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Oral health related quality of life is important for patients, but what about populations?

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Abstract

Objectives—To review population-based research into oral health related quality of life.

Methods—Narrative review of selected publications.

Results—In the 1970s, there were two incentives to assess non-clinical aspects of health: 1) a desire to understand impacts of disease on individuals' quality of life; 2) a search for population-level measures that might better quantify the impact of health care systems on populations. Dental researchers responded to those incentives, creating dozens of questionnaires that assess individuals' ratings of subjective oral health and quality of life. This has been a boon for clinical dental research, for example, by showing marked improvements in subjective oral health in patients receiving implant-supported dentures. Also, health surveys show poorer subjective oral health among disadvantaged population groups. However, the same measures show only modest benefits of general dental care. Furthermore, several population surveys show that today's young adults, who grew up with widespread exposure to preventive dental programs, have poorer subjective oral health than earlier generations that experienced unprecedented levels of oral disease. Yet to materialize is the hope that "socio-dental indicators" of subjective oral health might provide a meaningful metric to demonstrate population-level benefits of dental care. A fundamental limitation is that population health is a contextual measure, not merely the aggregated health status of individuals within the population.

Conclusion—While researchers have successfully broken with clinical dogma by assessing subjective dimensions of individuals' oral health, they have failed to explicitly ask people to assess the oral health of the community in which they live.

Keywords

oral health; quality of life; health surveys; epidemiology

Introduction

Most studies of oral health related quality of life attribute their theoretical underpinnings to a conceptual framework of oral health proposed by David Locker (1). Locker noted that conventional clinical-epidemiological measures of oral disease failed to capture individuals' experiences of sickness and suffering. His framework explicitly evaluated personal experiences of health and disease by adapting the World Health Organization's classification of impairment, disability and handicap (2). That classification was, in turn, motivated by the definition of health enshrined in the WHO charter, namely "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

Before 1988, dental researchers cited an additional incentive to evaluate subjective oral health, motivated by health care systems and their population impacts, rather than the health of individuals. Lois Cohen described the perspective with respect to the US health care

system: “It was about a generation ago, during the Administration of the late President Nixon, that [the United States] was engaged in heated political debates on the viability of a variety of health care programs. While other proposals were raised, databases which would allow for comparisons of health outcomes for these or other systems were sparse” (3). In the United Kingdom, Sheiham and Croog noted: “Complex effects of dental conditions occur in many areas of life, including economics, work, family life, and informal social interactions, and they may affect the quality of life as well. ... these larger social and psychological effects have not yet been adequately assessed, and there is a marked paucity of systematic studies in these areas” (4).

This distinction between individual- and societal-level impacts of oral disease has a parallel in clinical- and population-levels of interest in health. In its 1988 report, the US Institute of Medicine described a traditional view of public health, namely “what we as a society do collectively to assure the conditions in which people can be healthy” (5). And in its 2002 report, the Institute of Medicine was more explicit in defining health as a collective public good: “Health is a primary public good because many aspects of human potential such as employment, social relationships, and political participation are contingent on it” (6). Yet, with the emergence of the term “population health” at the turn of the century, there was a shift away from health as a population attribute. For example, Kindig defined population health as “the health outcomes of a group of individuals, including the distribution of such outcomes within the group”, thereby putting greater emphasis on the sum of individuals’ health experiences (7).

The aim of this presentation was to review population-based research into oral health related quality of life, focusing on the distinction between patient-assessments and population-assessments.

Materials and Methods

A narrative review was conducted of selected papers published since 1976. This paper is based on a July 15, 2011 oral presentation in Adelaide, South Australia, at a Festschrift honoring the work of Professor John Spencer.

Results

The first studies to systematically evaluate non-clinical dimensions of oral disease focused on populations. Susan Reisine’s pioneering studies documented the “social impact of dental disease” by showing surprisingly high rate of work loss, restricted activity and disability in the US population (8). John Spencer reported similar effects in the Australian population (9). However, there were problems with measurement and meaning of those indicators, including likely under-reporting and the fact that many episodes of work loss were due to dental visits for routine preventive and restorative care (10).

Researchers then began to measure individuals’ experiences of oral conditions, developing questionnaires to evaluate the functional, psychological and social consequences of dental disease. In 1986, Cushing et al developed a questionnaire to provide a “socio-dental indicator” of dental disease. Dozens of subjective oral health status measures have since been developed, both for adults (11) and for children, (12). Most of them ask people about adverse impacts of oral conditions, although some additionally evaluate positive dimensions of oral health (13, 14). When used in cross-sectional observational studies, those questionnaires have documented adverse impacts of oral disease in selected population groups and patient samples. For example, systematic reviews have found strong evidence

that impaired oral health related quality of life is associated with tooth loss (15) and with temporomandibular disorder (16).

A smaller group of longitudinal studies of subjective oral health is dominated by clinical studies of prosthodontics. Three of those clinical studies were randomized-controlled trials of implant-supported prostheses, and all three used the 49-item Oral Health Impact Profile (OHIP-49) to measure change in quality of life. A systematic review with meta-analysis concluded there was heterogeneity in efficacy estimates computed by comparing change in the implant-treated group with change in the conventional-denture group (17). However, a consistent finding was that the implant-treated groups had large and clinically meaningful reductions in OHIP-49 scores (Table 1). Specifically, patients receiving implant-supported mandibular dentures together with conventional maxillary dentures, experienced mean reductions in OHIP-49 of at least 30 units. Despite minor methodological variation in recording OHIP-49 responses, those reductions all exceeded minimally important differences. Furthermore, three studies reported effect sizes that exceeded 1 as measured using Cohen's D statistic, exceeding the benchmark of 0.8 signifying a "large" difference. Another single-group treatment study of patients receiving general dental care reported similarly-large treatment effect among edentulous patients. Predominantly, they received new or relined complete dentures.

In contrast, studies of dentate patients receiving general dental care report much smaller changes (Table 1). In the same study of Australian patients receiving public-sector care, the effect size for dentate patients was 0.4. In a comparable Canadian study of elderly patients receiving public-sector, general dental care, the effect size was only 0.32. And a prospective cohort study of a random sample of dentate people living in the Australian state of Tasmania reported an effect size of only 0.2 for patients who received dental care during the 12 month follow-up period. In that study, a similarly small reduction in mean OHIP-14 scores was observed among dentate people who did *not* receive treatment during the 12 month period.

Meanwhile, population surveys from several countries show a surprising relationship of poor oral health related quality of life in young adults. In Australia, (18) the United Kingdom, (19) the United States, (20) and Norway, (21) elderly people have lower mean OHIP-14 scores than age-groups as young as 15–24 years. The UK result was validated in a different survey that used the OHQoL-UK questionnaire to measure oral health related quality of life (13). In Canada, no difference in mean OHIP-14 scores was observed among age groups, (22) although that result is equally surprising given that the youngest generations in all of these studies have been exposed to more dental preventive care than the older generations with whom their results were compared.

Discussion

Growth in methods and knowledge about oral health related quality of life has proven a boon for clinical dental research. Association studies provide strong evidence that commonly-occurring oral disorders have a marked impact on people's functional, psychological and social well-being. Clinical studies demonstrate marked improvements in oral health related quality of life in patients who receive specialized and expensive forms of dental treatment, such as implant-retained dentures. However, the same person-specific questionnaires show only modest effects, at best, of general dental care on subjective oral health of dentate patients. Of equal concern are population-level findings that subjective oral health is no better in today's young adults than in older generations that had little exposure to preventive dental care and who experienced unprecedented levels of oral disease.

Yet to materialize is the hope that “socio-dental indicators” of subjective oral health might provide a meaningful metric to demonstrate population-level benefits of dental care. A fundamental limitation is that population health is a contextual measure, not merely the aggregated health status of individuals within the population. In principle, population benefits of oral health and dental care might be quantified using collective measures of health as a primary public good, such as participation in the workplace and society. However, efforts to measure societal impacts of oral disease apparently stopped in the 1980s. While there is some renewed interest in documenting the family impact of an individual’s oral health problems, this has been limited to studies of children where parents serve as proxies to report impacts on individual children (12,30). Studies of adults have successfully broken with clinical dogma by assessing subjective dimensions of individuals’ oral health, yet they have failed to explicitly ask people to assess how oral conditions affect their family, their broader social networks, or the community in which they live.

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References

1. Locker D. Measuring oral health: a conceptual framework. *Community Dent Health*. 1988; 5:3–18. [PubMed: 3285972]
2. World Health Organization. International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease. Geneva: World Health Organization; 1980. p. 205
3. Cohen, LK. The emerging field of oral health-related quality of life outcomes research. In: Slade, GD., editor. *Measuring Oral Health and Quality of Life*. Chapel Hill, NC: University of North Carolina, Dental Ecology; 1996. p. 1-9.
4. Sheiham A, Croog SH. The psychosocial impact of dental diseases on individuals and communities. *J Behav Med*. 1981; 4:257–72. [PubMed: 7033546]
5. Institute of Medicine (U.S.). Committee for the Study of the Future of Public Health. *The future of public health*. Washington, D.C: National Academy Press; 1988. p. xiip. 225
6. Institute of Medicine (U.S.). Committee on Assuring the Health of the Public in the 21st Century. *The future of the public’s health in the 21st century*. Washington, D.C: National Academies Press; 2003. p. xxvp. 509
7. Kindig DA. Understanding population health terminology. *Milbank Q*. 2007; 85:139–61. [PubMed: 17319809]
8. Reisine ST. Dental health and public policy: the social impact of dental disease. *Am J Public Health*. 1985; 75:27–30. [PubMed: 3966594]
9. Spencer AJ, Lewis JM. Requirement and supply of dental services in Victoria. *Aust Dent J*. 1989; 34:340–9. [PubMed: 2775021]
10. Reisine ST. The impact of dental conditions on social functioning and the quality of life. *Annu Rev Public Health*. 1988; 9:1–19. [PubMed: 3288228]
11. Slade, GD. Assessment of Oral Health Related Quality of Life. In: Inglehart, MR.; Bagramian, R., editors. *Oral health-related quality of life*. Chicago: Quintessence Pub; 2002. p. 29-46.
12. Barbosa TS, Gavião MB. Oral health-related quality of life in children: part I. How well do children know themselves? A systematic review. *Int J Dent Hyg*. 2008; 6:93–9. [PubMed: 18412720]
13. McGrath C, Bedi R. Measuring the impact of oral health on quality of life in Britain using OHQoL-UK(W). *J Public Health Dent*. 2003; 63:73–7. [PubMed: 12816136]
14. Broder HL, McGrath C, Cisneros GJ. Questionnaire development: face validity and item impact testing of the Child Oral Health Impact Profile. *Community Dent Oral Epidemiol*. 2007; 35 (Suppl 1):8–19. [PubMed: 17615046]

15. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. *Health Qual Life Outcomes*. 2010; 8:126. [PubMed: 21050499]
16. Dahlstrom L, Carlsson GE. Temporomandibular disorders and oral health-related quality of life. A systematic review. *Acta Odontol Scand*. 2010; 68:80–5. [PubMed: 20141363]
17. Emami E, Heydecke G, Rompre PH, de Grandmont P, Feine JS. Impact of implant support for mandibular dentures on satisfaction, oral and general health-related quality of life: a meta-analysis of randomized-controlled trials. *Clin Oral Implants Res*. 2009; 20:533–44. [PubMed: 19515032]
18. Slade GD, Sanders AE. The paradox of better subjective oral health in older age. *J Dent Res J Dent Res*. 2011; 60(11):1279–85.
19. Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, et al. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. *Community Dent Oral Epidemiol*. 2004; 32:107–14. [PubMed: 15061859]
20. Sanders AE, Slade GD, Lim S, Reisine ST. Impact of oral disease on quality of life in the US and Australian populations. *Community Dent Oral Epidemiol*. 2009; 37:171–81. [PubMed: 19175659]
21. Dahl KE, Wang NJ, Skau I, Ohrn K. Oral health-related quality of life and associated factors in Norwegian adults. *Acta Odontol Scand*. 2011
22. Locker D, Quinonez C. Functional and psychosocial impacts of oral disorders in Canadian adults: a national population survey. *J Can Dent Assoc*. 2009; 75:521. [PubMed: 19744362]
23. Awad MA, Locker D, Korner-Bitensky N, Feine JS. Measuring the effect of intra-oral implant rehabilitation on health-related quality of life in a randomized controlled clinical trial. *J Dent Res*. 2000; 79:1659–63. [PubMed: 11023260]
24. Awad MA, Lund JP, Shapiro SH, Locker D, Klemetti E, Chahade A, et al. Oral health status and treatment satisfaction with mandibular implant overdentures and conventional dentures: a randomized clinical trial in a senior population. *Int J Prosthodont*. 2003; 16:390–6. [PubMed: 12956494]
25. Allen PF, Thomason JM, Jepson NJ, Nohl F, Smith DG, Ellis J. A randomized controlled trial of implant-retained mandibular overdentures. *J Dent Res*. 2006; 85:547–51. [PubMed: 16723653]
26. Gagliardi DI, Slade GD, Sanders AE. Impact of dental care on oral health-related quality of life and treatment goals among elderly adults. *Aust Dent J*. 2008; 53:26–33. [PubMed: 18304238]
27. Locker D, Jokovic A, Clarke M. Assessing the responsiveness of measures of oral health-related quality of life. *Community Dent Oral Epidemiol*. 2004; 32:10–8. [PubMed: 14961835]
28. Crocombe LA, Brennan DS, Slade GD. The influence of dental attendance on change in oral health-related quality of life. *Community Dent Oral Epidemiol*. 2012; 40(4):53–61. [PubMed: 21883354]
29. Allen PF, O’Sullivan M, Locker D. Determining the minimally important difference for the Oral Health Impact Profile-20. *Eur J Oral Sci*. 2009; 117:129–34. [PubMed: 19320721]
30. Pahel BT, Rozier RG, Slade GD. Parental perceptions of children’s oral health: the Early Childhood Oral Health Impact Scale (ECOHIS). *Health Qual Life Outcomes*. 2007; 5:6. [PubMed: 17263880]

Table 1

Summary findings from six studies of subjective oral health and dental care

Place	Patients	Treatment	Number of subjects	Follow-up period	Dependent variable	MID*	Change in OHIP-score		
							Absolute	Cohen's D	
Montreal	53-65 yrs	Implant+denture	54	2 months	OHIP-49: 245-point scale	20	34.5	1.1	Montreal. (23)
Montreal	65-75 yr olds	Implant+denture	30	2 months	OHIP-49: 245-point scale	20	33.5	1.1	Montreal. (24)
Newcastle	mean=64 yrs, sd=9 yrs'	Implant+denture	45	3 months	OHIP-49: 196-point scale	17	54.0	1.1	Newcastle. (25)
Adelaide	75 years, edentulous	Public sector general dental care	44	6 months	OHIP-14: 56-point scale	5	11.2	0.9	Adelaide. (26)
	75 years, dentate	Public sector general dental care	75	6 months	OHIP-14: 56-point scale	5	3.2	0.4	
Toronto	59-88 yrs	Public sector general dental care	116	1 month	OHIP-14: 56-point scale	5	n/s	0.3	Toronto. (27)
Tasmania	15 years, dentate	Dental attendance	175	12 months	OHIP-14: 56-point scale	5	0.7	0.2	Tasmania. (28)
	15 years, dentate	No dental attendance	143	12 months	OHIP-14: 56-point scale	5	0.7	0.2	

* MID = Minimally important difference, adapted for different formats of the Oral Health Impact Profile (OHIP) reported by Allen et al (29) and Locker et al (27).