



Ciência & Saúde Coletiva

ISSN: 1413-8123

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Associação Brasileira de Pós-Graduação em
Saúde Coletiva
Brasil

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Ciência & Saúde Coletiva, vol. 16, núm. 1, marzo, 2011, pp. 1007-1015
Associação Brasileira de Pós-Graduação em Saúde Coletiva
Rio de Janeiro, Brasil

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Quality of life related to oral health: contribution from social factors

Qualidade de vida relacionada à saúde bucal:
contribuição dos fatores sociais

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Abstract *Sociodental indicators have been widely used in epidemiological research related to oral health, as they add the dimension of the impact of oral health on the quality of life of individuals and populations. Various studies have been done in order to validate new instruments to assess these subjective perceptions, however, the association between social parameters and impact on oral health-related quality of life (OHRQoL) has not been systematically studied, thus there is still doubt as to the role of the main social variables as OHRQoL impact modulators. This study aims to systematically review the literature in order to evidence the association between six social parameters and OHRQoL. Based on six exclusion criteria, the literature search revealed 40 eligible publications for analyses. The frequency of expected (positive) association between the social parameters and OHRQoL was greater than the non-expected (negative) associations for the six parameters. Conclusions: The social conditions most clearly associated with the perception of negative impact on OHRQoL were: women, with poor education and low income, immigrants or people belonging to minority ethnic groups.*
Key words Oral health, Quality of life, Social factors, Review

Resumo *Indicadores sociodentais têm sido largamente utilizados nas pesquisas epidemiológicas em saúde bucal, pois adicionam a dimensão de impacto da saúde bucal na qualidade de vida (OHR-QoL) de indivíduos e populações. Inúmeros trabalhos têm sido realizados com a finalidade de validar novos instrumentos para mensurar estas percepções subjetivas; entretanto, a associação entre parâmetros sociais e OHRQoL não foi estudada de forma sistemática, havendo dúvida em relação ao papel das principais variáveis sociais como moduladores de impactos. Este estudo objetivou revisar sistematicamente a literatura para evidenciar a associação entre seis parâmetros sociais e OHR-QoL. Baseados em seis critérios de exclusão, a pesquisa bibliográfica revelou quarenta artigos para análise. A frequência de associações esperadas (positivas) entre os parâmetros sociais e OHRQoL foi maior que as associações não esperadas (negativas) para os seis parâmetros. Concluiu-se que as condições sociais mais claramente associadas à percepção de impactos negativos da saúde bucal na qualidade de vida foram mulheres, de baixa escolaridade e baixa renda, imigrantes ou pessoas pertencentes a grupos étnicos minoritários.*
Palavras-chave Saúde bucal, Qualidade de vida, Fatores sociais, Revisão

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Introduction

Quality of life can be understood as “the degree to which a person enjoys the important possibilities of life”¹. It is multidimensional and depends on: (a) the individual’s external factors (i.e. social, cultural, economic and political ones); (b) health condition and health related to quality of life (i.e. symptoms, functional state and components of health perception); and (c) the individual’s internal factors (i.e. biological, lifestyle, health behavior, personality and values)². While most oral diseases are not fatal, they do lead to significant morbidity, which ends up in serious physical, social and psychological consequences that affect the patients’ quality of life³.

In order to evaluate the impact of oral health on the individuals’ quality of life, various socio-dental indicators have been developed and their use has become widespread⁴. Socio-dental indicators are measures of oral health-related quality of life and range from survival, through impairment, to function and perceptions⁵. They are extension measures in which dental and mouth disorders affect the normal social function and bring changes to behavior, such as work disability, school absenteeism, or inability to perform routine activities⁶.

The use of subjective oral health measures is supported the present understanding of what health, in its ample meaning is all about, that is, according to the WHO definition, physical, mental and social well-being.

The conceptual models of evaluation of health suggested by the WHO generated different indicators. For example, “disease-impairment-disability-handicap” model, which only incorporates negative impact on health, served as the basis of the development of OHIP (Oral Health Impact Profile). The “structure-functionability-participation” model, which incorporates both positive and negative influences on health, which was the basis of the development of OHQoL-UK (UK Oral Health Related Quality of Life)³.

The subjective measures, complementary to clinical measures of the oral health status have been considered essential to the definition of treatment needs^{1,7}. In addition to that, they offer information that can be used to make political decisions, such as the definition of priorities in dental services and investments in dental treatment directed to the population’s greatest need or to specific group of patients⁶.

However, the association between the socio-dental indicators and clinical condition has been

considered weak and social factors have been considered as clinical factors in the explanation of an oral health outcome^{8,9}. It is known that morbidity and mortality are strongly influenced by social factors such as age, gender, and socioeconomic status, and oral diseases are no exception¹⁰. Aging leads to more oral problems, such as tooth loss, periodontal disease and root caries¹¹. Pathological conditions, for example, xerostomia and mouth cancer are modulated by the gender variable^{12,13}. And social and economic deprivations are crucial to caries occurrence¹⁴.

Recently, a myriad of studies that utilize socio-dental indicators to evaluate the prevalence of subjective impacts on the quality of life of different populations have been published¹⁵⁻²³. The evaluation instruments, in the form of standard questionnaires, have been validated to be used in various populations²⁴⁻³⁵ and, some studies are using them as an outcome measure to evaluate clinical interventions^{36,37}. However, no summary has been made in order to answer what factors or the most serious oral problems that affect the individuals’ quality of life, or rather, if the perception of subjective impacts varies according to age, gender, education, income, residential area, or other social parameters related to the population that was studied. Therefore, this literature review tries to update the studies that evaluated oral health-related quality of life (OHRQoL) of individuals and populations, trying to determine the degree of association between social factors and subjective impacts.

Methods

The methods applied in this review include the literature search strategy, inclusion and exclusion criteria of articles. After the literature search, the articles summary data were placed in a table. All the abstracts were read in order to select studies following the inclusion and exclusion criteria. When doubts persisted, the whole article was taken and analyzed. Final analyses were done after the articles were obtained.

The search for articles about oral health related quality of life was done in October 2006, utilizing SCOPUS database (<http://www.scopus.com/scopus/home.url>) on two steps. In the basic research form, first step, the keywords “oral health” AND “quality of life” were used in the field “Article title, Abstract OR Keywords”. The document type chosen was “article” and the subject area was “health sciences”. No limits regarding publishing dates were fixed.

After the first search, two limits were added in the advanced search form, step two: limits to indexed periodicals in subject area "Dentistry" and languages "English" OR "Portuguese" OR "Spanish".

Studies were considered for inclusion if they addressed oral health related quality of life in individuals or populations, by means of a standardised evaluation instrument (interview or questionnaire). The studies should also include some form of comparison between different social groups (social parameter - for example: age, sex, socioeconomic and sociodemographic status, ethnics).

The following publications were excluded:

- . Case reports, literature reviews and theoretical essays;
- . Non indexed publications – books, theses and reports;
- . Studies without social parameter analyses, and with only subjective evaluations (pain, perceived treatment needs, self-rated oral health);
- . Studies where OHRQoL was evaluated as an endpoint to clinical trials (for example: OHRQoL before and after the implant surgery, or before and after dental treatment), which did not include social parameters;
- . Studies that evaluated the connection between systemic diseases (diabetes, depression, stress, Sjogren syndrome) and OHRQoL;
- . Studies without statistical analyses.

The identified social parameters were distinguished into six analysis categories: gender, age, education, income, ethnics, and residential area (urban or rural). The "income" parameter includes a series of income or economic status indicators, such as: occupation of the head of the household, health insurance, economic class categorization, degree of poverty. The parameter "ethnics" includes the immigrant condition.

Social associations were considered positive when followed an expected pattern, which were: more impact on women, elderly people, those with low education, low income, immigrants, African Americans, and those living in rural area. Social associations that didn't follow this expected pattern were considered negative. Associations that didn't have statistical significance were also identified.

The results were reported based on frequency distribution of the studies on negative, positive and non significant associations in each analyzed social parameter.

Results

Through the basic search form, 332 articles were identified and when limits were applied in the advanced search form, 186 articles remained. 40 articles remained after the evaluation of these articles regarding inclusion and exclusion criteria.

The characteristics of the articles that correlated social parameters with subjective indicators of impact on oral health related quality of life (OHRQoL) can be seen in Tables 1 and 2. The analysis of each social category comes in the following topics.

Gender

Although 39 articles report the ratio of men and women as a sociodemographic characteristic of the studied population, only 29 studies tested the association between gender and OHRQoL impacts (Table 1). Just one article reported more perception of impact on men¹⁰, seeing that this association was more significant only in the bivariate analysis, but it disappeared from the multiple regression model. In the articles where it was found a positive association between women and OHRQoL impacts, women reported a greater number of negative impacts^{12,38-40}, more dissatisfaction with appearance than men¹⁶, perceived more positive or negative oral impacts on their quality of life⁴¹, had more perception about the impairment related to tissue damage or mouth disease⁴² and to social and psychological dimension⁴³, and reported having more chewing difficulties, pain and worries about their oral health¹¹.

Age

The presentation of the studies regarding age can be seen in Table 2. All of the 42 articles reported age as a sociodemographic characteristic of the studied population and 25 studies tested the association between age and OHRQoL impacts (Table 1). Among which, 7 of these studies showed a negative association, with elderly people reporting less impact than younger people.

The elderly noticed less impact regarding aesthetics and dental sensibility to hot, cold and sweet²⁹, whilst young patients were more anxious about their dental status⁴⁴. Out of 11 studies that showed a positive association between aging and more negative impacts, 4^{10,39,45,46} showed the association was significant only in the bivariate analysis, and it became non significant after the inclusion of other co-variables in the multivariate analysis.

Table 1. Association between social parameters and OHRQoL indicators.

| Indicator | Social parameters | | |
|----------------------|---|--------------------------------------|----------------------------|
| | gender | age | education |
| OHIP-14 / OHIP-49 | | | |
| Positive association | 2 (12, 38) | 5 (10, 18, 20, 45, 46) | 6 (10, 20, 24, 46, 51, 53) |
| Negative association | 1 (10) | 4 (29, 33, 35, 50) | 0 |
| Non sig association | 9 (29, 30, 33, 35, 45, 46, 51, 52, 53) | 3 (30, 51, 52) | 0 |
| GOHAI | | | |
| Positive association | 0 | 2 (17, 32) | 1 (32) |
| Negative association | 0 | 1 (29 [*]) | 0 |
| Non sig association | 4 (17, 25, 29 [*] , 49) | 1 (49) | 2 (17, 25) |
| OIDP | | | |
| Positive association | 2 (12 [*] , 40) | 0 | 0 |
| Negative association | 0 | 2 (15, 33 [*]) | 0 |
| Non sig association | 4 (1, 22, 33 [*] , 52 [*]) | 2 (22, 52 [*]) | 0 |
| CPQ8-10/ CPQ11-14 | | | |
| Positive association | 0 | 0 | 0 |
| Negative association | 0 | 0 | 0 |
| Non sig association | 1 (28) | 0 | 0 |
| Others | | | |
| Positive association | 6 (11, 16, 39, 41, 42, 43) | 5 (19, 23, 39, 45 [*] , 48) | 3 (11, 39, 42) |
| Negative association | 0 | 2 (41, 44) | 0 |
| Non sig association | 5 (8, 23, 44, 45 [*] , 48) | 2 (16, 42) | 0 |
| Total | | | |
| Positive association | 9 | 11 | 10 |
| Negative association | 1 | 7 | 0 |
| Non sig association | 19 | 7 | 2 |
| Indicator | Social parameters | | |
| | income | ethnics | residential area |
| OHIP-14 / OHIP-49 | | | |
| Positive association | 5 (21, 35, 49, 50, 53) | 2 (35, 38) | 0 |
| Negative association | 0 | 1 (12) | 1 (10) |
| Non sig association | 3 (41, 47, 48) | 1 (33) | 1 (20) |
| GOHAI | | | |
| Positive association | 3 (32, 34, 42) | 1 (49) | 0 |
| Negative association | 0 | 0 | 0 |
| Non sig association | 1 (17) | 1 (25) | 1 (17) |
| OIDP | | | |
| Positive association | 1 (27) | 1 (27) | 0 |
| Negative association | 0 | 1 (12 [*]) | 0 |
| Non sig association | 3 (1, 15, 47 [*]) | 1 (33 [*]) | 1 (22) |
| CPQ8-10/ CPQ11-14 | | | |
| Positive association | 0 | 0 | 0 |
| Negative association | 0 | 0 | 0 |
| Non sig association | 0 | 0 | 0 |
| Others | | | |
| Positive association | 8 (8, 23, 39, 43-46, 50 [*]) | 4 (19, 39, 42, 43) | 2 (39, 42) |
| Negative association | 1 (40) | 0 | 0 |
| Non sig association | 1 (44) | 0 | 1 (43) |
| Total | | | |
| Positive association | 16 | 8 | 2 |
| Negative association | 1 | 1 | 1 |
| Non sig association | 7 | 2 | 4 |

^{*} Article with double entry in the table, because it applies to more than one indicator.

Table 2. Characteristics of the studies that analysed the association between social parameters and OHRQoL indicators.

| | 1989-1998 | 1999-2001 | 2002-2004 | 2005-2006 | Total |
|-----------------------------|-------------------|-----------|--|-----------------------------------|-------|
| Country | | | | | |
| UK | 0 | 1 (1) | 6 (19, 23, 33, 41, 48, 50) | 2 (12, 38) | 9 |
| Canada | 1 (11) | 0 | 0 | 1 (49) | 2 |
| USA | 2 (43, 44) | 0 | 2 (39, 42) | 1 (49') | 5 |
| Brazil | 1 (8) | 0 | 1 (52) | 0 | 2 |
| China | 0 | 0 | 2 (21, 34) | 1 (53) | 3 |
| Australia | 1 (35) | 0 | 1 (50') | 2 (45, 49) | 4 |
| Germany | 0 | 0 | 2 (10, 20) | 1 (51) | 3 |
| France | 0 | 0 | 2 (17, 32) | 1 (27) | 3 |
| Others | 0 | 0 | 4 (16, 18, 22, 30) | 7 (15, 24, 25, 28, 29, 46, 52) | 11 |
| Age Group | | | | | |
| Elderly (60 years or above) | 2 (11, 35) | 1 (1) | 3 (18, 21, 34) | 3 (25, 49, 51) | 9 |
| Adults (18-59 years) | 1 (8) | 0 | 6 (16, 17, 22, 30, 32, 33) | 2 (24, 38) | 9 |
| Adolescents (15-17 years) | 0 | 0 | 1 (47) | 0 | 1 |
| Children (10-14 years) | 0 | 0 | 0 | 2 (27, 28) | 2 |
| Adults and elderly | 2 (43, 44) | 0 | 9 (10, 19, 20, 23, 39, 41, 42, 48, 50) | 8 (12, 15, 29, 45-47, 52, 53) | 19 |
| Indicator | | | | | |
| OHIP-14 / OHIP-49 | 1 (35) | 0 | 8 (10, 18, 20, 21, 30, 33, 50, 52) | 9 (12, 24, 29, 38, 45-47, 51, 53) | 18 |
| GOHAI | 0 | 0 | 3 (17, 32, 34) | 3 (25, 29', 49) | 6 |
| OIDP | 0 | 1 (1) | 3 (22, 33', 52') | 4 (12', 15, 27, 52) | 8 |
| CPQ8-10 / CPQ11-14 | 0 | 0 | 0 | 1 (28) | 1 |
| Others | 4 (8, 11, 43, 44) | 0 | 7 (16, 19, 23, 39, 41, 42, 48) | 1 (50') | 12 |
| Study design | | | | | |
| Instrument validation | 2 (8, 35) | 0 | 4 (30, 32-34) | 7 (12, 24, 25, 27-29, 40) | 13 |
| Cross-sectional | 3 (11, 43, 44) | 1 (1) | 14 (10, 16-23, 39, 41, 48, 50, 52) | 7 (15, 45-47, 49, 51, 53) | 25 |
| Others | 0 | 0 | 1 (42) | 1 (38) | 2 |

* Article with double entry in the table, because it depict more than one characterization of a country or indicator.

Education

Out of 12 articles that correlated education and OHRQoL impacts, 10 related low education to higher levels of negative impact (Table 1), ^{5,10,11,24,39,46} kept this association only regarding bivariate analyses – in the multivariate analysis, the association between education and impact became non significant.

Income

As for income, the association between low income and more negative impacts was even clearer (Table 1). Only one article⁴⁰ reported an apparently inverse association, with more perception of impact on the upper class individuals. However, this study considered both positive and negative impacts on the analysis, and the authors reported that there was more perception of positive impacts.

In 16 articles that showed a positive association between a degree of poverty and OHRQoL

impacts, there were more frequent negative impacts and/ or intensity: adults living in poorer areas⁴⁷ or considered poor⁴³, individuals with lower income^{11,32,35,46,48,49} and belonging to a low social class^{8,23,48}, those without health insurance^{39,45} and unable to pay for dental services⁴², children that used to study in schools located in deprived areas, and families with a greater number of children²⁷, elderly people that received public social security^{21,34}.

Ethnicity

The immigrant condition was analyzed in 4 papers^{27,35,49,50}. For all, the trend was the same: immigrants^{35,49,50}, with less time since immigration⁴⁹, or children of a foreign mother²⁷, showed more negative OHRQoL impacts.

Out of the 7 works that studied the different ethnic origins in the same country: 3 were carried out in the UK^{12,19,33}, 1 in Malaysia²⁵, and 3 in the USA^{39,42,43}. From those, 2 showed a non signifi-

cant association with OHRQoL impacts^{25,33}; 1 showed more negative impacts, due to xerostomia, for white British individuals compared with non-white¹²; 1 showed more negative impacts on the Chinese community in the UK¹⁹; and the others showed more negative impact on the African Americans in the USA^{39,42,43}.

Residential area

Few studies tested the residential area, regardless of it being located in an urban or rural area, as a source of possible association with perception of OHRQoL impacts^{10,17,20,22,39,42,43}. Most of the analyzed studies do not clearly describe the place or the residential area of the studied population. The studies which clearly describe the urban or rural condition, most of them only deal with the urban population^{18,25,27,49,51-53} and only one study exclusively evaluated a rural population, this was done on children attending primary schools in a rural area of Uganda⁵⁴.

Out of the 7 studies that evaluated OHRQoL impacts related to the residential area: 4 had no significant association with OHRQoL^{17,20,22,43}, 2 reported more impact on rural area dwellers^{39,42}, and 1 more impact on urban residents¹⁰.

Discussion and conclusions

Most of the studies mentioned in this literature review were not designed to test associations between social parameters and the outcomes of impact on oral health-related quality of life. Most of the analyzed studies were designed for instruments validation (Table 2), which used a clinical association to the test of construct validity²⁶. This becomes a problem especially to the analyses of social parameters, since most studies contained very homogeneous population samples compared with the analyzed factors, e.g., age^{16-18,32,35,49,51,52}, education^{17,25,53} and income^{17,42,43,49}, which requires great care when it comes to analysing these associations.

Some special associations look clearer, such as the case of the gender influence on the perception of the impacts of oral health in the quality of life. Locker¹¹ reported that in a population sample, where women and men were not different when it comes to edentulousness, to the average number of teeth lost and to the loss of periodontal insertion, and where men showed more decayed coronary and radicular surfaces; women had more complaints about pain and ability to chew, and

showed greater concern and upset about their oral health. In two other studies involving multivariate analyses, after the adjustment of the variable gender with clinical variables⁴³ and other socio-demographic variables⁴², women had more social and psychological impacts. Such studies seem to show that, under similar clinical conditions, women tend to perceive more impact on their oral health-related quality of life than men. The perception of most positive impacts⁴¹, as well as the negative ones^{11,12,16,38-43}, may show that women weigh their oral health more when they evaluate their quality of life. However, it is important to point out a great number of studies did not find significant association between gender and OHRQoL impacts on bivariate analyses (Table 1), which may show the differences in gender vary between distinct populations.

The association between age and the subjective impacts on oral health is still unclear. The hypothesis that elderly individuals would suffer more impact due to the fact they have, throughout their lives, more oral problems¹¹ is susceptible to questioning. It seems to exist confounding or interaction between clinical factors, such as dental prosthesis, tooth loss, xerostomia, and aging¹⁰. When these clinical factors are controlled, the elderly tend to notice the negative impacts much less than the young individuals. A study conducted in Norway, with a national representative sample¹⁵, identified the presence of confounding between age and the number of teeth lost. In the stratified analysis, the adjusted OR did not differ much from the non adjusted OR, except for age. When all other variables were controlled, the association between age and the OIDP scores was reversed and statistically significant – the greater the age, the less the impact. The study by Steele *et al*⁵⁰, with national representative samples from Australia and the UK, also reported less impact on the elderly when the co-variable keys were controlled. The authors concluded that age and tooth loss are strongly related, but have independent effects on OHRQoL. Tooth loss, which is related to aging, is related to more negative impacts; while aging independently, resulted in fewer impacts. In the study by McGrath and Bedi⁴⁸, in the UK, adult individuals noticed more impact than the elderly individuals. In this study not only were the negative impacts studied, but also the positive ones, and a bigger perception was related to positive impacts (58%). This can mean that oral health to the elderly is not as worrisome as it is to younger people when it comes to general health worries. McMillan *et*

*al*²¹ found a weak association between clinical parameters and OHRQoL impacts on the elderly in Hong Kong. The authors reported that the ratio of elderly with negative impact was low and that “they did not seem particularly bothered by their oral condition, especially when compared with other often traumatic events that had occurred in their lives. Their expectations of oral health also appeared to be low”. Locker *et al.*⁵⁵ evaluated elderly people with medical chronic conditions and physical disabilities, whose major oral problems were tooth loss and xerostomia and found weak or moderate correlations of the clinical conditions with general psychological well-being and life satisfaction, thus showing that oral health is just a factor that influences the psychological well-being of these individuals.

The associations between education, income and OHRQoL impacts seem to be well defined with poor socio-economic status – low education and low income – implying high levels of impact on quality of life. However, it is necessary to mention that there is an important connection between age, education, income, and the use of removable prostheses, which leads to confounding or an interaction of these variables¹⁰.

The immigrant condition, although may form a clear positive association with the OHRQoL impacts, showed interaction with the clinical factor “tooth loss” in a population sample in Australia⁵⁰. Still, in this study, immigrants from countries other than the UK and Ireland and having less than 25 teeth had more OHRQoL negative impacts than non immigrants. The authors came up with the hypothesis that cultural differences could explain the marked differences of impact detected in the first generation immigrants and Australians.

In contrast, the analysis of different ethnic origins in the same country is something more complex, because the categorizations differ from country to country and there are few studies testing such an association^{12,19,25,33,39,42,43}. Newton *et al.*¹⁹ described that, in general, minority ethnic groups report higher levels of dissatisfaction with their oral health than what is expected in the ethnically majority population. However, it would be prudent to analyze, in future studies, the possibility of interaction or confounding of this variable with socio-economic status.

Finally, the association analysis between the (urban/ rural) residential area and OHRQoL outcomes is made difficult by the small number of pertinent studies and multiple definitions of the “rural” and “urban” categories. In the 7 studies that tested this association, regions with fewer than 20,000 inhabitants were considered “rural” – country: Germany^{10,20}, regions with fewer than 5,000 inhabitants – country: France¹⁷, university students that reported their rural origin – country: Tanzania²², non metropolitan areas in the north of Florida – country: the USA^{39,42,43}. Moreover, Ettinger *et al.*⁵⁶ described that, in the USA, the US Census Bureau define as urban, places with more than 2,500 inhabitants, being all other places considered rural. The hypothesis that individuals living in rural areas would suffer more negative OHRQoL is supported by the argument that they have much less access to health services in these areas, which would lead to the late search for treatment, due to pain⁴². One single study showed the occurrence of more negative impact on individuals living in urban areas¹⁰, however no explanatory hypothesis was conceived and, another study with the same population sample showed a non significant association²⁰.

Collaborators

F Cohen-Carneiro contributed to the conception, methodological design, and development of the research project, analysis and interpretation of the results, and drafting of the article. R Souza-Santos contributed to the methodological design of the research project, interpretation of the results, and critical review. MAB Rebelo collaborated in the methodological design and the development of the research project.

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Artigo apresentado em 31/07/2008

Aprovado em 11/12/2008

Versão final apresentada em 11/01/2009