

UNMET DENTAL TREATMENT NEED IMPAIRS QUALITY OF LIFE IN HEPATITIS C VIRUS-INFECTED PATIENTS

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ABSTRACT

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Introduction The hepatitis C virus (HCV) infection is a health condition affecting 3% of the world population, which oral manifestations and associated factors interest both physicians and dentists. The aim of this work was to describe the dental treatment need and the impact of the perception of the oral component of health on the quality of life in HCV+ patients.

Methodology Descriptive study on a convenience sample. 45 HCV+ patients (46±5 y.o.) completed the OHIP-14 questionnaire, which consists of 14 questions grouped in 7 domains (D1 functional limitation, D2 physical pain, D3 psychological discomfort, D4 physical disability, D5 psychological disability, D6 social disability and D7 general disability). The participants indicated their responses using a Likert-type frequency scale. The Community Caries Index of Treatment Need (CCITN) was determined for each patient. The proportion and CI95% of the social impact on the quality of life were calculated. The association between CCITN and the quality of life was assessed by Chi² (p<0.05).

Results The CCITN was 11 (8-14). The overall social impact was 38% (24-52%). The increasing order relationship of the impact on each of the domains was D1, D7, D6, D4, D5, D2, D3. A significant association between oral health-related quality of life and CCITN was observed (Chi² = 7.57, p = 0.006), showing greater impairment of the quality of life as the treatment need increased.

Conclusion The association between CCITN and quality of life becomes evident using OHIP-14 during dental appointments. The results suggest the need for comprehensive interventions during the provision of oral health care to HCV+ patients.

KEYWORDS

Dental Care; Hepatitis C; Medical Risk; Oral Medicine; Quality of Life.

1. INTRODUCTION

The hepatitis C (HCV) viral infection affects 175 million subjects over the world, that is, 3% of its population; and, three millions of new infections are reported each year [1]. Chronic liver pathology consequent to HCV has been reported in eighty percent of the infected patients. If no treatment is administered, close to 25% of patients progresses to liver cirrhosis [2]. Once cirrhosis has been diagnosed,

the incidence of hepatocellular carcinoma, one of the main indications of liver transplant, is 3-5% per year [3]. In Latin America and the Caribbean region HCV infected patients are estimated at 7.8 million [4]. In Argentina HCV is considered a low prevalence infection, with an approximate value of 1.2%, which increases in overcrowded dwelling conditions up to 3.6%. Males (3.4%) are more affected than females (2.5%) [5]. The infection risk rate has also been studied in South American countries. The



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Table 1. Description of the Community Caries Index of Treatment Need (CCITN).

Health condition	Score	Needed treatment
Healthy mouth with preventive treatment	00	No treatment needed
Healthy mouth without preventive treatment	01	Basic preventive plan
Healthy mouth with dental white spots/ deep grooves	02	Additional preventive plan including the sealing of dental grooved and fissures
Amelo-dentinal tooth decay in 1 quadrant of the mouth	03	Additional preventive plan + restorative treatment in 1 quadrant
Amelo-dentinal tooth decay in 2 quadrant of the mouth	04	Additional preventive plan + restorative treatment in 2 quadrants
Amelo-dentinal tooth decay in 3 quadrant of the mouth	05	Additional preventive plan + restorative treatment in 3 quadrants
Amelo-dentinal tooth decay in 4 quadrant of the mouth	06	Additional preventive plan + restorative treatment in 4 quadrants
Pulp disease in 1 quadrant of the mouth	07	Additional preventive plan + pulp treatment in 1 quadrant of the mouth + restorations
Pulp disease in 2 quadrants of the mouth	08	Additional preventive plan + pulp treatment in 2 quadrants of the mouth + restorations
Pulp disease in 3 quadrants of the mouth	09	Additional preventive plan + pulp treatment in 3 quadrants of the mouth + restorations
Pulp disease in 4 quadrants of the mouth	10	Additional preventive plan + pulp treatment in 4 quadrants of the mouth + restorations
Missed teeth in 1 quadrant of the mouth	11	Additional preventive plan + pulp treatment + tooth removal + prosthesis rehabilitation in 1 quadrant of the mouth
Missed teeth in 2 quadrants of the mouth	12	Additional preventive plan + pulp treatment + tooth removal + prosthesis rehabilitation in 2 quadrant of the mouth
Missed teeth in 3 quadrants of the mouth	13	Additional preventive plan + pulp treatment + tooth removal + prosthesis rehabilitation in 3 quadrant of the mouth
Missed teeth in 4 quadrants of the mouth	14	Additional preventive plan + pulp treatment + tooth removal + prosthesis rehabilitation in 4 quadrant of the mouth

nosocomial infection risk was the highest (45.3%), followed by sexual transmission (18.8%), unknown causes (12.5%), use of intravenous drugs (4.7%) and occupational exposure (4.7%) [6].

Extra hepatic manifestations of HCV infection include depression (25%) and diabetes (15%) as the most frequent ones, along with chronic renal disease, B-cells lymphoma, cutaneous porphyria and rheumatoid arthritis [7]. The oral manifestations of hepatic dysfunction include oral mucosa jaundice and petechiae, blood coagulation disorders, gingivitis and gum bleeding, perioral rash, atrophic tongue and hepatic halitosis. Xerostomia has been reported as a frequent symptom of HCV infection and Sjögren disease, and sialadenitis and oral lichen planus are more likely to occur [8,9]. Dry eye and mouth symptoms have been reported in 20-30% of HCV infected patients. However, less than 5% of Sjögren patients are also HCV patients [10]. As for the periodontal conditions of patients suffering from hepatic diseases, there are no updated reports focused on their association, but the development of specific research lines has been encouraged [11].

In this regard, the affected oral status described above may result in predisposing conditions for the development of periodontal disease and oral carcinogenesis. For this reason, the existence of an immunological link between HCV and periodontal health is being studied [12].

The health care of HCV infected patients is a matter of concern of both, physicians and dentists. The inclusion of the dental examination and treatment in the routine medical health care protocol for these patients has been proposed and the interdisciplinary collaboration between physicians and dentists has also been pointed out as mandatory [13]. However, little is known about the oral component of health in HCV patients.

This lack of updated knowledge motivated this investigation aimed at determining the need for dental treatment in HCV positive patients and the social perception they have of the oral component of health on their quality of life. Our hypothesis states that oral health conditions derived from HCV infection impair the quality of life of the affected subjects.

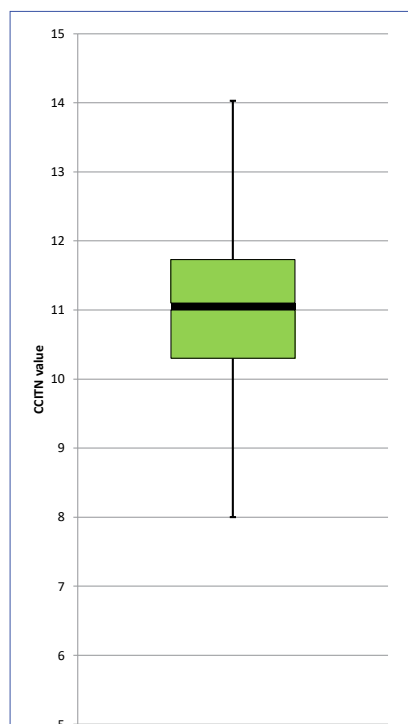


Figure 1. CCITN in HCV+ patients. Box plot of the distribution of the index obtained values showing median and range of the need for dental treatment in a sample of 45 infected subjects.

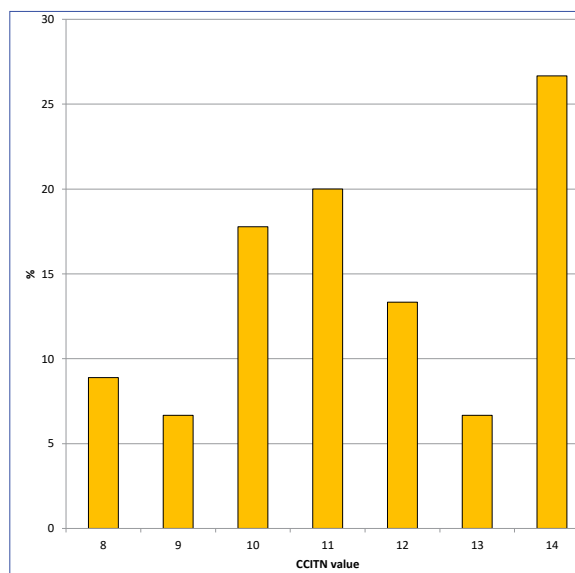


Figure 2. HCV+ patients need for dental treatment. Bar chart of the percent distribution of patients according to CCITN values (n = 45).

2. METHODOLOGY

The investigation was planned as a descriptive observational study including some preliminary analytical work regarding the prevalence of the need for dental treatment and its associated social impact on the quality of life of HCV+ patients. From this study population, a sample consisting of 45 patients was obtained through the non-probabilistic convenience sampling method. Thirty patients were males and 15 were females, with a mean age of 46 ± 5 y.o. Participants were recruited from patients with chronic moderate HCV infection referred to this Unit by their treating hepatologists for oral check-up. The reported time course of the infection was for all of them three years and the drug therapy they had received was interferon and rivabirin. All of the referred patients had health insurance, a formal employment, middle income and were high school graduates.

Patients coinfecting with HIV, users of nasal drugs, smokers and users of intravenous drugs (except for those rehabilitated five years prior to recruitment) were not included in this study. Recruitment was done at the High Risk Patients Dental Care Unit (CLAPAR I), an oral health care clinic at the Dental School of the University of Buenos Aires, between April 2014 and July 2015. All participants gave their written informed consent for free and voluntary participation in the study.

The research protocol was reviewed and approved by the Ethics Committee of the Dental School of the University of Buenos Aires (Acceptance number:

CETICAFUUBA20020120100324BA/13). The need for dental treatment was assessed through the Community Caries Index of Treatment Need (CCITN) [14] during the clinical routine examination of the oral cavity performed by three previously calibrated operators (Kappa's coefficient=0.92). The CCITN was designed to determine the oral health condition of populations in terms of health and disease. It indicates the recommended treatment to achieve a healthy oral condition, and it also estimates the amount of appropriate resources to provide the corresponding oral health care. The index is determined within an ordinal number scale from 0 to 14 following the criteria shown in the Table 1.

The social impact of the oral health condition on the quality of life was measured using the validated questionnaire Oral Health Impact Profile (OHIP-14) [15], which consists of 14 questions grouped in 7 domains; namely, D1: functional limitation, D2: physical pain, D3: psychological discomfort, D4: physical disability, D5: psychological disability, D6: social disability and D7: general disability. Participants indicated their responses using a Likert-type frequency scale: never, hardly ever, sometimes, frequently and very frequently, coded as 0, 1, 2, 3 and 4 respectively. The total score was obtained as the sum of the coded score numbers given to each of the questions. This procedure allows the calculation of 0 as the minimal score and 56 as the maximal one, indicating greater impact as the score value increases.

The descriptive statistical data analysis included the calculation of median and range for the CCITN and the frequency distribution determination for each category of the index. The assessment of the social impact included the calculation of the percent proportion of the impact along with the 95% confidence interval. The inferential statistical analysis evaluated through Chi² test the association

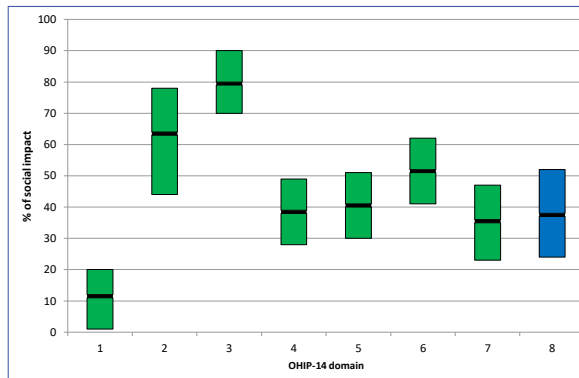


Figure 3. Social impact of the oral component of health in HCV+ patients. Box plot of the distribution of the social impact expressed as %. The proportion and CI95% obtained in 45 patients are shown. The numbers on the x axis indicate the OHIP-14 domains: 1 functional limitation, 2 physical pain, 3 psychological discomfort, 4 physical disability, 5 psychological disability, 6 social disability and 7 general disability. Number 8 indicates the overall impact value.

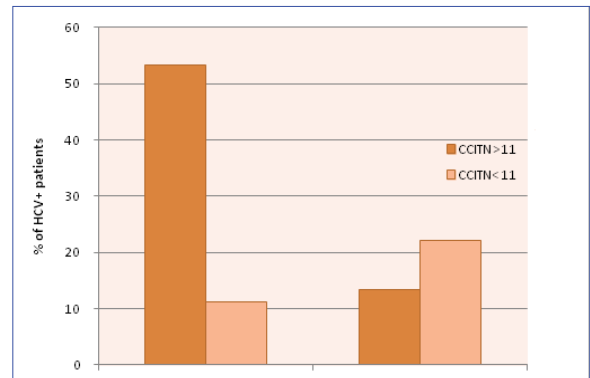


Figure 4. Association between Community Caries Index of Treatment Need (CCITN) values and Oral Health Impact Profile (OHIP-14) score. Bar plot of the distribution of HCV+ patients (n = 45) grouped according median CCITN and mean % of social impact reported through OHIP-14.

between CCITN score and OHIP-14 percent of impact distributions according to their corresponding median and mean values, respectively. The level of significance used to determine the association was $p < 0.05$.

3. RESULTS

The need for dental treatment found in HCV+ patients in this investigation was great. The obtained median value of CCITN was 11 and its range was 8-14, as shown in Fig. 1 and Fig. 2. There were no patients with healthy oral conditions and no patients with only amelo-dentinal tooth decay either. In all cases, tooth decay involved dental pulp in different extent. The frequency distribution of CCITN values found in male patients was not significantly ($\text{Chi}^2=0.21$, $p=0.96$) different from those determined for female patients (data not shown).

The social impact of the oral component of health self-reported through the use of OHIP-14 revealed a 38% of impact (CI95%: 24-52%) in HCV+ patients included in the convenience sample studied in the present research and no significant differences ($\text{Chi}^2=0.34$, $p=0.88$) were found between male and female patients (data not shown).

Fig. 3 shows this finding along with the differential impact recorded for each single domain of the questionnaire. The social impact showed the increasing order $D1 < D7 < D4 < D5 < D6 < D2 < D3$, being D3 (78%, IC95 90-66%) and D2 (62%, IC95 48-76%), the domains revealing the highest social impact of the oral component of health on the quality of life.

To assess the association between CCITN and OHIP-14, the distribution of patients was determined in two categories according to the value of 11 for the dental treatment need, and according to the value of 38% for the social impact. Fig. 4 shows 52% of the HCV+ patients reporting social impact above 38% if their CCITN value is found above 11, revealing a

significant association between those two variables ($\text{Chi}^2=7.57$, $p=0.006$).

4. DISCUSION

This is the first study investigating the need for dental treatment in HCV+ subjects in association with the quality of life of this patient population. The results reported herein interest both physicians and dentists and provide new evidence for the successful interdisciplinary approach of this viral infection. Up to now, most studies have focused exclusively on the oral manifestations of the HCV infection and on the haemostatic associated complications. For instance, oral lichen planus is clinically diagnosed by dentists [16] and it has been reported as involved in oral carcinogenesis [17].

Another well-known systemic disorder of HCV infection involves haemostatic complications leading to oral bleeding during dental procedures [8], especially in the acute stage of the disease, but fewer complications have been reported in asymptomatic chronic patients [18]. It is also known that the viral infection may alter the metabolism of certain drugs. That is why the current clinical challenge includes the prediction and treatment of hemorrhage and the careful evaluation of drugs interactions in HCV infected patients [19].

The results reported in this study show a clear social impact of the oral component of health which impairs the quality of life of the studied HCV+ patients, who mainly experience physical pain and psychological discomfort because of their dental status consequent to the course of the liver disease as we hypothesize. Given that the study design used herein lacks a control group studied in parallel, data of CCITN and OHIP-14 previously reported in other groups of patients may be useful for a comparative discussion. Compared to non-medically compromised patients, the CCITN largely exceed the reported value of 6 [20] in healthy subjects and the social impact on

the quality of life regarded as intermediate [21]. As compared to other viral infections, HIV+ patients showed also social impact of the oral conditions on the quality of life with similar percentage (36%) and similar CCITN values [14].

These results are in line with previous findings of hepatologists, surgeons and psychologists reporting that HCV infection negatively changes the patients' quality of life in the analysis of the psychological component of health [22]. Increased levels of anxiety and depression have been reported to impair the quality of life [23].

The results obtained in this investigation provide evidence to support the early referral to oral health care of HCV+ patients, which will benefit the patients since the beginning of the medical treatment if they are referred to the dentist during the first medical visit, a professional decision that we strongly recommend.

Although the sample size we analyzed may appear small, it was large enough to perform the planned statistical analysis meeting the criteria of optimal sample size.

The future perspective of this research includes the extension of the study variables such as the Community Periodontal Index, dental plaque index, HCV viral load in blood, routine hepatic enzymes laboratory values and the time course of the viral infections which will be interesting to perform a multivariate analysis of factors.

5. CONCLUSION

On the basis of the features of this convenience sample showing moderate chronic viral infection, it can be concluded that the need for dental treatment in HCV+ patients is high and impairs the quality of life of the subjects, a fact detectable during the routine dental visit through the use of the OHIP-14 Questionnaire. Our results suggest that oral preventive measures should be necessarily reinforced in the oral health care of this group of patients.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

MF: participated in the research goal proposal, research protocol design, and scientific writing of the manuscript. SM: participated in the clinical examinations and data collection procedures.

AS: participated in the research plan design and critical revision of the manuscript. GS: participated in the clinical examinations, data collection, statistical analysis and scientific writing of the manuscript.

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Questions

1. Which of the following oral manifestations could be found in HCV infected patients?

- a. Mucosa jaundice and petechiae, blood coagulation disorders;
- b. Gingivitis and gum bleeding, perioral rash, atrophic tongue and hepatic halitosis;
- c. Xerostomia;
- d. All of them are correct.

2. What is the ideal dental treatment approach for HCV positive patients?

- a. Interdisciplinary approach;
- b. No specific approach;
- c. Approach does not matter if patients receive medical treatment;
- d. Interdisciplinary approach is not required.

3. What is the need for dental treatment in HCV infected patients?

- a. No need;
- b. Low;
- c. Moderate;
- d. High.

4. What is the relationship between unmet oral health care needs and the quality of life in HCV positive patients?

- a. Impairs quality of life;
- b. Improves quality of life;
- c. Quality of life is not affected;
- d. There is no relation between oral health and quality of life.