Assessment of the influence of income levels on periodontal health assessed by the CPITN index of 35-44 year-olds in Iasi, Romania

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Abstract

Aim: The aim of this study was to assess the periodontal condition of a group of 35-44 years old patients from the Iasi region of Romania using the CPITN index and to see if there were any correlations with the income level of the patients assessed. ***Method***: A cross-sectional study was conducted in dental clinics in rural and urban areas of Iasi in 2006-2007 and a sample of 928 people (age 35-44 years old) was examined according to the CPITN index criteria by two calibrated examiners. Their income level was then assessed as high, medium or low. Data were analyzed using the SPSS statistical program package. The Spearman correlation was used to compare the differences in prevalence and the correlation between CPITN scores and income. The study was approved by the Department of the Trust who gave ethical approval. ***Results***: Of the 928 patients 311 (43.5%) were in the highest income level group, 437 (47%) were in the middle income group and 180 (19.5%) were in the lowest income group**.** Only 84 patients (9.1%) were assessed as CPITN 0. A further 201 (21.7%) were assessed as having a CPITN score of 1. The majority (504 – 54%) were assessed as CPITN 2 and 141 (15.2%) as CPITN 3 or 4 (having a pocket or pockets of 3.5mm or deeper). Only 24 patients (2.4%) had a pocket or pockets of 5.5mm or deeper (CPITN 4). None of these 24 patients came from the group with the highest income. When statistically tested, the Spearman correlation confirmed an association between the presence of a pocket or pockets deeper than 3.5mm and income level (r=-0.3, p=0.001). ***Conclusions***: In Iasi county, in the 35-44 year-olds who were studied, the majority had a CPITN score of 2. Just over 15% had a pocket or pockets deeper than 3.5mm and only 2.5% had a pocket or pockets deeper than 5.5 mm. Income level was a risk factor which correlated with the presence of periodontal pockets.

Key-words: Periodontal diseases, CPITN, 35-44 year-olds, income levels

Introduction

It has been, in the last 70 years, in spite of an improvement in the prevalence of dental caries in many developed countries, in some sections of the population and in some countries a number of factors related to life style and economics are having a detrimental effect on oral health, in general, and periodontal health, in particular [1]. Such life style factors include: an increase in the consumption of refined, sugar containing food products together with a reduction in consumption of natural, unrefined foods [2], poor or lack of oral hygiene [3], and difficulty in accessing oral health care [4]. Few studies have assessed the impact of these life style and economic factors on periodontal health.

It has been suggested that 10-20% of the population are at risk of losing their teeth due to advanced periodontal breakdown (disease) regardless of their economic status and the availability of dental care [5]. However, epidemiological studies of periodontal diseases in Europe, most of which have used using the Community Periodontal Index of Treatment Needs (CPITN) [6], suggest that there is a considerable variation in percentages of individuals with one or more sites with pocket depths of 6 mm or more [7]. The results of studies carried out in patients from different age groups and in socially different communities indicate increased incidence and prevalence of both dental caries and periodontal diseases, when the patients have low incomes [8], are from rural areas [9], are physically handicapped persons and are elderly [3]. Data on the periodontal condition and treatments needs in Romania are scarce. This has limited the planning of oral health care services and prioritizing oral health care. It has also made international comparisons difficult [10]. Indeed the authors of this paper

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have found only one Romanian epidemiological study of periodontal diseases published in the international literature [11].

Aims

Against this background the aim of the study reported in this paper was to evaluate the implications of income level on periodontal health in a population of 35-44 year-olds from different communities in Iasi and its surrounding region.

Methods

The sample of subjects selected for inclusion in this study was drawn using the inclusion and exclusion criteria suggested by Clive (2006) [12] and the Romanian Ministry of Health (1997) [13]. All adult patients aged 35-44 years who attended dental care clinics in the urban areas of Iasi and Pascani and clinics in the rural areas of Tomesti and Dancu, both of which are in the Iasi area, during 2006-2007 were invited to take part in the study. Periodontal data and information on the patients' socio-economic status, as assessed by income level, were collected by two examiners who had calibrated prior to the study.

The periodontal status was assessed using the CPITN technique [6]. The socio-economic status of the patients was evaluated as:
- Low if the patient claimed to have income of a monthly <500lei, (<165US$)
- Medium if the patient claimed to have a monthly income of between 500 and 1000 lei, (165-333 US$)
- High if the patient claimed to have a monthly income of >1000 lei. (>333 US$)

Patients were asked which of these three categories they were in.

Data were examined using statistical software (SPSS version 12, SPSS Inc, Chicago, USA). The differences between income level were tested statistically using the Spearman correlation for the association between CPITN scores and income level.

The study was approved by the Department of the Trust who gave ethical approval.

Results

All 928 patients aged 35-44 years-old who attended the four clinics during the study period agreed to participate in the study. The locations where they were examined (urban/rural, gender and economic status are presented in *Table 1*.

1. The prevalence of periodontal diseases as assessed using the CPITN.
- 84 patients (9.1%) were assessed as having a CPITN score of 0
- 201 patients (21.7%) were assessed as having a CPITN score of 1
- 502 patients (54%) were assessed as having a CPITN score of 2
- 117 patients (12.7%) were assessed as having a CPITN score of 3
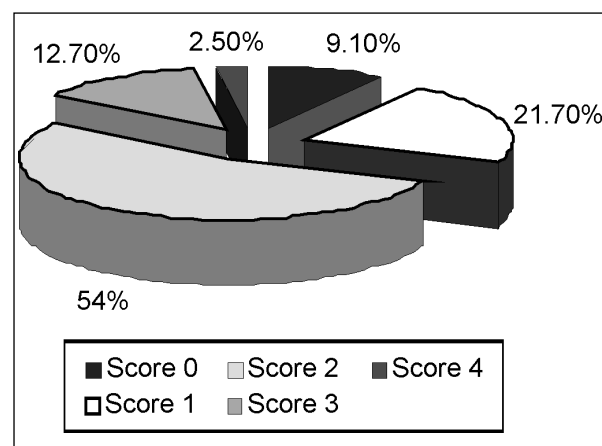- 24 patients (2.5%) were assessed as having a CPITN score of 4 *(Figure 1)*

Figure 1. *CPITN Scores of the patients examined*

The 24 patients who were assessed as having a CPITN score of 4 may well be at risk of losing at least one tooth due to periodontal breakdown in the future as they had at least one site with a pocket depth greater than 6 mm. The 117 patients who were assessed as having a CPITN score of 3 may have sites where periodontal breakdown could progress. Thus a maximum of 141 (15.2%) of the population of 35-44 year-olds examined could be

Table 1. *Socio-demographic characteristics of the sample population*

| | Female | Male | Urban area | Rural area | INCOME LEVEL | | |
					LOW: <500 lei	MEDIUM: 500-1000 lei	HIGH: >1000lei
Nr.	454	474	491	437	180	437	311
%	*49.08*	*50.98*	*53.33*	*46.66*	*19.5*	*47*	*43.5*
Total				928			

described as probably having some periodontal breakdown in their mouths.

2. CPITN and gender distribution.

The distribution of CPITN scores for male and female patients is presented in *Figure 2*. The percentage of patients with a healthy periodontal status (CPITN score = 0) was higher in males (10.1 %) than 38 in the females (7.9%). There were similar findings for the CPITN scores of 2, in that 55% of males as opposed to 52.9% of females were assessed as having this score, CPITN 3 (males 14.3%:females: 11.2%) and CPITN 4 (males 3.4%: females 1.5%). Only for those assessed with a CPITN score of 1 was there a higher percentage of females: 26.4% v 17.1% males.

3. CPITN and income level.

Of the 928 patients 311 (43.5%) were in the highest income level group, 437 (47%) were in the middle income group and 180 (19.5%) were in the lowest income group. Of the 84 patients assessed as having a healthy periodontal status (CPITN score 0) 43 were from the highest income group, 37 from the medium income group and 4 from the lowest income group.

Of the 201 patients assessed as having a CPITN score of 1, 96 were from the highest income group, 88 were from the medium income group and 17 from the lowest income group.

Of the 502 patients assessed as having a CPITN score of 2, a total of 162 were from the highest income group, 229 from the medium income group and 111 from the lowest income group.

Table 2. Spearman correlation between CPITN and income level

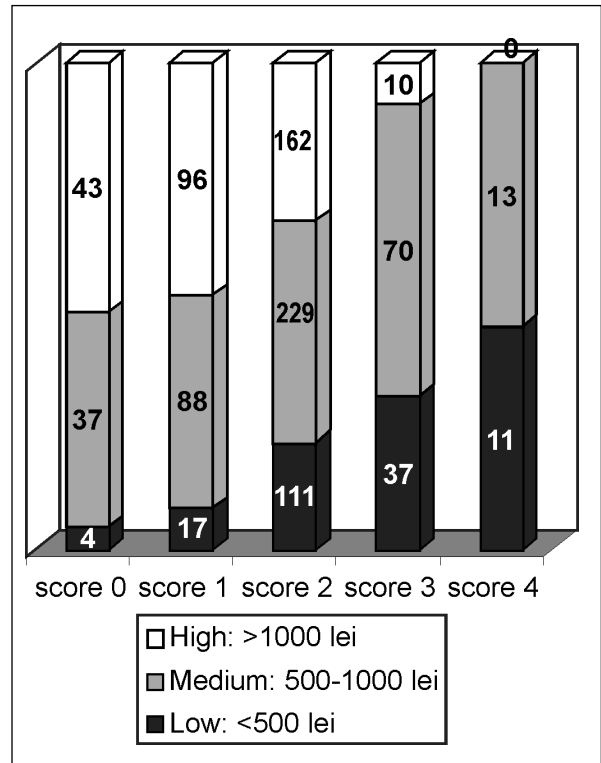| Bivariate Correlation	Correlation coeficient	p value	CI
Spearman	-0.30	0.001	95%

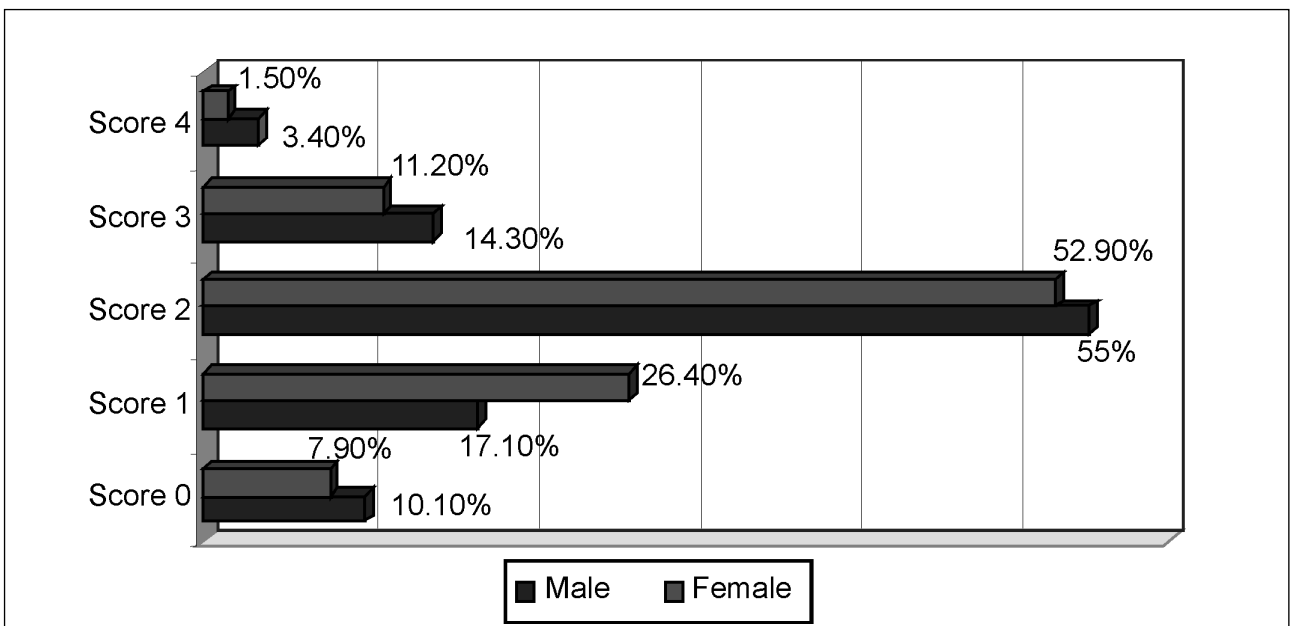**Figure 3.** *CPITN Scores by Income Level (3lei = US$ 1)*

Figure 2. *CPITN scores by gender*

Of the 117 patients assessed as having a CPITN score of 3, 10 were from the highest income group, 70 were from the medium income group and 37 were from the lowest income group.

Of the 24 patients assessed as having a CPITN score of 4, none were from the highest income group, 13 were from the medium income group and 11 were from the lowest income group. These data expressed as percentages can be seen in *Figure 3.* It is very noticeable that as CPITN scores rose there was a decrease in the percentage of patients from the highest income level group and an increase in the percentage of patients from the lowest income group. When statistically tested using Spearman's correlation a statistically significance threshold of 0.001 was obtained and a correlation coefficient r = -0.30. These results confirm the association between the two variables.

Discussion

In this study income level was used as a proxy for socio-economic status. It has previously been claimed to represent one of the risk predictors for periodontal disease. The CPITN was used in this study as it is easy to use. However, it is accepted that the CPITN has its limitations and only assesses gingival bleeding, calculus, and pockets. The CPITN was originally designed for assessment of treatment needs, the cumulative effect of periodontal destruction over time such as attachment loss, recession, furcation involvement and loss of alveolar bone are not assessed by the index scores that were obtained. It is only possible to compare the results of this study with one previous Romanian study (Petersen and Tănase, 1997) [11] which was performed in Bucharest. The results of this study [11] suggested that 72.2% of 35-44 year-olds had a CPITN score of 2, a higher percentage than the 54% in the current study.

At one level, as only 9.1% of patients were assessed as having a CPITN score of 0, it could be claimed that 90.9% of the 35-44 year-olds studied required some treatment for their periodontium. Of these 21.7% had chronic gingivitis without calculus or any pocketing and required just simple measures of oral hygiene, a further 54% had calculus and/or restoration overhangs, which again required relatively simple treatment. Only 15.2% had at least one pocket of greater depth than 3.5mm and only 2.5% at least one pocket of greater depth than 5.5mm. These data suggest that relatively few of the patients assessed were at a high risk of losing teeth in the future due to periodontal breakdown. It should be noted that the comparability of data from CPITN studies has been questioned [15] as has its reliability as an epidemiological tool [16]. Nevertheless, there have been a large number of CPITN based studies in European countries in which the score 2 predominates [17], such as in Denmark, Finland, Portugal, Spain, Great Britain, Poland and Hungary [17]. The results of the current study for a CPITN score of 2 are therefore in agreement with these previous studies. The finding that those from the socio-economically deprived section of the community (in this study, those with a low income) were more prone to periodontal breakdown mirrors the results of previous studies [8, 18], as does the finding that 35-44 year-olds males were more likely to have pockets of 5.5mm or deeper than females, a similar situation to that found in an Australian study [18]. In contrast in a study in the United States of America, this finding was reversed and the female population appeared to be more prone to deep pockets [19]. This finding may be due to cultural and racial differences.

Finally, it must be accepted that a low income level may well be one of a number of adverse factors that predisposed those in this group to a higher prevalence of periodontal pockets than those in the highest income group.

Conclusions

1. The majority of the 35-44 year-old patients studied were assessed as having a CPITN score of 2. Fifteen per cent of patients were assessed as having at least one pocket of 3.5mm or greater depth. However, only 2.5% were assessed as having a pocket or pockets of 5.5mm or greater depth

2. Patients with a low income level were statistically more likely to have a CPITN score of 3 or 4 than those from the highest income level.

3. This result suggests that in the patients studied, a low level of income represented a risk factor which is inversely proportionally correlated to deep pockets and for those with the highest income the prevalence of pockets decreased.

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