Research Article

Sociodemographic Determinants for Oral Health Risk Profiles

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The present study aimed to explore the association between caries risk profiles and different sociodemographic factors. The study sample (n = 104) was randomly selected within an urban population in Flanders, Belgium. Caries risk was assessed by anamnesis, clinical examination, salivary tests, and a questionnaire. Age, gender, and socio-economic status were extracted from social insurance data files. Social indicators were “occupational status,” “being entitled to the increased allowance for health care interventions” and having access to the “Maximum Bill” (MAF), initiatives undertaken to protect deprived families. In the bivariate analysis there were significant differences in risk profiles between occupational groups (P < .001), between entitled and non-entitled individuals to the increased allowance (P = .02), and between access or no-access to the MAF (P < .01). The multiple logistic model showed a significantly higher chance of being in the low risk group for individuals with no-access to the MAF compared to those with access (OR:14.33–95% C.I. 2.14–95.84).

1. Introduction

Taking into account new insights in the management of diseases, a patient-centred holistic approach is recommended. This involves that care providers should respect patients’ prospects, concerns, preferences, wants and needs, and solicit patients’ input into decisions [1].

This person-centred approach is very important in preventive care and is directed to increase patients’ knowledge and beliefs, self-regulation skills and abilities, and social facilitation [2]. An initial assessment of these factors together with biological predictors of a potential disease will be part of new preventive health management strategies.

In order to plan appropriate, patient-centred caries management in oral health care, frameworks are elaborated which the dental team can use to bring together key elements of information about patients and patients’ teeth. Recently “risk assessment” and “early detection” were focused [3–5]. “Risk assessment” aims to detect unfavourable factors before the initiation of the disease. It is the process of quantifying the probability of a harmful effect to individuals or populations from certain human activities or from unfavourable environmental factors. “Early detection” aims to detect any disease process in a very early stage.

Risk assessment is part of a primary prevention strategy, early detection is part of the secondary prevention.

Caries management by risk assessment (CAMBRA) coupled with early detection and a quick and effective response can be seen as one of the best and cost-efficient ways of dealing with one of the most prevalent oral health problems, caries. This “medical model,” where the etiologic disease-driving agents are balanced against protective factors, and integrated in a risk assessment model, offers the possibility of patient-centred disease prevention and management before there is irreversible damage done to the teeth [6].

The rational for a caries risk assessment management in industrialized Western countries is as follows.

(i) A rather low incidence of the disease in the general population justifying the efforts and costs to identify high-risk groups. In the late 70s the incidence of caries was very high and omnipresent in all age groups. In contrast, today caries prevalence and incidence decreased and are concentrated in 20% of the population. An attempt to identify individuals and groups expected to be at high-risk seems sensible.

(ii) Risk assessment as a screening activity without followup and an adapted targeted prevention is useless.
The chance of developing new caries

\[ \text{Mean} = 36.59 \]
\[ \text{Std. dev.} = 25.379 \]
\[ N = 99 \]

3. Material and Methods

The study sample \((n = 1000)\) was randomly selected, after stratification by age, within the population of a metropolitan area in Flanders, Belgium: Ghent and surroundings. Five age groups were defined. Invitations to participate were sent in four consecutive quarters, starting in November 2007 and ending in April 2008.

Data from clinical examination, salivary tests, health anamnesis, and an oral health habits questionnaire were used to assess oral health risk. In particular, caries risk was assessed including

(a) past caries experience (clinical examination),
(b) assessment of the general health (mainly diabetes, epilepsy, polypharmacy, and smoking habits) (health anamnesis),
(c) diet: intake of nutrients with high sugar concentration and frequency (number of meals and between-meals) (questionnaire),
(d) oral hygiene: frequency of tooth brushing (questionnaire),
(e) quantity of clinical observable dental plaque (clinical examination),
(f) fluoride programme (questionnaire),
(g) saliva: flow and buffer capacity (salivary tests),
(h) risk enhancing dental patterns: crowding, exposed root surfaces, and ill-fitting restorations (clinical examination).

Three examiners participated in the oral examinations. A calibration for the diagnostic criteria of caries was performed on 43 teeth, registered within 21 clinical cases. The inter-examiner reliability was high, with weighted kappa values being 0.97, 0.93 and 0.92 for the respective examiners.

Analyses were performed taking the risk profile as a dependent variable. Risk profile was calculated as a percentage and reduced to a categorical variable in the inferential analyses. Three risk levels have been defined: low (25% or less), moderate (between 25% and 75%) and high (75% and higher).

Age, gender, and socioeconomic status were used as independent variables. They were extracted from social insurance data files. Social indicators were “occupational status”, “being entitled to the increased allowance for health care interventions” and “having access to the mechanism known as the Maximum Bill (MAF)”. The two last mentioned initiatives were undertaken to improve access to the health care system and to protect deprived families from large expenses for health care.

Nonparametric bivariate analyses by means of nonparametric tests (Mann-Whitney U and Kruskal Wallis for 2 or more independent groups, resp.), and multiple logistic regression were performed to estimate the contribution of
Table 1: Cross-tabulation for different sociodemographic variables and the three caries risk levels (Mann-Whitney U and Kruskal Wallis for 2 or more independent groups, resp.).

|                | Low risk | Moderate risk | High risk | P-value |
|----------------|----------|---------------|-----------|---------|
| **Age**        |          |               |           |         |
| <12 years (n = 6) | 33.3%    | 66.7%         | 0%        | NS      |
| Young (n = 19)  | 47.4%    | 26.3%         | 26.3%     |         |
| Adults (n = 54) | 46.3%    | 46.3%         | 7.4%      |         |
| 60+ (n = 20)    | 45%      | 50%           | 5%        |         |
| **Gender**     |          |               |           |         |
| Male (n = 42)   | 40.5%    | 52.4%         | 7.1%      |         |
| Female (n = 57) | 49.1%    | 38.6%         | 12.3%     |         |
| **SES**        |          |               |           | <.0001  |
| Worker (n = 21) | 23.8%    | 61.9%         | 14.3%     |         |
| Employee (n = 30) | 66.7%    | 26.7%         | 6.7%      |         |
| Managerial (n = 11) | 81.8%    | 18.2%         | 0%        |         |
| Self-employed (n = 7) | 14.3%    | 57.1%         | 28.6%     |         |
| Others (n = 2)  | 0%       | 0%            | 100%      |         |
| **Increased allowance** |       |               |           | .02     |
| No (n = 80)     | 52.5%    | 40%           | 7.5%      |         |
| Yes (n = 12)    | 25%      | 41.7%         | 33.3%     |         |
| **MAF Family (Maximum Bill)** |       |               |           | <.01    |
| No (n = 82)     | 52.4%    | 40.2%         | 7.3%      |         |
| Yes (n = 10)    | 20%      | 40%           | 40%       |         |

Table 2: Differences in mean risk profiles and components for different social groups.

|                     | Chance of developing new caries | Fluoride programme | Amount of dental plaque | Diet   |
|---------------------|---------------------------------|--------------------|-------------------------|--------|
| Access to MAF*      | 54.20%                          | 22.40%             | 15.20%                  | 10.50% |
| No access to MAF    | 33.27%                          | 8.50%              | 10.50%                  | 8.50%  |
| P-value             | .01                             | .003               | .05                     | .5     |

*MAF: Maximum bill, a mechanism to protect deprived families from large expenses for health care.

the independent risk indicators. The analyses were carried out using SAS statistical program. The level of significance was set at 0.05.

4. Results

The response rate was low with 104 out of 1000 invited participants accepting the invitation and presenting themselves at the dental clinic for the oral examination. The third quarter presented the lowest response rate while for the first call the response rate was the highest (12%). There was little difference between responders and non-responders in terms of gender, age and social indicators. There was a small over representation of participants of forty and a small under representation of self-employed in the responder group.

4.1. Explorative Data Analysis. The average chance of developing new caries, calculated on the basis of the risk profile as it was described in Section 3 is shown in Figure 1.

The overall average chance of developing new caries was 36.6%. A rather equal spread was found between the different risk factors diet (9.3%), oral hygiene and plaque amount (11.3%), fluoride program and saliva properties (10.1%), and past caries experience and related diseases (5.9%).

The distribution of the chance of developing new caries was left-skewed. 45.5% of participants belonged to the “low risk” group, meaning that they have less than 25% chance of developing new caries, 44.4% belonged to the “moderate risk” group and 10.1% belonged to the “high risk” group, which has a mean chance of 87% of developing new caries.

4.2. Inferential Analysis. In the bivariate analysis (Table 1) risk profiles were not significantly different between age groups and between males and females. All social variables showed strong and significant links with the risk profile. There were significant differences between occupational groups (P < .001), between entitled and non-entitled individuals to the increased allowance (P = .02), and between access or no-access to the MAF (P < .01). Participants from lower social classes showed a significantly higher mean risk profile for developing new caries.

The most important factors related to dental caries in this group were an inadequate fluoride program (mainly frequency of tooth brushing with a fluoride toothpaste), and insufficient oral hygiene (plaque amount) (Table 2).
The multiple model (Table 3) showed that the chance of being in the low risk group for individuals with no-access to the MAF was 14 times higher compared to the individuals with access to the MAF (OR:14.33–95% C.I. 2.14–95.84).

6. Conclusion
All social variables showed strong and significant links with the caries risk profile. For each social category a gradation has been observed between the three different oral health risk levels. Stepwise risk-based prevention opens opportunities to further decrease caries prevalence in low-prevalence communities.

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