

Quality of Life in Patients with Sepsis of Oral and Maxillofacial Origin

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Abstract

Purpose: This prospective study means to analyse the perception of an individual in relation to the daily limitations that are caused by the oral and maxillofacial health issues, for the patients with cu sepsis and also to study the causal relation between disease and the incriminated risk factors (factors in the residence, collectivity, job environment, behavioural factors).

Material and methods: The study group was made of 50 patients, sex ratio 1:1, aged between 20-54, hospitalized at the Clinic of Oro-Maxillofacial Surgery from "Sf. Spiridon" Emergency Clinical County Hospital Iași in the period of time between 2015 and 2016, with sepsis that has an oral and maxillofacial entrance point. The quality of life was assessed by using the OHIP-14 questionnaire, to outline the impact of oral health on the quality of life.

Results: 57% of the subjects feel a functional limitation, 60% pain, 57.4% physical disabilities, 55.4% psychological disabilities, 59.4% social disabilities and 54.6% handicap.

Conclusions: The sepsis patients with an oral and maxillofacial entrance point have a moderately affected quality of life, especially for the age group 40-49. From the patients that felt pain, 56.4% also shoed social disabilities, 41.9% psychological disabilities and 35.6% physical disabilities. The handicap was associated with psychological disabilities (43.8%), physical disabilities (40.3%), and social disabilities (33.2%). Knowing the most frequent disabilities associated with the disease allows the clinician to adapt the monitoring programmes for each individual, in order to decrease the negative impact on the quality of life.

Keywords: Sepsis, Oro-maxillofacial, Quality of life

Introduction

The quality of life in relation to oral health is a new concept, but it grows rapidly. Contrary to the initial vision, according to which most diseases with oral entrance point are not life-threatening and do not cause obvious changes on the people affected, the concept of quality of life in relation to oral health grew more and more, in response to the need of showing people's perception or daily limitations caused by the oral health problems [1].

We have to mention the following studies on the relationship between dental diseases and the quality of life: Reisine [2] investigated productivity loss following dental problems, and Cushing, *et al.* [3] described the prevalence of food restrictions, pain, discomfort and aesthetic discontent caused by dental disorder. Locker and Grushka [4] reported the impact of oral and facial pain on the loss of work days, sleep disorders, eating habits, bed rest, prolonged house rest and a decrease in the social contacts.

Systemic bacterial infections represent an important chapter of infectious pathology due to the increasing incidence, the gravity of the clinical picture, the difficulty in establishing an etiologic diagnosis, the relatively limited therapeutic possibilities (generated by pan resistant strains) and significant mortality.

Martin and colab. Report an increase with 8,7% in the number of systemic bacterial infections between 1979 and 2000, from 164,000 to 660,000 cases [5]. In another study, Klevens and colab. also estimate a constant increase of 3.1% a year in the incidence of sepsis cases, within a modern medical system [6].

According to the data published by the World Health Organization (WHO) over 1400 people around the world die every day because of a severe sepsis. The prognosis is more reserved for those who associate risk factors like: old age, immune depression, polymicrobial infections. The fact that some modern techniques of etiologic identification were introduced in current practice and also the use of schemes of treatment that are adapted to the sensitivity profile of an infected strain did not lead to a spectacular decrease in the lethality by this cause.

Sometimes, in certain epidemiologic conditions, staphylococcal colonization strains may become responsible for the appearance of a variety of diseases: from localized infections, to severe forms of sepsis. Polymorphism and the lack of specificity for the symptoms make it difficult to differentiate between the different categories of the disease and also to identify the associated comorbidities. In this context a thorough medical history and a complete physical examination have the role to give further information that will help identify the patients with risk.

Considering these aspects, the present research is oriented towards developing new lab techniques that will allow a shorter time needed to isolate the infected strains and to test sensitivity to antibiotics. The alarming increase in the rate of resistance of staph and also of some negative Gram bacteria imposes a permanent reassessment of the treatment schemes used. In the case of the immune-depressed patients the emergency conduct plan must control the infectious process and also correct the associated imbalances (the treatment of background conditions) [7,8].

Implementation of global strategies for the prevention of bacterial infections continues to provoke much controversy. Data from the literature on risk factors and management options are limited and often difficult to interpret [9,10,11].

The favourable evolution of the disease depends on how early the etiologic diagnosis was established and also on the moment when the adequate therapy was initiated, and is also corroborated with the established impact of oral diseases on the individual and the community.

Purpose and Objectives

The purpose of this study was to analyse the impact of sepsis diagnosis with an oral and maxillofacial entrance point on oral health and the way it influences the quality of life, compared on genders, age groups and living environments, in order to describe their particularities and to start some individualized prevention programmes.

Material and Methods

The observational study was made on a group of 50 patients, hospitalized in the Clinic of Oral and Maxillofacial Surgery from "St. Spiridon" Emergency Clinical County Hospital Iași in the period of time between 2015 and 2016. The criteria for inclusion of patients in the study group were: age over 18; the certainty of the diagnostic that is proven by meeting clinical and lab parameters (bacteriologic, hematologic, biochemical and imagistic investigations) and signing the form of informed consent.

OHIP questionnaire was applied in order to establish the global status of oral health assessment (OHRQoL – Oral Health-Related Quality of Life) by using 7 fields: functional limitation, physical pain, psychological discomfort, physical disabilities, psychological disabilities, social disabilities and handicap (Table 1).

| Parameter | Scale | Number of questions | Question rank | Number of the question |
|---------------------------|--------|---------------------|---------------|------------------------|
| Oral Health Global Status | OHRQoL | 14 | 5 | 1-14 |
| Functional Limitation | FL | 2 | 5 | 1, 2 |
| Pain | P | 2 | 5 | 3, 4 |
| Psychological Discomfort | PD | 2 | 5 | 5, 6 |
| Physical Disability | PhD | 2 | 5 | 7, 8 |
| Psychological Disability | PsD | 2 | 5 | 9, 10 |
| Social Disability | SD | 2 | 5 | 11, 12 |
| Handicap | H | 2 | 5 | 13, 14 |

Table 1: OHIP-14 Score.

The principle of scores: the same questionnaire is applied to all the cases and the primary score is calculated for each particular case; the scale of standardized scores varies from 0 to 70, a small score represents the state of “better” as global status of oral health [12].

In statistical analyses we used both descriptive and analytic methods with a significance value of 95%. The data were centralized in SPSS 18.0 database and were processed using the appropriate statistical functions, t-Student/ F ANOVA test, Spearman Scale and correlation coefficient for reliability analysis.

Results and Discussion

The study group (n = 50) was homogenous:

1. Gender distribution: 25 women and 25 men, sex ratio 1:1,
2. The patients’ age was between 20 and 64, without significant gender differences of the mean age (45.36 vs 44.88 years old; p = 0,886),
3. The patients’ residence was: 54% urban vs 46% rural (Table 2).

| Gender | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Min | Max | Test t-Student P |
|--------|----|-------|----------------|------------|----------------------------------|--------|-----|-----|------------------|
| | | | | | -95%CI | +95%CI | | | |
| Male | 25 | 45.36 | 10.50 | 2.10 | 41.03 | 49.69 | 25 | 63 | 0.886 |
| Female | 25 | 44.88 | 12.84 | 2.57 | 39.58 | 50.18 | 20 | 64 | |
| Total | 50 | 45.12 | 11.61 | 1.64 | 41.82 | 48.42 | 20 | 64 | |

Table 2: Descriptive age indicators (years) compared on gender.

Validating the questionnaire

The inter-correlation matrix indicated the degree of association between items. The values are useful for proving that there are no problems in building those items and that there is no high degree of similarity. Cronbach alfa value = 0.830 represents an acceptable value in relation to the threshold that is required (0.700) to validate this questionnaire (Table 3).

| Inter-Term Correlation Matrix | | | | | | | | | | | | | | |
|-------------------------------|--------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|
| | q1 | q2 | q3 | q4 | q5 | q6 | q7 | q8 | q9 | q10 | q11 | q12 | q13 | q14 |
| q1 | 1.000 | 0.427 | 0.283 | 0.247 | 0.045 | 0.122 | 0.049 | -0.076 | -0.24 | 0.086 | 0.006 | -0.136 | -0.43 | 0.016 |
| q2 | 0.427 | 1.000 | 0.491 | 0.334 | 0.236 | 0.505 | 0.343 | 0.255 | 0.065 | 0.392 | 0.246 | 0.449 | 0.243 | 0.217 |
| q3 | 0.283 | .491 | 1.000 | 0.451 | 0.021 | 0.252 | 0.279 | 0.150 | 0.194 | 0.361 | 0.259 | 0.431 | 0.115 | 0.278 |
| q4 | 0.247 | 0.334 | 0.451 | 1.000 | 0.305 | 0.151 | 0.369 | 0.451 | 0.277 | 0.335 | 0.553 | 0.392 | 0.170 | 0.219 |
| q5 | 0.045 | 0.236 | 0.021 | 0.305 | 1.000 | 0.371 | 0.407 | 0.368 | 0.205 | 0.151 | 0.269 | 0.182 | 0.386 | 0.305 |
| q6 | 0.122 | 0.505 | 0.252 | 0.151 | 0.371 | 1.000 | 0.075 | 0.278 | 0.231 | 0.434 | 0.124 | 0.128 | 0.255 | 0.141 |
| q7 | 0.049 | 0.343 | 0.279 | 0.369 | 0.407 | 0.075 | 1.000 | 0.382 | 0.304 | 0.173 | 0.408 | 0.384 | 0.429 | 0.384 |
| q8 | -0.076 | 0.255 | 0.150 | 0.451 | 0.368 | 0.278 | 0.382 | 1.000 | 0.352 | 0.275 | 0.663 | 0.357 | 0.362 | 0.092 |
| q9 | -0.024 | 0.065 | 0.194 | 0.277 | 0.205 | 0.231 | 0.034 | 0.352 | 1.000 | 0.157 | 0.144 | 0.211 | 0.389 | 0.143 |
| q10 | 0.086 | 0.392 | 0.361 | 0.335 | 0.151 | 0.434 | 0.173 | 0.275 | 0.157 | 1.000 | 0.175 | 0.250 | 0.280 | 0.300 |
| q11 | 0.006 | 0.246 | 0.259 | 0.553 | 0.269 | 0.124 | 0.408 | 0.663 | 0.144 | 0.175 | 1.000 | 0.219 | 0.210 | 0.135 |
| q12 | -0.136 | 0.449 | 0.431 | 0.392 | 0.182 | 0.128 | 0.384 | 0.357 | 0.211 | 0.250 | 0.219 | 1.000 | 0.375 | 0.351 |
| q13 | -0.043 | 0.243 | 0.115 | 0.170 | 0.386 | 0.255 | 0.429 | 0.362 | 0.389 | 0.280 | 0.210 | 0.375 | 1.000 | 0.346 |
| q14 | 0.016 | 0.217 | 0.278 | 0.219 | 0.305 | 0.141 | 0.384 | 0.092 | 0.143 | 0.300 | 0.135 | 0.351 | 0.346 | 1.000 |

Table 3: The matrix of correlation for the items in OHIP-14 questionnaire.

The Covariance matrix is calculated and used in the analysis.

Domain of Functional Limitation

Q1: Did you have trouble pronouncing any word because of problems with your teeth, mouth or dentures?

Problems with pronunciation caused by dental diseases were frequently met, in 30% of the patients.

Question 2: Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?

Taste was strongly influenced by oral and dental problems for 42% of the patients who responded the questionnaire (Figure 1).

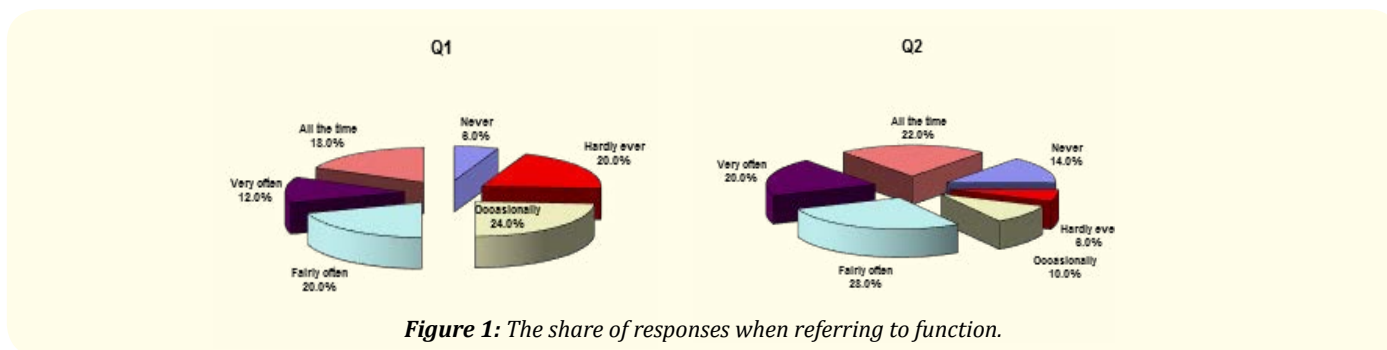


Figure 1: The share of responses when referring to function.

The score for the functional limitation varied from 1 to 10, showing the fact that about 57% of the subjects feel a functional limitation very often, without significant gender differences (58.4% vs 54.8%; p = 0.641) or residence (60.0% vs 54.6%; p = 0.338). When referring to age groups, we notice that about 69% of the subjects aged between 40 and 60 feel great functional limitation, when compared with younger patients, where the score was significantly reduced, 64% of the patients aged between 20 and 29 almost never feel functional limitation (p = 0.014).

Domain of Pain

Question 3: Have you had pain or ache in your mouth?

48% of the subjects often felt pain in the oral cavity.

Question 4: Did you find it uncomfortable to eat any food because of problems with your teeth, mouth or dentures?

38% of the subjects felt discomfort during mastication, which was caused by their oral and dental problems (Figure 2).

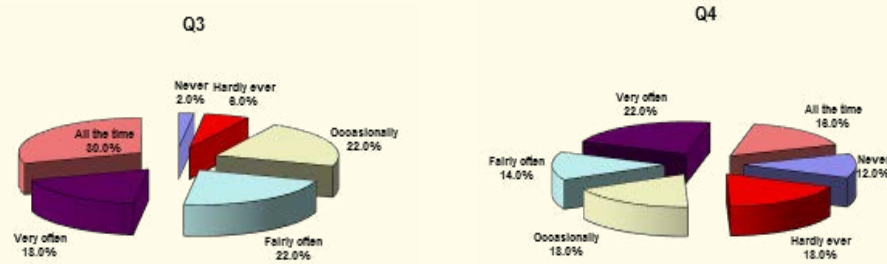


Figure 2: The share of responses when referring to pain.

The score for pain varied from 0 to 10 showing the fact that 60% of the subjects feel pain quite often, with no significant differences on gender (59.2% vs 61.2%; $p = 0.789$), age group (varies from 40% to 75.4%; $p = 0.706$) or residence (62.6% vs 57.4%; $p = 0.486$).

Domain of Psychological Discomfort**Question 5: Have you felt self-conscious because of problems with your teeth, mouth or dentures?**

About 36% of the patients inquired showed psychological consequences caused by oral and dental problems.

Question 6: Have you felt tense because of problems with your teeth, mouth or dentures?

54% of the subjects had a frequent state of tension caused by the dental problems (Figure 3).

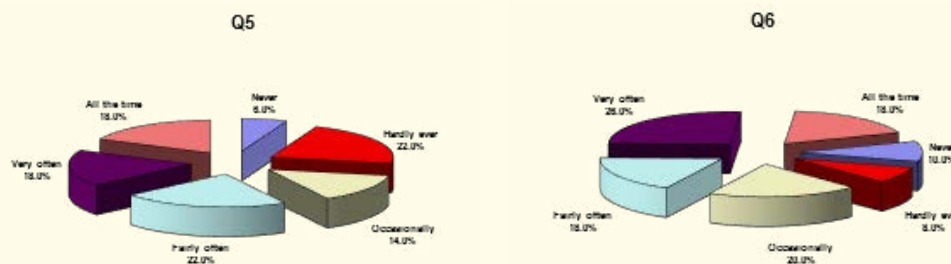


Figure 3: The share of the answers depending on psychological discomfort.

The score for psychological discomfort varied from 0 to 10 showing the fact that 57.4% of the subjects feel great discomfort, with no significant differences on gender (54.4% vs 60.4%; $p = 0.419$), age groups (with variations between 45.7 and 67.7%; $p = 0.338$) or residence (58.1% vs 56.5%; $p = 0.828$).

Domain of Physical Disability**Question 7: Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?**

38% of the patients were forced to have a poor diet, because of the oral and maxillofacial problems.

Question 8: Have you had to interrupt meals because of problems with your teeth, mouth or dentures?

The meals were interrupted more frequently because of the oral and dental problems for 54% of the responding subjects (Figure 4).

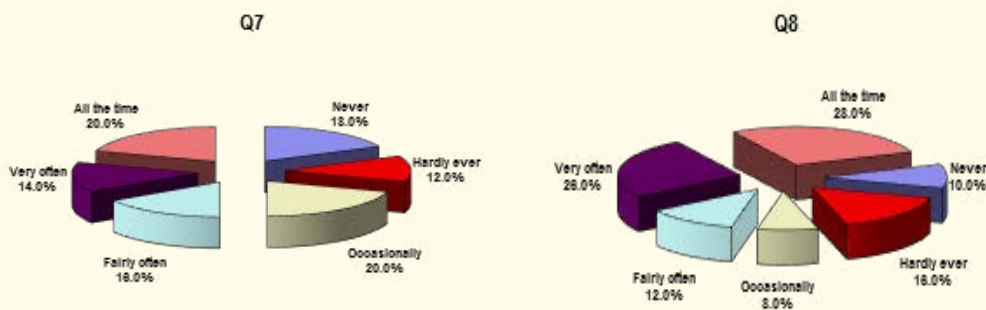


Figure 4: The share of responses on physical disabilities.

The score for physical disabilities showed the fact that 56.8% of the subjects feel physical disabilities quite often, with no significant differences on gender (55.2% vs 58.4%; $p = 0.702$) or residence (56.3% vs 57.4%; $p = 0.896$). When talking about age groups, we notice a more frequent state of illness for the age group 30-39 years old (72.7%), but 76% of the patients aged between 20 and 29 felt occasional physical disabilities ($p = 0.02$).

Domain of Psychological Disability

Question 9: Have you found it difficult to relax because of problems with your teeth, mouth or dentures?

38% of the subjects reported that they find it very difficult to rest very often or even all the time.

Question 10: Have you been a bit embarrassed because of the problems with your teeth, mouth or dentures?

A share of 34% of the patients declared that they feel embarrassed by their oral and maxillo-facial problems (Figure 5).

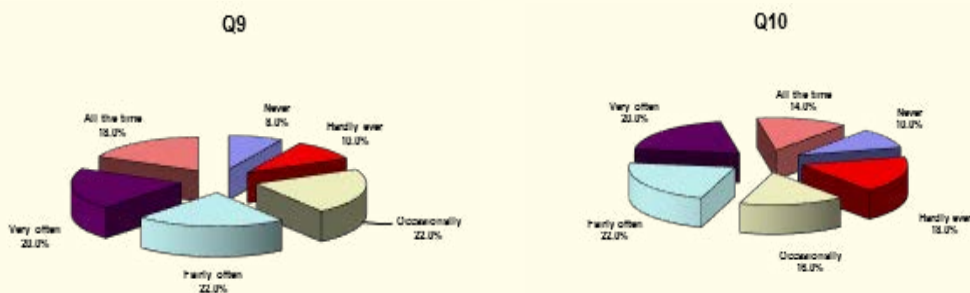


Figure 5: The share of responses on psychological disabilities.

The score for psychological disabilities varied from 0 to 9 showing the fact that 55.6% of the subjects feel great psychological disabilities, without significant differences on gender (56.0% vs 55.2%; $p = 0.287$), age group (shares between 42% and 63.8%; $p = 0.415$) or residence (53.7% vs 57.8%; $p = 0.542$).

Domain of Social Disability

Question 11: Have you been a bit irritable with other people because of the problems with your teeth, mouth or dentures?

36% of the subjects showed often or all the time a state of irritation towards other people, which was caused by their oral and maxillo-facial problems.

Question 12: Have you had difficulty doing your usual job because of problems with your teeth, mouth or dentures?

46% of the patients with oral and maxillofacial problems (Figure 6) experienced difficulties in doing their usual job.

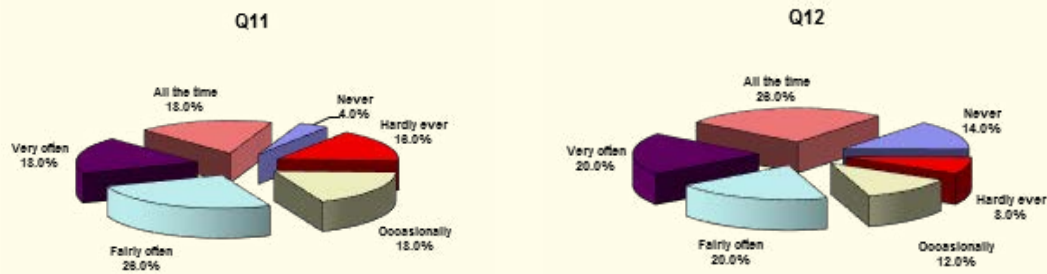


Figure 6: The share of responses on social disabilities.

The score for social disabilities varied from 1 to 9, showing the fact that 59.4% of the subjects feel social disabilities quite often, with no significant differences on gender (57.6% vs 61.2%; $p = 0.615$), age groups (1 the interval 44% - 64.30%; $p = 0.597$) or residence (58.5% vs 60.4%; $p = 0.790$).

Domain of Handicap

Question 13: Have you felt that life in general is more or less satisfying in spite of the problems with your teeth, mouth or dentures?

38% of the questioned patients were frequently dissatisfied by the oral or maxillofacial problems.

Question 14: Have you been totally unable to function because of problems with your teeth, mouth or dentures?

34% of the questioned subjects (Figure 7) were often or all the time unable to function and perform the usual activities.

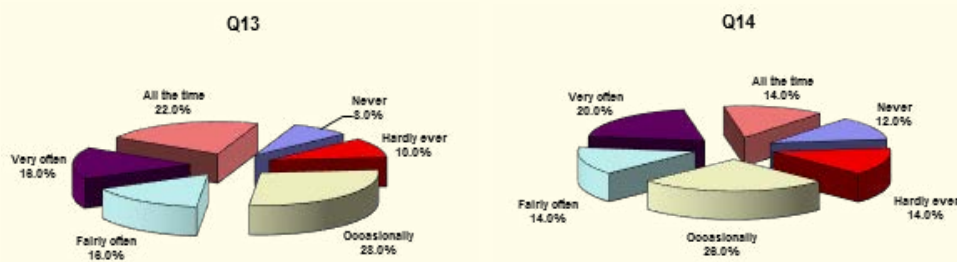


Figure 7: The share of responses on presence of the handicap.

The score for handicap varied from 0 to 10 showing the fact that 54.6% of the subjects feel a handicap quite often, with no significant differences on gender (57.3% vs 52.0%; $p = 0.485$), age group (38% - 70%; $p = 0.073$) or residence (54.8% vs 54.3%; $p = 0.950$).

Scores correlation between domains, results that can be extrapolated to the general population:

- 43.4% of the subjects who felt pain, ($p = 0.002$), and also 31.8% of the subjects with psychological disabilities ($p = 0.024$) declare functional limitation;
- From the patients who felt mostly pain, 56.4% showed social disabilities ($p = 0.001$), 35.6% physical disabilities ($p = 0.011$) and 41.9% psychological disabilities ($p = 0.002$);
- From the patients with handicap, 43.8% associated psychological disabilities ($p = 0.001$), 40.3% physical disabilities ($p = 0.004$) and 33.2% social disabilities ($p = 0.018$) (Table 4).

| Correlations | | | | | | | | | |
|----------------|-----|-------------------------|---------|---------|--------|---------|---------|---------|---------|
| | | FL | P | PD | PhD | PsD | SD | H | |
| Spearman's rho | FL | Correlation Coefficient | 1.000 | 0.434** | 0.318* | 0.224* | 0.188 | 0.190 | 0.165 |
| | | S8ig. (2-tailed) | - | 0.002 | 0.024 | 0.118 | 0.191 | 0.187 | 0.252 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | P | Correlation Coefficient | 0.434** | 1.000 | 0.142 | 0.419** | 0.356* | 0.564** | 0.213 |
| | | Sig. (2-tailed) | 0.002 | - | 0.325 | 0.002 | 0.011 | 0.000 | 0.137 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | PD | Correlation Coefficient | 0.318* | 0.142 | 1.000 | 0.304 | 0.310 | 0.118 | 0.359 |
| | | Sig. (2-tailed) | 0.024 | 0.325 | - | 0.032 | 0.028 | 0.415 | 0.010 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | PhD | Correlation Coefficient | 0.224 | 0.419** | 0.304* | 1.000 | 0.349* | 0.566** | 0.438** |
| | | Sig. (2-tailed) | 0.118 | 0.002 | 0.032 | - | 0.013 | 0.000 | 0.001 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | PsD | Correlation Coefficient | 0.188 | 0.356* | 0.310* | 0.349* | 1.000 | 0.169 | 0.403** |
| | | Sig. (2-tailed) | 0.191 | 0.011 | 0.028 | 0.013 | - | 0.241 | 0.004 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | SD | Correlation Coefficient | 0.190 | 0.564** | 0.118 | 0.566** | 0.169 | 1.000 | 0.332* |
| | | Sig. (2-tailed) | 0.187 | 0.000 | 0.415 | 0.000 | 0.241 | - | 0.018 |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | H | Correlation Coefficient | 0.165 | 0.213 | 0.359 | 0.438** | 0.403** | 0.332* | 1.000 |
| | | Sig. (2-tailed) | 0.252 | 0.137 | 0.010 | 0.001 | 0.004 | 0.018 | - |
| | | N | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Table 4: Correlation among the domains of oral health.

**Correlation is a significant at the 0.01 level (2-tailed).

*Correlation is a significant at the 0.05 level (2-tailed).

Quality of Life

The Score for quality of life varied from 6 to 57, the mean score showing a moderately altered quality of life (mean score 40.06 from a maximum 70).

Depending on socio-demographic characteristics, we noticed the following aspects:

1. there were no significant differences between genders (39.80 vs 40.32; p = 0.885);
2. on age groups there was a significantly increased mean score for the group 40-49 years old (47.23; p = 0.012);
3. there were no significant statistical differences involving the residence of the subjects (40.41 vs 39.65; p = 0.834) (Table 4, Figure 8).

| Characteristics | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Min | Max | p for F _{ANOVA} Test |
|-----------------|----|-------|----------------|------------|----------------------------------|--------|-----|-----|-------------------------------|
| | | | | | -95%CI | +95%CI | | | |
| All cases | 50 | 40.06 | 12.49 | 1.77 | 36.51 | 43.61 | 6 | 57 | - |
| Gender | | | | | | | | | 0.885 |
| Male | 25 | 39.80 | 12.51 | 2.50 | 34.64 | 44.96 | 8 | 55 | |
| Female | 25 | 40.32 | 12.71 | 2.54 | 35.07 | 45.57 | 6 | 57 | |
| Age groups | | | | | | | | | 0.012 |
| 20-29 y | 5 | 27.00 | 18.28 | 8.17 | 4.31 | 49.69 | 6 | 41 | |
| 30-39 y | 11 | 43.00 | 8.59 | 2.59 | 37.23 | 48.77 | 28 | 53 | |
| 40-49 y | 13 | 47.23 | 8.64 | 2.40 | 42.01 | 52.45 | 28 | 57 | |
| 50-59 y | 14 | 38.43 | 11.99 | 3.20 | 31.50 | 45.35 | 13 | 53 | |
| 60-69 y | 7 | 34.71 | 12.55 | 4.74 | 23.10 | 46.32 | 9 | 47 | |
| Residence | | | | | | | | | 0.834 |
| Urban | 27 | 40.41 | 13.25 | 2.55 | 35.17 | 45.65 | 6 | 57 | |
| Rural | 23 | 39.65 | 11.81 | 2.46 | 34.55 | 44.76 | 8 | 57 | |

Table 5: Descriptive indicators of the quality of life score, depending on the demographic characteristics.

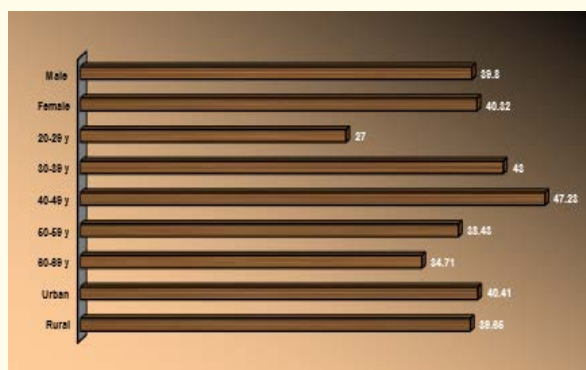


Figure 8: Mean score of quality of life (OHRQoL) depending on demographic characteristics.

An observational study regarding the effects of oral disorders which was performed on 3033 subjects who were interviewed over the phone in 2009 by David Locker, concludes that one in 5 Canadian adults (20%) said they faced functional limitation and social and psychological impact because of these disorders [13].

Cohen-Carneiro F, *et al.* (2010) report good stability and internal consistency (ICC = 0.97; Cronbach’s alpha = 0.89) following a cross-sectional study in a consecutive sample (n = 126). The prevalence of oral impacts was greater in the community far from the urban centre [70.3 (59.9-80.7)] than in the community closer to it [44.3 (30.7-57.7)], and in women [66.7 (56.0-77.3)] in comparison with men [49.1 (35.3-62.7)]. The OHIP-14 adapted to rural populations in Amazonas State was valid, reproducible, and consistent. There was high prevalence of impacts, especially for riverine communities that lived far from urban centres [14].

Conclusions

In the present study, the age group 40-49 was the most affected, as it recorded a significantly higher OHRQoL score. There were no significant differences in the quality of life on genders residence.

From the patients with pain, 56.4% showed social disabilities, 41.9% psychological disabilities and 35.6% physical disabilities. These results can be extrapolated to the general population.

The handicap was associated with psychological disabilities (43.8%), physical disabilities (40.3%) and social disabilities respectively (33.2%).

The data presented illustrate the negative impact of oral and maxillofacial disorders on the quality of life, when they are the cause of a severe disease or of a disease that is potentially severe, such as sepsis. This requires monitoring programmes for the patients with such disorders, so that, by using individualized care plans, they will be able to overcome the changes they and their families go through.

The OHP-14 that we used as tool in measuring the impact or oral and maxillofacial disorders in patient's quality life and was able to correctly appreciate the relation between different factors and can be considered an efficient instrument to assess the impact of sepsis, as complication of these clinical entities. On the other hand, as other authors' opinion, the scores of OHIP-14 were to be interpreted in the patient's disorders context.

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