Oral health promotion in school settings
Best practice examples, research results and challenges

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Part 1: The basics of oral
Oral health: a neglected health issue?

Dr Margaret Chan
Director General of the WHO

"Oral diseases are a neglected area of international health. We have the tools and best practices to address them but we need to ensure that they are applied and implemented."

January 2007 Resolution WHA60/R17
Knowledge test

Question 1:
Where does prevalence of untreated tooth decay rank among 291 diseases?

☐ A. ranks last
☐ B. ranks 201
☐ C. Ranks 99
☒ D. Ranks first

Question 2:
How many people suffer from untreated tooth decay?

☐ A. 0.5 billion
☒ B. 3 billion
☐ C. 4 billion
☐ D. 6 billion
A global epidemic?

- untreated decay of primary and permanent teeth: 3,054m
- migraine: 1,013m
- severe periodontitis: 743m
- diabetes: 549m
- asthma: 334m

Estimated number of people affected by common diseases, 2010.
4 main oral diseases

1. Tooth decay (dental caries)
2. Periodontal disease
3. Edentulousness
4. Oral cancer
Tooth decay

- Most common disease for children worldwide
- Multifactorial disease with a strong social gradient
- Early onset with first teeth - lifelong problems with cumulative effects
- Pain, eating & sleeping impacts, poor growth development and school performance
- Largely preventable: oral hygiene, fluorides and healthy nutrition
Causes of tooth decay
Lack of simple prevalence data

Basic global prevalence data for dental caries of 12-yr olds is largely outdated or unavailable. About 1/3 of countries have no data at all.
Tooth decay worldwide
Dentists worldwide

**GLOBAL DENSITY OF DENTISTS**
Population per dentist 2007:
- Fewer than 3,000
- 3,000 - 19,999
- 20,000 - 49,999
- 50,000 - 199,999
- 200,000 or more
- No data

World country average: 5,075 people per dentist
Highest density: Croatia 5,588 people per dentist
Lowest density: Ethiopia 1,278,446 people per dentist
Tooth decay worldwide

- The highest burden is in middle-income countries
- Tooth decay remains largely untreated
Example: Reality in The Philippines

97% of 6-year old children have dental caries, with on average 8 decayed teeth. Almost none of the caries is treated.

82% has at least one tooth with severe infection (pufa).
Tooth decay and nutritional status

Number of decayed teeth in 6-year old children

- Underweight children had higher levels of tooth decay
- Extraction of severely decayed teeth is associated with weight gain
Then why not a priority?
Then why not a priority?

• Top killers: diarrhea and pneumonia
• 30% underweight
• 66% worm infections
• 34 million people suffer from HIV/AIDS
• 250 million people suffer from malaria
• Obesity and other non communicable diseases are on the rise
WHO: Basic Package of Oral Care

**Oral Urgent Treatment**
Oral Urgent Treatment (OUT) is an on-demand service providing basic emergency oral care. The three fundamental elements of OUT are:
- relief of oral pain
- first aid for oral infections and dento-alveolar trauma
- referral of complicated cases.
OUT can be provided by trained non-dentist personnel.

**Affordable Fluoride Toothpaste**
Use of Affordable Fluoride Toothpaste (AFT) is one of the most important preventive measures in managing tooth decay. However, fluoridated toothpaste is often too expensive for disadvantaged groups in low- and middle-income countries to purchase. Approaches to AFT aim at enabling everyone to clean teeth twice daily with quality fluoride toothpaste.

**Atraumatic Restorative Treatment**
Atraumatic Restorative Treatment (ART) is a caries management approach, consisting of a preventive (fissure sealant) and a restorative component (restoration). ART can be performed inside and outside a dental clinic, as it uses only hand instruments and a powder-liquid high-viscosity glass-ionomer, and requires neither electricity nor running water. It is relatively painless, minimizing the need for local anaesthesia and making cross-infection control easier.
Oral healthcare - The reality

- Many people across the world have limited access to proper oral healthcare
- Illegal oral care is often the only way for pain relief
Priority for prevention

- Oral diseases are expensive to treat - no resources
- Treatment is useless if the root causes are not addressed

Prevention and effective self-care are the only realistic options for populations in low-/middle income countries!
Effective prevention

"Prevention by daily use of fluoride is the only realistic way of reducing the high burden of tooth decay in populations"

"Access to fluoride for dental health is a human right"

WHO/FDI/IADR Global Consultation on Oral Health through Fluorides, 17-19 Nov 2006, Geneva
Fluorides

The use of fluoride to prevent tooth decay has been recognized as one of the 20 public health success stories of the 20th century.

Only 30% of the world population has access to fluorides.
Fluorides

Numbers of people exposed to appropriate fluoride in million - against total world population

Only 30% of the world population has access to fluorides.
Fluoride toothpaste

Advantages
• Solid long-term evidence
• Good cost-effectiveness
• Promoting oral hygiene (toothbrushing)

Challenges/Disadvantages
• Quality control and affordability
• Needs personal compliance

“Brush teeth at least twice a day for two minutes with fluoridated toothpaste (1,200–1,500 ppm fluoride concentration)”
Costs of treatment versus prevention

In high-income countries:

**Comprehensive oral care:**
up to 5,000 US$/yr/person

**Personal prevention expenses:**
up to 150 USD/yr (dental hygienist etc)

**Self-care with fluoride toothpaste:**
0.30-5 USD/yr
Stepwise modules of an oral health promotion programme

1. **Daily supervised toothbrushing with fluoride toothpaste**
   - **Number of children reached**: low
   - **Focus on prevention**: large
   - **Availability of essential care**: focus on prevention

2. **Additional periodic self-application of fluoride (gel, rinsing) for high-risk population**
   - **Number of children reached**: medium
   - **Focus on prevention**: large
   - **Availability of essential care**: focus on prevention

3. **Additional periodic fluoridation through third persons (varnish) and/or application of sealants**
   - **Screening to identify high-risk children**
   - **Number of children reached**: medium
   - **Focus on prevention**: large
   - **Availability of essential care**: focus on prevention

4. **Clinical oral care in the school setting available (at least periodically)**
   - **Number of children reached**: high
   - **Focus on prevention**: large
   - **Availability of essential care**: availability of essential care

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Daily supervised group toothbrushing with fluoride toothpaste (min 1000ppm)

High-risk population: Additional periodic self-application of fluoride

Additional periodic fluoridation through third persons (varnish) and/or professional application of sealants

Screening - selection of high-risk children

On demand pain relief and emergency care (referral)

Preventive care

Full clinical oral care available and accessible

Habit formation/reinforcement

Daily toothbrushing with fluoride toothpaste (min 1000ppm)
Benefits of the framework

- **Stepwise introduction with focus on prevention**
  Toothbrushing with fluoride toothpaste as basic hygiene behaviour

- **Scale over scope**
  Reaching more children with basic interventions rather than few children with comprehensive services

- **Priority for evidence - adapted to resources available**
  Discouraging mass-screening and health education as the first (and most of the time only intervention)

- **Clarity for education sector lead - supportive health sector role**
Part 2: Oral health promotion in schools
Interventions with limited effectiveness

- Information & health education campaigns
- Written materials (leaflets, posters)
- Costly treatment requiring trained personnel
Oral health promotion

Schools as venues to promote oral health

"Health is created and lived by people within the settings of their everyday life; where they learn, work, play, and love."

The Ottawa Charter for Health Promotion (1986)
School oral health promotion

Opportunities:

• Reaching children at an early age → receptive for behaviour change

• Schools are organized → development of habits

• Building skills and providing services, together with improving the conditions of the school environment, have the potential to influence lifelong knowledge, attitudes, health status, and behaviors of children

• Cost-effective

• Integrating oral health into school health and Water, Sanitation and Hygiene (WASH)
School oral health promotion

Skill-based oral health promotion

Daily group toothbrushing as a strategy
The Fit for School Programme

Improving the environment and developing healthy routines

- Daily group handwashing with soap
- Daily toothbrushing with fluoride toothpaste
- Bi-annual deworming

Access to Water, Sanitation and Hygiene (WASH) - improved school environment
The Fit for School Programme

• The FIT approach originated in the Philippines in 2007/2008 where it was implemented by the Department of Education

• In 2011, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the South-East Asian Ministers of Education Organization (SEAMEO INNOTECH) expanded the FIT approach to Indonesia and Lao PDR
Fit for School interventions
The Principles of Fit for School

- Simple, evidence-based packaged interventions
- Working with existing structures & resources
- Integration into the education sector
- Parent and community involvement (including monitoring)
- Low costs
- Clear roles and responsibilities: education sector, local government units, school heads
Regional Fit for School Programme

CAMBODIA
- 10 model schools (7,564 children)
- 546 scale-up schools (~195,000 children)

LAO PDR
- 22 model schools (4,758 children)
- 976 scale-up schools (~90,000 children)

PHILIPPINES
- Model Country
- ~9000 schools (~2,9 Mio children)
- Regional Office & Regional Partner SEAMEO INNOTECH

INDONESIA (West Java)
- 12 model schools (7,063 children)
- 164 scale-up schools (~120,000 children)
Programme evaluation research:

Impact of WASH and health interventions on:

- Child health outcomes (real-life conditions)
- Behaviour change
- Water, Sanitation and Hygiene

Aim: Two-year effect of the FIT programme on parasitological, nutritional and oral health status of child
**Research methods**

**FIT-PAS**

- **Two-year longitudinal cohort**
  - Cambodia, Indonesia and Lao PDR
  - FIT schools (n = 41)
  - Control schools (n = 41)
  - Random selection of 6-7 year-olds (n = 1,847)

- Follow-up after 24 months (n = 1,499; 81%)
Research methods

Dental caries and odontogenic infection
dmft/DMFT, pufa/PUFA

Weight and height
z-scores and WHO classification

Worms and sociodemographic interview
Results: oral health

Oral health status

Dental caries: 94%, dmft = 9.2 ± 4.4
Odontogenic infections: 73.2%, pufa = 3.8 ± 2.6
Results: oral health

Oral health status

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<tr>
<th></th>
<th>FIT schools</th>
<th>Control schools</th>
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<tbody>
<tr>
<td>Increment in DMFT:</td>
<td>0.48 ± 0.91</td>
<td>0.63 ± 1.12 *</td>
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Prevented fraction:
- All countries: 24%
- Cambodia: 18%
- Indonesia: 22%
- Lao PDR: 38%

Cochrane meta-analysis: 24%
Learnings

- Programme compliance and implementation quality: 18%, 22%, 38%

- Monitoring and evaluation of implementation quality is key
  - Reaching full programme potential:
    - Clear roles & responsibilities, commitment
      - Education sector
      - Local community
    - Health sector needs to support the strategy

- Future programme evaluation studies should explore the use of intermediary outcomes, processes
More findings...

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RESEARCH ARTICLE

‘Fit for school’ – a school-based water, sanitation and hygiene programme to improve child health: Results from a longitudinal study in Cambodia, Indonesia and Lao PDR

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Other potential interventions

- Once a week toothbrushing with higher concentrated fluoride gel  
  Shown to be effective in the Philippines in addition to toothbrushing

- Access to urgent oral care

- Application of silver diamine fluoride
Stepwise modules of an oral health promotion programme

1. Daily supervised toothbrushing with fluoride toothpaste
   - Simple - large reach - focus on prevention - availability of essential care

2. Additional periodic self-application of fluoride (gel, rinsing) for high-risk population

3. Additional periodic fluoridation through third persons (varnish) and/or application of sealants
   - Screening to identify high-risk children

4. Clinical oral care in the school setting available (at least periodically)
   - On demand pain relief and emergency care (referral)

2015: Water, Sanitation and Hygiene (WASH) indicators are in the SDGs

All schools should reach Basic WASH Service by 2030

- **Basic drinking water**
  - Drinking water from an *improved* source is available at the school

- **Basic sanitation**
  - Improved facilities, which are single-sex and usable (accessible, functional, private) at the school

- **Basic handwashing**
  - Handwashing facility with *water and soap* at the school

Oral hygiene is part of (hand) hygiene
Conclusions

✓ Oral health interventions should be among the priority choices in health promotion planning to improve child development.

✓ School-based toothbrushing with fluoride toothpaste as group activities can be an effective vehicle to prevent dental caries.

✓ Oral health interventions should be integrated into schools as part of school feeding & WASH programmes!