A Global Oral Health Course: Isn't It Time?

Asef Karim, D.M.D., M.P.H.; Ana Karina Mascarenhas, Dr.P.H.; Shafik Dharamsi, Ph.D.

Abstract: This article examines current global oral health initiatives to underserved dental populations and assesses the level of familiarity with these initiatives among dental students. The World Health Organization (WHO)'s basic package of oral care (BPOC) is described, as well as successes and difficulties in global oral health initiatives. A survey was conducted of third-year dental students at a North American dental school to determine their familiarity with global oral health initiatives set out by the WHO and the World Dental Federation (FDI). The majority of the surveyed students (87 percent) expressed interest in volunteering their professional services in international settings. However, none of the surveyed students knew about the BPOC or the FDI's role in global oral health. The findings indicate that predoctoral dental public health courses in dental schools ought to include a course on global oral health to expose students to global oral health issues and equip them with interventions like the BPOC so they can provide better care to globally underserved dental populations.

Dr. Karim is in private practice in Vancouver, British Columbia; Dr. Mascarenhas is Professor and Director, Division of Dental Public Health, Goldman School of Dental Medicine, Boston University; and Dr. Dharamsi is Assistant Professor, Department of Family Practice, Faculty of Medicine, and Associate Director, Centre for International Health, University of British Columbia. Direct correspondence and requests for reprints to Dr. Asef Karim, 4981 Earles Street, Vancouver, British Columbia V5R 3R7, Canada; 604-868-8493; drkarim@live.ca.

Key words: global oral health, international oral health, primary oral health care, basic package of oral care, World Dental Federation (FDI)

Submitted for publication 2/26/08; accepted 7/20/08

There are vast differences between developed and developing countries in oral health status and in the availability, access, and affordability of oral health services.[1,2] The World Health Organization (WHO) and World Dental Federation (FDI) are helping to bridge this gap by encouraging developing countries, international dental aid organizations, and dental volunteers to incorporate the basic package of oral care (BPOC) as a guiding framework for the delivery of oral health services. The BPOC, which includes oral urgent treatment (OUT), affordable fluoride toothpaste (AFT), and atraumatic restorative treatment (ART), can be delivered by locally trained health workers using some basic instruments. The effort to standardize a global approach to improve the condition of underserved dental populations could be enhanced if the dental education community adopted and advocated the BPOC principle.

This article proposes that dental training institutions and universities in both developed and developing countries ought to consider introducing a dental public health course with a focus on global oral health into predoctoral dental curricula. Set within a framework of primary oral health care (POHC) principles that advocate the development of dental programs that are simple, effective, and inexpensive and involve local people (Table 1), a course on global oral health would focus on the global burden of oral disease and the health care policies and interventions that can be used to address it. Such a curricular addition can help future dental professionals to contribute more competently to international oral health issues with increased awareness, sensitivity, knowledge, and skills.

Global Burden of Oral Disease

Oral health is an important component of general health and indicator for quality of life. Despite the recognition of oral health as a human right, individuals throughout the world, particularly the poor and socially disadvantaged in developing countries, suffer greatly from oral disease.[1] Among the conditions they face are caries, gingivitis and periodontal disease, tooth loss, oral cancer, HIV-AIDS-related oral disease, facial gangrene (Noma), dental erosion, dental trauma, and dental fluorosis.[1-3] In addition to these clinical manifestations of oral disease and the associated detrimental impacts on health, the sociobehavioral ramifications of compromised oral health include oral dysfunction leading to malnutrition, facial disfigurement, time lost from work or school, and social isolation.[4,5] The factors that contribute to this burden of oral disease include poverty, a high illiteracy rate, compromised oral hygiene habits, lack of oral health education and promotion, and lack of access to timely, affordable oral health services.[6] Fur-

Table 1. Primary oral health care (POHC) principles

Equity	Oral health services should reach all people.
Prevention	Preventing oral disease is more cost-effective than disease treatment.
Community participation	Empowering a community to solve its own oral health issues will have a greater long-term effect. This necessitates recruitment of a large workforce including teachers, community health workers, and volunteers.
Appropriate technology	Implement care by technology that is affordable and meets the oral health needs of the population.
Intersectorial approach	Create a positive environment for community health improvement by engaging various sectors (health, education, community leaders).

thermore, many developed and developing countries display weak national oral health programs, have greater inequitable distribution of dental professionals between urban and rural areas, and poorly manage public dental health facilities with inadequate dental materials, drugs, instruments, and equipment.[5,7-13]

It has been convincingly argued that a social determinants approach is crucial for establishing a population strategy framework that highlights the need to examine the underlying "cause of the cause" or social conditions that result in unequal oral health distribution and disease.[10] In order to comprehensively address oral health inequalities, current research suggests a conceptual shift from the traditional "downstream" biomedical/behavioral model (in which individual risk factors are assessed and preventive/educational interventions focus on behavioral change at the individual level with little focus on the broader factors that influence well-being) to a broader "upstream" model that focuses on the social environments in which oral health behaviors are formed. Downstream interventions have a predominantly curative focus and target already established harmful health behaviors. Upstream interventions are directed at the circumstances (such as poverty and illiteracy) that may bring about harmful health behaviors and conditions. Upstream interventions thus focus on prevention and health promotion at a societal level. They include comprehensive educational media campaigns, community engagement, healthy public policies, and legislative action.[10,14] An emphasis on community and societal versus individual interventions is more likely to have the desired impact on oral health outcomes among vulnerable populations.[10,14-16]

The Basic Package of Oral Care: A Downstream Intervention

The WHO Collaborating Centre at the University of Nijmegen in The Netherlands has worked within primary oral health care principles (Table 1) to create an affordable and sustainable community service called the basic package of oral care (BPOC).[7,13] The BPOC (Table 2) is designed to work with minimum resources for maximum effect and does not require a dental drill or electricity. The BPOC can be tailored specifically to meet the needs of a community. Most significant is the fact that a dentist trained in BPOC can train local ancillary medical and dental personnel to become BPOC-proficient.[7] These local non-dentist BPOC-trained individuals can then become the primary resource for oral health promotion and simple curative care in their communities.

A large non-dental labor force, including community health workers (CHWs) and teachers, is integral to primary oral health care (POHC) and BPOC.[11] Most developing countries have a large contingent of community health workers compared to the professional dental work force (Table 3).[17] These workers are trained to deliver a range of services, including childhood immunization promotion, growth monitoring, family planning, and health promotion

Table 2. The basic package of oral care (BPOC)

Oral urgent treatment (OUT)	Relief of pain from abscesses, first aid for oral infections, and referral of complicated cases.
Affordable fluoride toothpaste (AFT)	Availability of toothpaste containing fluoride, which is the most effective preventive measure against caries.
Atraumatic restorative treatment (ART)	For caries, manual removal of decay using hand instruments and filling with a fluoride-releasing restorative material. No dental drill or suction is involved, and the tooth is saved rather than extracted.

Table 3. Numbers of community health workers

Country	Dental Workers*	Community Health Workers**
Nepal	359	16,206
Ethiopia	63	18,652
South Africa	5,995	9,160
Pakistan	7,862	65,999

*Dentists, dental assistants, and dental technicians.
**Traditional medicine practitioners, faith healers, community health education workers, community health officers, family health workers, lady health visitors, health extension package workers, community midwives, and traditional birth attendants.

and education. They also treat minor ailments and injuries, and are trained to identify and refer more serious cases to physicians.[18] As such, they have the educational and clinical capacity required to learn BPOC and promote POHC.

Global Dental Volunteering

Over the past few decades, there has been a strong international aid response to public health emergencies and oral health disparities in developing countries.[19-22] The public health focus has been to decrease mortality and morbidity by targeting attention to acute respiratory infections, diarrhea, malaria, measles, HIV/AIDS, neonatal problems, and malnutrition.[21-26] Many dental non-governmental organizations (NGOs) and volunteers have contributed to remedying global oral health disparities.[26,27] However, much less is known about the dental NGO sector compared to the medical and health NGO sector.

In 2002, one of dentistry's global representatives, the World Dental Federation (Federation Dentaire Internationale, FDI), published a landmark study analyzing baseline data about dental aid organizations.[28] Benzian and Gelbier, the authors of the study, noted that dental NGOs are relatively new, staffed by a few individuals who are mainly volunteers, have inadequate funding, lack professional management, lack consistent quality assurance, lack research awareness, and communicate and collaborate poorly with other NGOs, thus rendering, for the most part, inadequate education, insufficient training, and unsustainable service delivery.[28] The majority of the developmental dental NGOs originated in developed countries (61 percent), while the remainder were established within developing countries.[28,29] A noteworthy point about all humanitarian and health NGOs is that currently there is no overall regulatory mechanism to oversee their work, monitor ethical standards, or evaluate their actions.[29] Although the lack of regulation does not necessarily detract from the value of their contribution, it does indicate that there is no enforceable standard to aspire to and little collaboration with local and international dental organizations.[28,29] In an effort to provide basic oral health care to underserved populations with limited oral health care and human resources, FDI is advocating the framework of POHC with BPOC as an essential tool for developing programs and projects that host countries can accept, afford, and sustain.[7,28,30] Specifically, BPOC training of community health aides, NGO workers, and professional dental volunteers is a front-line defense against existing oral health dilemmas.[31] A recent study has shown that "the atraumatic restorative treatment (ART) [in BPOC] can be used in the school setting to improve the oral health of large populations of underserved children."[32] POHC and BPOC are strategies to assist oral health care systems in addressing a population's oral health needs; however, BPOC, though based within a preventive POHC model, is a downstream intervention focusing on restorative care (Figure 1). To be more effective at the front line, BPOC and POHC need comprehensive ownership from the professional dental community and dental education institutions.

POHC and BPOC Initiatives: Successes and Difficulties

Globally, there have been many recent initiatives to promote oral health and provide BPOC (Table 4). The majority of the oral health education interventions have involved primary schools and village health posts.[33-37] The basic strategy has involved a one-time instruction session (varying from one hour to several days) of head teachers, teachers, midwives, nurses, or village health workers on various aspects of oral health for children and mothers, including oral hygiene instruction and techniques, use of fluorides, dietary habits, dental attendance, dental trauma, and toothache.[35] Some interventions were unsuccessful, revealing that a one-time session did not change the oral health status of children or their oral health behavior over a period of time.[34,35,37] A few studies did document successful incorporation of oral health promotion into general health programs.[35-37] Outreach programs that have included BPOC have shown the most effectiveness, particularly because of the clinical effectiveness of the ART restorations

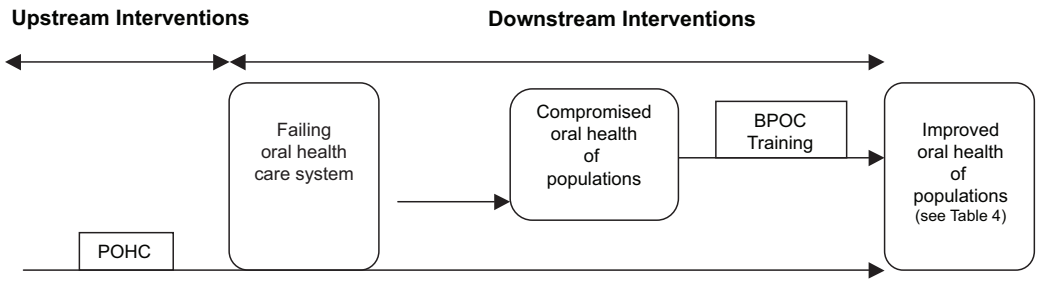

Figure 1. Oral health care interventions: primary oral health care (POHC) and the basic package of oral care (BPOC)

that were placed.[32,38-41] Oral health education is simply not sufficient to change oral conditions; in addition to receiving oral health education and improving oral hygiene practices, individuals need basic oral treatment. As such, health promotion must go hand-in-hand with health service provision, thus reflecting a more coordinated approach with the combination and balance of upstream (health education) and downstream (clinical prevention) oral health determinants and interventions.[10,14]

These programs indicate that BPOC can be successful and that the presence of dental professionals is essential for supervision and long-term success of the interventions.[38-41] Although non-dentists are capable of performing the essentials in BPOC, they require encouragement, support, evaluation of techniques, and re-education if necessary. A framework that includes professional guidance is ideal for success.

Dental Student Survey on Global Oral Health Issues

At a North American dental school, a simple global oral health information survey was conducted with third-year dental students to determine if they would volunteer their professional dental services in an international setting, if they felt adequately prepared by their formal dental education to understand global oral health issues, and if they were familiar with WHO's BPOC and FDI. Following Institutional Review Board (IRB) approval, 108 students were approached to voluntarily participate in the study after a regularly scheduled lecture class. Table 5 shows the five questions that were asked; the first two questions were multiple-choice and the last three were fill-in-the-blank. The collected data were entered and analyzed using Excel.

Only 56 percent of the students (sixty) stayed after class to participate and complete the survey. Eighty-seven percent of surveyed students (fifty-two) stated that they would consider volunteering their dental skills and expertise as a senior dental student or future dentist in an international setting or developing country, whereas 13 percent stated that they would not.

Thirty-three percent of the surveyed students stated that they felt their dental education had "not at all" prepared them to understand the status of oral health conditions globally, especially in developing countries. Forty-seven percent of the surveyed students stated that they were "somewhat" prepared, 13 percent stated that they were "moderately" prepared, and 7 percent stated that they were "greatly" prepared by their dental education to understand the status of oral health conditions globally.

None of the surveyed students could correctly answer the question "Who created the basic package of oral care (BPOC)?" as WHO. The majority of surveyed students answered the question with a question mark.

None of the surveyed students could correctly answer the question "Name the three components of BPOC" as OUT, AFT, and ART. The majority of students answered this question by leaving the space blank or with a question mark.

None of the surveyed students could correctly identify FDI when asked, "Name the world's main dental/oral health NGO [whose] mandate is to 'bring together the world of dentistry, represent the dental profession of the world, and stimulate and facilitate

Table 4. Oral health education (OHE) and BPOC interventions

Primary School OHE or Village Health Post OHE

Location	Trainees/Program	Report Conclusion	Summary Findings	Source
Tanzania	Head teacher and one teacher from 19 schools received a one-time, one-day oral health workshop.	Mixed results after three years.	No change in caries status of school subjects over time; some marginal change in status of gingivitis and plaque levels.	van Palenstein Helderman et al.[1]
Zimbabwe	School teachers received a one-time, three-day oral health workshop.	Ineffective results after 3.5 years.	One-time training of primary school teachers in oral health aspects to educate pupils in good oral health behavior and practice was ineffective in lower plaque levels over 3.5 years.	Frencken et al.[2]
West Java, Indonesia	School teachers, nurses, midwives, and village health volunteers received a two-day workshop on oral health.	Village health posts and schools conducted OHE activities regularly (improvement from before).	In village health posts, mothers knew about cause and prevention of early childhood caries and reported early toothbrushing of infants' teeth and demonstrated adequate brushing of infants' teeth. Children's oral health knowledge increased, and their teeth seemed cleaner; they appeared to brush more efficiently and for a longer time period.	Hartono et al.[3]
Namibia	Nurses, teachers, and school health monitors participated in four one-day oral health workshops.	Successful incorporation of oral health promotion into general health program.	Dissemination of oral health messages in primary health context and demonstration of correct ways to brush teeth to more than 7,000 primary school children.	John[4]
Belgium	School teachers and children receive a one-hour oral health education session yearly.	Insignificant reduction of caries after six years.	Implemented yearly extraoral health promotional program did not result in significant caries prevalence reduction. Effectiveness on plaque levels and gingival health inconclusive.	Vanobbergen et al.[5]

Dental Outreach Promoting BPOC, ART, and OHE

Location	Trainees/Program	Report Conclusion	Summary Findings	Source
China	Five assistant dentists placed 294 ART restorations in 197 12–13-year-olds in four schools.	The six-year survival rate of Class I ART restorations placed for the treatment of caries in permanent teeth was high.	The ART restorations had a high long-term survival rate: 76% for the small restorations evaluated at the six-year examination and 59% for the large restorations.	Lo et al.[6]
Johannesburg, South Africa	Team: one dentist, two dental therapists, a dental assistant, and support staff.	ART approach, as part of integrated package, made restorative treatment available to populations previously without care.	ART approach reduced extractions (by 17.4%), restored more teeth, and made oral care in the mobile dental system more preventive, less dental threatening, and more patient-friendly.	Mickenautsch et al.[7]
Philippines	BPOC, ART, and OHE in schools by dentists and teachers.	More than 90% of the ART restorations were evaluated as successful.	Incorporated oral health education into the science and health curriculum involving teachers and parents; after three year re-examination, increase of cavity-free children from 8.8% to 16.2%.	Monse-Schneider[8]
Malawi	178 ART preparations and restorations by two dentists.	The quality of ART Class I restorations (after three years) is competitive with that of conventional amalgam restorations.	The survival rates of the ART restorations after three years was 81.0%, while the survival rates of the amalgam restorations were 90.4%.	Kalf-Scholte et al.[9]
Zimbabwe	Oral health program in secondary schools using ART approach.	ART is appropriate for population groups currently not receiving preventive and restorative dental care.	The survival rate of the ART restorations after three years was 85.3%.	Frencken et al.[10]

(continued)

Table 4. Oral health education (OHE) and BPOC interventions *(continued)*

Sources:

1. van Palenstein Helderman WH, Munck L, Mushendwa S, van't Hof MA, Mrema FG. Effect evaluation of an oral health education programme in primary schools in Tanzania. Community Dent Oral Epidemiol 1997;25:296–300.

2. Frencken JE, Borsum-Andersson K, Makoni F, Moyana F, Mwashaenyi S, Mulder J. Effectiveness of an oral health education programme in primary schools in Zimbabwe after 3.5 years. Community Dent Oral Epidemiol 2001;29:253–9.

3. Hartono SWA, Lambri SE, van Palenstein Helderman W. Oral health education in West Java, Indonesia: involvement of nurses, midwifes, village health volunteers, and teachers. Developing Dent 2002;2:3–7.

4. John C. FDI Fund: smiling schools of Namibia. Developing Dent 2003;1:9–11.

5. Vanobbergen J, Declerk D, Mwalili S, Martens S. The effectiveness of a 6-year oral health education programme for primary schoolchildren. Community Dent Oral Epidemiol 2004;32:173–82.

6. Lo EMC, Holmgren CJ. Six-year follow up of atraumatic restorative treatment restorations in China's school children. Community Dent Oral Epidemiol 2007;35:387–92.

7. Mickenautsch S, Rudolph MJ, Ogunbodede EO. The impact of the ART approach on the treatment profile in a mobile dental system (MDS) in South Africa. Int Dent J 1999;49(3):132–7.

8. Monse-Schneider B. Preventive oral health care programme for Filipino children. Developing Dent 2002;1:12–5.

9. Kalf-Scholte SM, van Amerongen WE, Smith JE, van Haastrecht HJA. Atraumatic restorative treatment (ART): a three-year clinical study in Malawi—comparison of conventional amalgam and ART restorations. J Public Health Dent 2003;63:99–103.

10. Frencken JE, Makoni F, Sithole WD, Hackenitz E. Three-year survival of one-surface ART restorations and glass-ionomer sealants in a school oral health programme in Zimbabwe. Caries Res 1998;32:119–26.

Table 5. Global oral health information questionnaire

Third-Year Dental Students at a North American Dental School

1) Would you consider volunteering your dental skills and expertise as a senior dental student or future dentist in an international setting/developing country? Please circle one of the choices on the right.	Yes No
2) Has your dental education prepared you to understand the status of oral health conditions globally, especially in developing countries? Please circle one of the choices on the right.	1) Not at all 2) Somewhat 3) Moderately 4) Greatly

3) Who created the basic package of oral care (BPOC)?

Answer:_____

4) Name the three components of the BPOC:

a)_____

b)_____

c)_____

5) Name the world's main dental/oral health NGO (non-governmental organization).

(This organization's mandate is to "bring together the world of dentistry, represent the dental profession of the world, and stimulate and facilitate the exchange of information across all borders with the aim of optimal oral health for all people.")

Answer:_____

the exchange of information across all borders with the aim of optimal oral health for all people.'" Again, the majority of surveyed students answered the question with a question mark.

The results of the questionnaire suggest that there is a gap between global oral health policy and interventions set out by WHO and FDI and awareness of this policy, interventions, and global oral health issues among North American dental students. The majority of the third-year dental students at this dental school expressed a desire to volunteer their professional services in international settings. However, none of the surveyed students knew about WHO's BPOC or FDI's role in global oral health.

Dental Education to Address Global Oral Health Issues

There is a growing consensus within the dental profession that its members must advocate and champion collective professional and moral responsibilities to serve the public good by providing expert care to all in need.[42-46] Patthoff affirms that this approach to provide care is essential to move the dental profession beyond isolated volunteerism into an organized health system that sustains care.[47] Furthermore, Mouradian emphasizes that "relying solely on volunteerism risks framing the dental profession's efforts as nice and commendable (which they are indeed), but not necessary—not a required part of a profession's social contract with the public it serves."[48]

Despite this discussion on dental professionalism and the moral responsibilities of dental practitioners, community service is not a formally recognized competency for a general dentist in North America.[49,50] The recently revised competencies for the predoctoral dental school curriculum endorsed in March 2008 by the American Dental Education Association (ADEA) are intended to define the entry-level professional capacities of the general dentist. However, this document does not once mention "community service."[49] Furthermore, in the competency domain of professionalism, there is no mention of providing care to underserved communities or populations.

Appealing to dental professionals to fulfill their social contract to provide care to the underserved has its shortcomings. First, the message itself is tainted with negativity. It portrays dental professionals as not achieving their expected goals and implies a collective failure of the profession; this creates neither an enabling nor encouraging environment for effective change. Second, the request is presented as an afterthought, which may not necessarily be consistent with one's dental education. For the most part, established dental education has focused mainly on restorative clinical approaches for individual paying clients, while prevention of oral disease in communities or vulnerable populations is given less prominence. Thus, it is an unrealistic expectation for a dental professional to consciously provide care for underserved populations when formal dental training largely promotes principles of care that are to the contrary. Third, this appeal is not practically enforceable since licensed dental professionals are not required or mandated by their regulatory licensing body to provide such care. Creating a predoctoral global oral health course that includes the principles of POHC and BPOC at all levels could reinforce the concept that care to the underserved is integral to the profession—i.e., it is an ethical responsibility. Essentially, it affords students the opportunity to hear, learn, practice, and evaluate for themselves the value of such care. The curriculum components of a global oral health course based in dental public health could include the following:

- the global burden of oral disease,
- general health and oral health care systems of developed and developing countries,
- primary oral health care strategies,
- the role of WHO and FDI in international health,
- the role of humanitarian organizations and global dental volunteers,
- BPOC as a competent form of oral health care delivery,
- dental ethics, with topics on sustainability, global health ethics, and addressing the needs of underserved populations, and
- cultural competence in addressing international oral health issues.

By developing global oral health dental curricula in developed and developing countries, global oral health issues and interventions will become recognized and validated as necessary professional responsibilities, not regarded as optional interventions in resource-poor situations.

Instilling a public purpose in dental students is as important as teaching them about the newest clinical techniques or latest high tech dental software.[51] A sense of awareness can be created that oral health education, promotion, and service delivery exist in unique parallel formulas that can be applied depending on the circumstances. As such, global oral health education teaches the value of alternatives and does not cripple students to believe that there is only one ideal treatment modality for all situations. This will enable students as future dental professionals to feel confident and skillful regardless of their environment; it may even inspire some to become international dental volunteers, dental NGO leaders, or oral health policy advocates.[51] Educating students about global oral health issues includes them in the reality of global oral health disparities and facilitates the belief that they can affect change within and beyond their immediate community.[52,53]

There are encouraging examples of such curricular change in Vietnam and Peru. Vietnam is modifying the curriculum in all three of its dental schools to focus on teaching community-based preventive treatment.[11] These dental schools are incorporating BPOC into their curricula and are requiring new dental graduates to work in government postings for up to three years. In Peru, the Faculty of Stomatology at the Universidad Peruana Cayetano Heredia has developed and implemented a model dental public health program at the undergraduate level.[54] The program consists of six courses throughout the four-year program that focus on socioeconomic and cultural diagnoses, general health appraisal, generation of epidemiological findings about community-wide oral health needs, preventive-promotional community-based interventions in general health and oral health (BPOC and ART), local surveillance system in oral health, and a mandatory fifth year of rural internship.[42] Such programs challenge dental students to value dental public health issues and provide a realistic understanding of prevailing oral health problems faced by the international community. Furthermore, these programs offer students and young professionals the opportunity to be a constructive part of the solution.

Conclusion

To develop dental professionals who have the capacity to treat underserved populations, academic dental institutions in developed and developing countries need to critically evaluate their preventive dental education programs. There needs to be greater emphasis on the implementation of a global oral health course at all predoctoral levels to highlight global oral health issues and include the principles of primary oral health care and the basic package of oral care.

Acknowledgment

We are grateful to Dr. Jennifer Beard, Assistant Professor of International Health, Boston University School of Public Health, for her professional support, feedback, and guidance in this research paper.

REFERENCES

1. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S. The global burden of oral diseases and risks to oral health. Bull World Health Organ 2005;83(9):661–9.
2. Petersen PE. Priorities for research for oral health in the 21st century: the approach of the WHO Global Oral Health Programme. Community Dent Health 2005;22:71–4.
3. Yee R, Sheiham A. The burden of restorative dental treatment for children in third world countries. Int Dent J 2002;52:1–9.
4. Watt RG. Strategies and approaches in oral disease prevention and health promotion. Bull World Health Organ 2005;83(9):711–8.
5. World Health Organization. The world oral health report, 2003. Geneva: World Health Organization, 2003.
6. Auluck A. Oral health of poor people in rural areas of developing countries. J Can Dent Assoc 2005;71(10):753–5.
7. van Palenstein Helderman W, Benzian H. Implementation of a basic package of oral care: towards a reorientation of dental NGOs and their volunteers. Int Dent J 2006; 56:1–5.
8. Sheiham A. The Berlin declaration on oral health and oral health services. Department of Epidemiology and Public Health, University College London, Medical School. At: www.ibiblio.org/taft/cedros/english/newsletter/n5/Berlin.html. Accessed: October 28, 2006.
9. Mautsch W. The Berlin oral health declaration, 10 years later: where are we now? Developing Dent 2003;1:1–3.
10. Watt RG. From victim blaming to upstream action: tackling the social determinants of oral health inequalities. Community Dent Oral Epidemiol 2007;35:1–11.
11. van Palenstein Helderman W, Mikx F, Truin GJ. Workforce requirements for a primary oral health care system. Int Dent J 2000;50:371–7.
12. World Health Organization. Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, USSR, September 6–12 1978. At: www.who.int/hpr/NPH/docs/declaration_almaata.pdf. Accessed: February 2008.
13. Mikx F. Caring for oral needs through the basic package of oral care. Developing Dent 2003;1:5–8.
14. Watt RG. Emerging theories into the social determinants of health: implications for oral health promotion. Community Dent Oral Epidemiol 2002;30:241–7.
15. Newton JT, Bower EJ. The social determinants of oral health: new approaches to conceptualizing and researching complex causal networks. Community Dent Oral Epidemiol 2005;33:25–34.
16. Dharamsi S. Building moral communities? First, do no harm. J Dent Educ 2006;70(11):1235–40.
17. The World Health Report 2006, Annex, Table 4. Global distribution of health workers in WHO member states. At: www.who.int/whr/2006/annex/06_annex4_en.pdf.
18. Lady health worker programme: training programme review. National Programme for Family Planning and Primary Health Care, Ministry of Health, Government of Pakistan. At: www.phc.gov.pk/. Accessed: February 2008.
19. Benzian H, van Palenstein Helderman W. Dental charity work: does it really help? Br Dent J 2006;201(7):413.
20. Hobdell M, Petersen PE, Clarkson J, Johnson N. Global goals for oral health 2020. Int Dent J 2003;53:285–8.
21. Salama P, Spiegel P, Talley L, Waldman R. Lessons learned from complex emergencies over past decade. Lancet 2004;364:1801–13.

22. Connolly MA, Gayer M, Ryan MJ, Salama P, Spiegel P. Communicable diseases in complex emergencies: impact and challenges. Lancet 2004;364:1974–83.
23. VanRooyen MJ, Eliades MJ, Grabowski JG, Stress ME, Juric J, Burkle FM. Medical relief personnel in complex emergencies: perceptions of effectiveness in the former Yugoslavia. Prehosp Disaster Med 2001;16(3):104–8.
24. Spiegel PB, Burkle FM, Dey CC, Salama P. Developing public health indicators in complex emergency response. Prehosp Disaster Med 2001;16(4):281–5.
25. Lewis D. Development NGOs and the challenge of partnership: changing relations between North and South. Soc Policy Administration 1998;32(5):501–12.
26. Hobdell MH. A taxonomy of volunteering—humanitarian missions: what they can do and what it involves. Developing Dent 2003;1:16–20.
27. Dickson M, Dickson G. Volunteering: beyond an act of charity. J Can Dent Assoc 2005/2006;71(11):865–9.
28. Benzian H, Gelbier S. Dental aid organizations: baseline data about their reality today. Int Dent J 2002;52: 309–14.
29. de Ville de Goyet C, Marti RZ, Osorio C. Natural disaster mitigation and relief. Chapter 61: control priorities in developing countries. 2nd ed. Washington, DC: World Bank, WHO, and Fogarty Centre, 2006.
30. FDI policy statements: guidelines for dental volunteers, August 2005. At: www.fdiworldental.org/federation/assets/statements/ENGLISH/Public_Health/Guidelines_dental_volunteers.pdf. Accessed: February 2008.
31. van Palenstein Helderman W, Mikx F. Integrating oral health into primary health care: experiences in Bangladesh, Indonesia, Nepal, and Tanzania. Int Dent J 1999;49:240–8.
32. Lo EMC, Holmgren CJ. Six-year follow up of atraumatic restorative treatment restorations in China's school children. Community Dent Oral Epidemiol 2007;35: 387–92.
33. van Palenstein Helderman WH, Munck L, Mushendwa S, van't Hof MA, Mrema FG. Effect evaluation of an oral health education programme in primary schools in Tanzania. Community Dent Oral Epidemiol 1997;25:296–300.
34. Frencken JE, Borsum-Andersson K, Makoni F, Moyana F, Mwashaenyi S, Mulder J. Effectiveness of an oral health education programme in primary schools in Zimbabwe after 3.5 years. Community Dent Oral Epidemiol 2001;29:253–9.
35. Hartono SWA, Lambri SE, van Palenstein Helderman WH. Oral health education in West Java, Indonesia: involvement of nurses, midwifes, village health volunteers, and teachers. Developing Dent 2002;2:3–7.
36. John C. FDI Fund: smiling schools of Namibia. Developing Dent 2003;1:9–11.
37. Vanobbergen J, Declerck D, Mwalili S, Martens S. The effectiveness of a 6-year oral health education programme for primary schoolchildren. Community Dent Oral Epidemiol 2004;32:173–82.
38. Mickenautsch S, Rudolph MJ, Ogunbodede EO. The impact of the ART approach on the treatment profile in a mobile dental system (MDS) in South Africa. Int Dent J 1999;49(3):132–7.
39. Monse-Schneider B. Preventive oral health care programme for Filipino children. Developing Dent 2002;1:12–5.
40. Kalf-Scholte SM, van Amerongen WE, Smith JE, van Haastrecht HJA. Atraumatic restorative treatment (ART): a three-year clinical study in Malawi—comparison of conventional amalgam and ART restorations. J Public Health Dent 2003;63:99–103.
41. Frencken JE, Makoni F, Sithole WD, Hackenitz E. Three-year survival of one-surface ART restorations and glass-ionomer sealants in a school oral health programme in Zimbabwe. Caries Res 1998;32:119–26.
42. Catalanotto FA, Patthoff DE, Gray CF, eds. Professional promises: hopes and gaps in access to oral health care (special issue). J Dent Educ 2006;70(11):1117–245.
43. Ozar DT. Basic oral health needs: a public priority. J Dent Educ 2006;70(11):1159–65.
44. Welie JVM. Is dentistry a profession? Part 2: the hallmarks of professionalism. J Can Dent Assoc 2004;70(9):599–602.
45. Garetto LP, Yoder KM. Basic oral health needs: a professional priority? J Dent Educ 2006;70(11):1166–9.
46. Crall JJ. Access to oral health care: professional and societal considerations. J Dent Educ 2006;70(11):1133–8.
47. Patthoff DE. How did we get here? Where are we going? Hopes and gaps in access to oral health care. J Dent Educ 2006;70(11):1125–32.
48. Mouradian WE. Band-aid solutions to the dental access crisis: conceptually flawed—a response to Dr. David H. Smith. J Dent Educ 2006;70(11):1174–9.
49. American Dental Education Association. Competencies for the new general dentist (as approved by the 2008 ADEA House of Delegates). J Dent Educ 2008;72(7):823–6.
50. Association of Canadian Faculties of Dentistry. Competencies for a beginning dental practitioner in Canada, 2005. At: www.acfd.ca/en/publications/ACFD-Competencies.htm. Accessed: July 23, 2008.
51. American Dental Education Association. Position paper: statement on the roles and responsibilities of academic dental institutions in improving the oral health status of all Americans (as revised by the 2004 House of Delegates). J Dent Educ 2008;72(7):841–8.
52. Huynh-Vo L, Rosenbloom JM, Aslanyan G, Leake JL. Investigating the potential for students to provide dental services in community settings. J Can Dent Assoc 2002;68(7):408–11.
53. Kerr AR, Changrani JG, Garry FM, Cruz GD. An academic dental center grapples with oral cancer disparities: current collaboration and future opportunities. J Dent Educ 2004;68(5):531–41.
54. Bernabé E, Bernal JB, Beltrán-Neira RJ. A model of dental public health teaching at the undergraduate level in Peru. J Dent Educ 2006;70(8):875–83.