMR programme. It is an additional guide to the Guidelines on Oral Healthcare for Schoolchildren in Malaysia, towards the improvement of oral health of schoolchildren in Malaysia thereby enhancing their quality of life.

The positive benefit of weekly sodium fluoride mouth rinses on caries reduction would be a major population based strategy in our endeavor to ensure that schoolchildren remain caries free throughout their school years, particularly in areas without/low fluoridated water supply. In addition, to get the maximum impact of caries prevention, fluoride mouth rinsing programmes could be combined with other preventive activities to further reduce caries levels.

9 REFERENCES

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***Appendix* 1**

PROGRAM FMR DI SEKOLAH

SENARAI SEKOLAH DAN STATUS KESIHATAN PERGIGIAN MURID 12 TAHUN

Nama Klinik Pergigian/Daerah :…… Tahun : ……

No	Nama Sekolah Rendah di daerah	Murid 12 tahun			Prevalens Karies > 40%		Mean DMFT > 2		Kawasan rendah /tanpa bekalan air berfluorida		Sekolah status berisiko tinggi (jika memenuhi kriteria f,h,j)		Sekolah terpilih untuk FMR Program
		Enrolmen	% Prevalens Karies	Mean DMFT	Ya	Tidak	Ya	Tidak	Ya	Tidak	Ya	Tidak	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Jumlah													

Jumlah sekolah dalam daerah (Jumlah a): ……
Jumlah sekolah di kawasan rendah/tanpa bekalan air berfluorida (Jumlah j): ……..
Jumlah sekolah status berisiko tinggi (Jumlah l): ……
Jumlah sekolah terpilih untuk FMR Program (Jumlah n): ……

Disediakan oleh: ……..
Nama:……
Jawatan :……

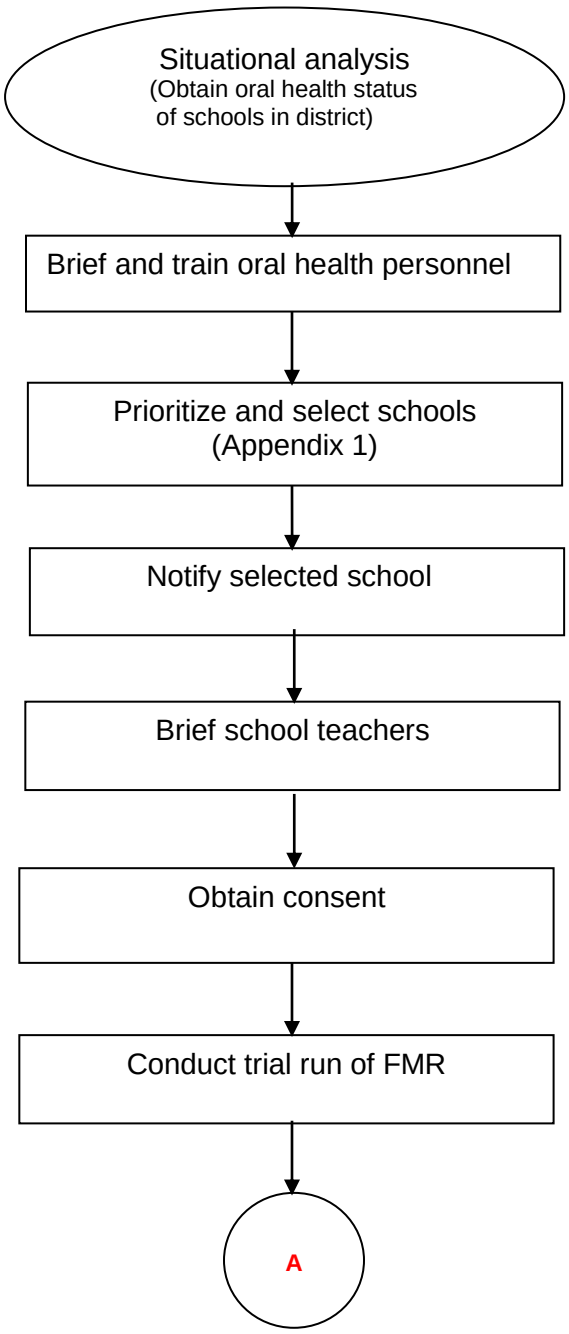
Disemak oleh:…….
Nama:……
Jawatan :……

Diluluskan oleh : ……
Nama:……
Jawatan :……

Appendix 2

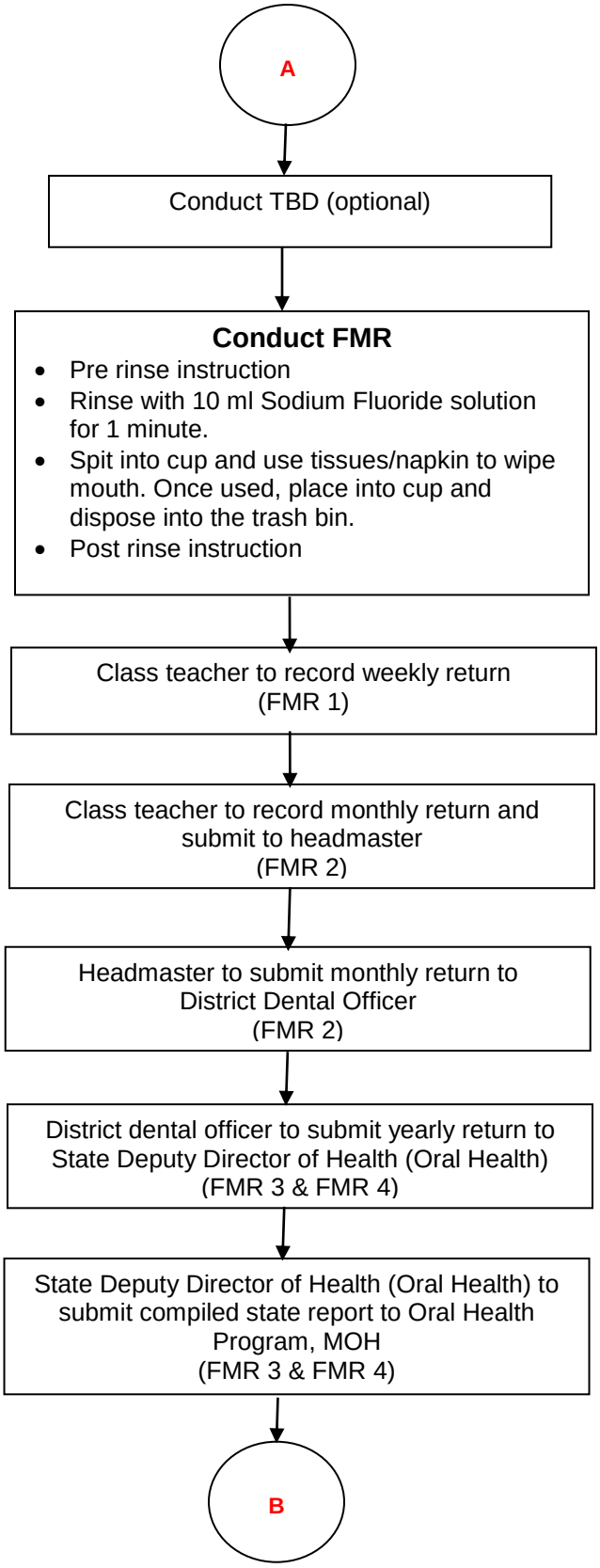
Flow chart of School-Based Fluoride Mouth Rinsing Programme

1. Planning Phase (state/district level)

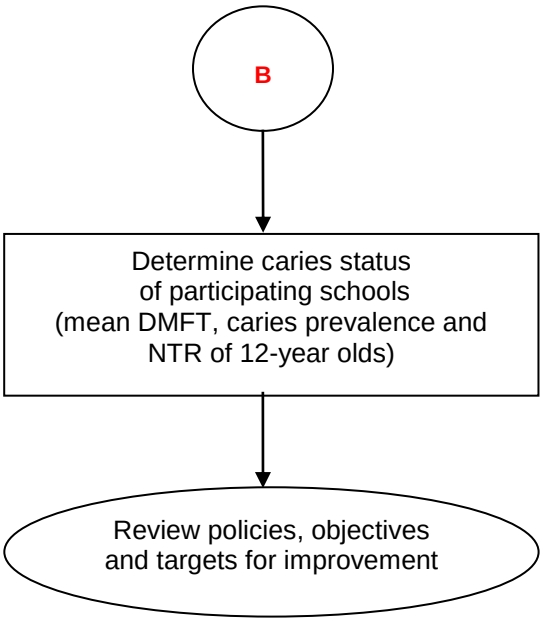


2. Implementation phase (district/school level)

3. Monitoring phase (state/district/school level)



4. Evaluation phase (state/district level)



Note:

If schoolteachers are unable to conduct FMR or record FMR activities, oral health personnel will undertake the task.

***Appendix* 3**

i. CARA PENYEDIAAN LARUTAN NATRIUM FLORIDA 0.2%

1. Guru sekolah adalah bertanggungjawab untuk menyediakan larutan natrium florida 0.2% sebelum aktiviti berkumur dengan florida dijalankan.
2. Campurkan 10 g serbuk natrium florida dengan 5 liter air. Goncangkan larutan tersebut sehingga serbuk natrium florida larut sepenuhnya.
3. Tuangkan larutan tersebut ke dalam botol-botol kapasiti 500ml.
4. Agihkan 10 ml larutan natrium florida kepada murid-murid untuk aktiviti berkumur.

ii. CARA BERKUMUR DENGAN LARUTAN NATRIUM FLORIDA

1. Murid-murid diminta berbaris dan memegang cawan plastik masing-masing.
2. Pastikan cawan yang digunakan tidak mengandungi air.
3. Guru kelas akan tuangkan 10 ml larutan natrium florida ke dalam setiap cawan murid. Gunakan *dispensing cup* atau *syringe* yang ditanda dengan paras 10 ml untuk menyukat larutan natrium florida. Pastikan *dispensing cup* dipegang di paras mata semasa membuat sukatan, agar kuantiti larutan lebih tepat.
4. Apabila larutan natrium florida telah diagihkan kepada semua murid, wisel ditiup oleh guru yang bertanggungjawab, sebagai isyarat untuk memulakan prosedur berkumur dengan larutan tersebut. "*Stop watch*" perlu digunakan untuk memastikan bahawa murid-murid berkumur untuk satu minit. Apabila selesai tempoh satu minit, wisel perlu ditiup sekali lagi. Apabila wisel dibunyikan, murid-murid perlu meludahkan keluar larutan tersebut.
5. Guru kelas diminta memastikan bahawa murid-murid mengerakkan lidah dan pipi semasa berkumur, agar semua permukaan gigi murid diliputi oleh larutan natrium florida.
6. Setelah selesai aktiviti tersebut, ludah ke dalam cawan dan guna tisu/napkin untuk lap mulut. Kemudian masukkan tisu/napkin tersebut ke dalam cawan untuk menyerap sisa fluorida. Selepas itu buang ke dalam tong sampah.
7. Baki larutan natrium florida perlu dibuang sebaik sahaja aktiviti berkumur dijalankan, untuk mengelakkan murid terminum larutan tersebut.
8. Pastikan bahawa murid-murid tidak minum, makan atau berkumur selama 30 minit selepas aktiviti berkumur ini dijalankan.

9. Guru kelas hendaklah sentiasa merekod kehadiran murid-murid yang mengambil bahagian dalam aktiviti berkumur ini (Appendix 6).

iii. NOTA TAMBAHAN

1. Bagi sekolah yang mempunyai enrolmen tinggi, kelas yang berlainan boleh melakukan kumuran dengan florida pada hari yang berlainan, secara berjadual.
2. Pastikan aktiviti berkumur dengan florida dijalankan pada setiap minggu persekolahan. Contohnya, jika hari aktiviti berkumur ini jatuh pada hari cuti sekolah (*occasional holiday*) atau pada hari kelepasan am, murid-murid perlu berkumur pada hari yang lain, tetapi pada minggu yang sama. Jangan berselang minggu.
3. Murid-murid yang tidak sihat, contohnya murid yang selsema akan dikecualikan dari melakukan aktiviti FMR pada hari tersebut.

Appendix 4

Instruments and materials (Basic requirements per school)

1. Tooth Brushing Drill (optional)

	Item	Quantity needed
(i)	Toothbrush	1 per child
(ii)	Typodent model	1 per class
(iii)	Toothpaste	1 per class
(iv)	Disposable cups	1 per child
(v)	Pail of clean water and a water scoop	1 per class

2. Fluoride Mouth Rinsing

	Item	Quantity needed
(i)	0.2% neutral sodium fluoride solution	10 ml per child per rinse
(ii)	5 litre plastic container	1 per school (enrolment of 500)
(iii)	Disposable Cup	1 per child
(iv)	Tissues/Napkin	1 per child
(v)	10ml dispensing cup/syringe	10 per school
(vi)	500ml plastic container	10 per school
(vii)	Recording format (FMR 1)	1 per class
(viii)	Whistle	1 per class
(xi)	Stop watch	1 per class
(xii)	Digital Weighing Scale	1 per district

Appendix 5

TOOTH BRUSHING DRILL PROCEDURE (Optional)

1. OBJECTIVE

Schoolchildren should be able to maintain good oral hygiene by practising systematic tooth brushing.

2. WORK PROCESS

- Schedule Tooth Brushing Drill (TBD)
- Prepare the equipment
- Involve class teacher in the activity.
- Group children in a suitable location for tooth brushing activity.
- Each child should have a toothbrush and plastic cup/mug/disposable cup
  Dispense toothpaste (pea-size) to every child.
- Carry out TBD prior to rinsing with sodium fluoride solution.
- Record activity in PKP 101 Pin. 2/92.

***Appendix* 6**
(FMR 1)

PROGRAM FMR DI SEKOLAH
LAPORAN MINGGUAN AKTIVITI FMR

Nama Sekolah :_____
Nama Kelas :_____ Tahun: _____

Bil	Nama	Januari					Februari					Mac					April					Mei					Jun				Nota
		Minggu					Minggu					Minggu					Minggu					Minggu					Minggu				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	
(i)	Jumlah Murid (Mingguan)																														
(ii)	Jumlah Murid (Bulanan)																														
(iii)	Purata Murid (Bulanan) (Jum. Murid (Bulanan)/ Bil Minggu FMR diadakan)																														

***Borang ini hendaklah diisikan oleh Guru Kelas**

Appendix 6 samb……

***Appendix* 6**
(FMR 1)

PROGRAM FMR DI SEKOLAH
LAPORAN MINGGUAN AKTIVITI FMR

Nama Sekolah :_____
Nama Kelas :_____ Tahun: _____

Bil	Nama	Julai					Ogos					Sept					Okt					Nov					Dis				Nota
		Minggu					Minggu					Minggu					Minggu					Minggu					Minggu				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	
(i)	Jumlah Murid (Mingguan)																														
(ii)	Jumlah Murid (Bulanan)																														
(iii)	Purata Murid (Bulanan) (Jum. Murid (Bulanan)/ Bil Minggu FMR diadakan)																														

***Borang ini hendaklah diisikan oleh Guru Kelas**

***Appendix* 7**
(FMR 2)

PROGRAM FMR DI SEKOLAH
LAPORAN BULANAN AKTIVITI FMR

Nama Sekolah: ……
Bulan:…….. **Tahun:……**

Kelas **(a)**	**Enrolmen Murid** **(b)**	**Jumlah Murid (Bulanan) Menjalani FMR** ***(c)**	**Bil. Minggu Program FMR Diadakan** **(d)**	**Purata Murid (Bulanan) Yang Berkumur Dengan Fluorida** **(e) = (c)/(d)**
Jumlah				

*** Jumlah Murid (Bulanan) sila rujuk FMR 1 (ii)**

Tandatangan Guru Besar:……..

Nama Guru Besar:……..

Tarikh:……..

Appendix 8
(FMR 3)

PROGRAM FMR DI SEKOLAH
LAPORAN TAHUNAN AKTIVITI FMR

Nama Daerah/Negeri : …… **Tahun:…….**

Nama Sek. Menjalani FMR	Bil. Enrolmen Tahun 1-6	Bil. Kedatangan Baru Tahun 1-6	Jumlah Kedatangan Baru untuk Tahun-tahun yang terlibat dengan FMR	Bil. Kelas Mengadakan FMR	Jumlah Minggu Program FMR Diadakan	Jumlah Murid Bulanan Yg Menjalani FMR	Purata Minggu FMR Diadakan	Purata Murid Yang Menjalani FMR	% Murid Tahun 1-6 Menjalani FMR
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)=(f)/(e)**	**(i)=(g)/(h)**	**(j)= (i)/(d) x100**
Jumlah									

Jumlah sekolah status berisiko tinggi di kawasan Rendah/Tanpa Bekalan Air Berfluorida . Rujuk Appendix 1, kolum (l) : **……**

%Sekolah Di kawasan Rendah/Tanpa Bekalan Air Berfluorida Menjalankan FMR = Jumlah (a)/Appendix 1 (l) x 100 **:……**

Tandatangan TPKN(G)/Pegawai Pergigian Daerah :……...

Nama TPKN(G)/Pegawai Pergigian Daerah : ……..

Tarikh: ……

***Appendix* 9**
(FMR 4)

PROGRAM FMR DI SEKOLAH
LAPORAN TAHUNAN STATUS KESIHATAN PERGIGIAN MURID SEKOLAH

Nama Sekolah/Daerah/Negeri : …… Tahun:…….

TAHUN	TAHUN PERSEKOLAHAN	BIL. ENROLMEN	BIL. KEDATANGAN BARU	STATUS KESIHATAN PERGIGIAN					
				BIL. BEBAS KARIES	% BEBAS KARIES	BIL. DMFT	MEAN DMFT	BIL. NTR	% NTR
		(a)	(b)	(c)	(d)=(c)/(b) x 100	(e)	(f)= (e)/(b)	(g)	(h)=(g)/(b) x100
2018	Tahun 1								
	Tahun 2								
	Tahun 3								
	Tahun 4								
	Tahun 5								
	Tahun 6								
	Peralihan								
	KKI								
JUM.									

Tandatangan TPKN(G)/Pegawai Pergigian Daerah :……...

Nama TPKN(G)/Pegawai Pergigian Daerah : ……..

Tarikh: ……

Appendix 10

FLUORIDE OVER-DOSAGE

The effect of fluoride over-dosage is nausea, vomiting, hypersalivation, abdominal pain and diarrhea [1-3]. A first step in any case of suspected fluoride over-dosage is to obtain a history in order to estimate the amount swallowed. If the amount is estimated to be less than 5mg/kg body weight transfer to hospital is unnecessary but milk should be given in order to slow down the absorption of fluoride in the stomach into the bloodstream. The Probably Toxic Dose (PTD) has been set at 5mgF/kg body weight[1, 2, 4]. The PTD is defined as the minimum dose that could cause toxic signs and symptoms and requires immediate treatment and hospitalization [1- 4].

SODIUM FLUORIDE SOLUTION FOR FMR PROGRAMME

The amount of fluoride present in 10ml of 0.2% sodium fluoride (NaF) solution is 9.0mgF [5]. In the case of accidental ingestion of a 10ml of 0.2% NaF solution by a 6 – 8 year old child (estimated body weight of 23kg), the amount of fluoride per kg body weight will be 9.0mgF/23kg i.e. 0.4mgF/kg body weight. Hence, in case of accidental ingestion of a 10ml of 0.2% NaF solution, the amount of fluoride per kg body weight is only 0.4mgF as compared to the Probably Toxic Dose of 5mgF/kg body weight. However, as a precaution, we would still recommend that a cup of milk be given to the child in case of accidental swallowing of the 10ml in 0.2% NaF solution for fluoride mouth rinsing so as to minimize any untoward side-effects.

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Appendix 11

LITERATURE REVIEW ON FLUORIDE MOUTH RINSING PROGRAMME

Fluoride is considered a strategy to control caries at either the community or individual levels. Modes of application include water fluoridation, fluoride dentifrice, fluoride rinse, professional fluoride application and fluoride-releasing dental materials. Fluoride mouth rinse is a concentrated solution intended for daily or weekly use where the fluoride is retained in dental plaque and saliva to help prevent dental caries. A randomized clinical evaluation of a fluoride mouth rinse in an *in situ* caries model showed that in conjunction with a fluoride dentifrice, fluoride mouth rinses enhance enamel fluoride uptake, which may be useful in caries prevention[1]. In 1965, Torrel and Ericsson[2] reported that daily use of a 0.05% sodium fluoride mouth rinse reduced the development of new caries by 50%, while fortnightly rinsing reduced the caries level by about one third. This study became a classic model in the field of fluoride mouth rinsing.

School based fluoride mouth rinsing programme usually involved children rinsing once or twice a day, or once a week or biweekly with a neutral sodium fluoride solution. The length of rinsing time is usually set at 60 seconds, although 30-second rinsing times have been recommended to 4-6-year-old children[3]. Extensive studies indicating that fluoride mouth rinse reduces caries experience among schoolchildren had been conducted since the last four decades. A Cochrane systematic review confirmed that supervised regular use of fluoride mouth rinse can reduce tooth decay in children and adolescents. A combined results of 35 trials showed that, on average, there is a 27% reduction in decayed, missing and filled tooth surfaces in permanent teeth with fluoride mouth rinse compared with placebo or no mouth rinse. This benefit is likely to be present even if children use fluoride toothpaste or live in water-fluoridated areas[4].

Another systematic review on 28 articles concluded that daily or weekly sodium fluoride mouth rinse had a significant caries reduction among adolescents. Daily and weekly/fortnightly rinse programmes showed an average of 39% fewer decayed-missing-filled-surface in permanent teeth and with daily use a slightly higher caries reduction rate. However, there is limited data available to show the effect on deciduous teeth[5]. Results from a randomized controlled trial showed that both herbal and fluoride mouth rinses, when use fortnightly were equally effective and could be recommended for use in school based health education program to control dental caries[6]. Many more studies also reported the positive effects of school based fluoride mouth rinsing program in caries prevention[7-11]. Use of fluoride mouth rinse by children ages 6 years

and older does not place them at risk for enamel fluorosis as most children by age 6, can rinse and spit with little to no ingestion and they are also considered past the age for their teeth to be affected by fluorosis because only certain posterior teeth are still at a susceptible stage of enamel development, and these will not be readily visible[12].

A study conducted in ten United States (US) cities to compare the effectiveness of caries-prevention procedures in the late 1980's, however, found only a limited reduction in dental caries attributable to fluoride mouth rinse, especially when children were also exposed to fluoridated water. Benefits were more likely for children in high risk schools[13]. In a systematic review on clinical trials published after 2002, using fluoride measures (such as fluoride mouth rinses, fluoride gels or foams) are found to be beneficial in preventing crown caries and reversing root caries, but the quality of evidence was graded as low for fluoride mouth rinse[14].

In Malaysia, the school based fluoride mouth rinsing programme is practiced in low and non-fluoridated areas. This programme involves primary schoolchildren aged 6 to 12 years old participating in weekly fluoride mouth rinsing. In a 3-year field study in Sarawak, it was concluded that a school-based weekly 0.2% sodium fluoride mouth rinsing programme is an effective caries preventive measure and recommended that it should be implemented in fluoride deficient areas as a means of reducing the prevalence of dental caries in these communities[15]. Another study in Sandakan, Sabah reported a decrease in caries prevalence in a cohort of children 3 years after the implementation of a weekly fluoride mouth rinsing programme[16]. However, a local study in Pasir Mas, Kelantan found little beneficial effects in decreasing caries experience among schoolchildren who participated in the fluoride mouth rinsing programme[17].

School based fluoride mouth rinsing programme is found to have long term caries preventive effects until adulthood. A study conducted in Japan found the positive caries preventive effects of school based fluoride mouth rinse programme from nursery school to junior high school can continue in adults aged 20 years and older[18].

The cost of implementing fluoride mouth rinsing programmes is relatively low. A study in Japan[19] estimated the cost of implementation was about US$0.20 per child per year. In a 2010 Association of State and Territorial Dental Directors (ASTDD) US survey[20], reported that fluoride mouth rinse programme costs between $0.54 cents and $2.54 per child per year.

As most evidences found were on the positive caries preventive effects of school based fluoride mouth rinse programme, it is thus recommended to be implemented where suitable to improve the oral health status of the children and adolescents.

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