Proceeding of the Public Health and Well-being Conference, Vol. 1, 2023, pp. 16-26

ISSN 2659-2096
DOI: https://doi.org/10.32789/publichealth.2023.1002

Quality of Life-Related to Oral Health in Post-COVID-19 Primary Care Patients

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QUALITY OF LIFE-RELATED TO ORAL HEALTH IN POST-COVID-19 PRIMARY CARE PATIENTS

Abstract: The persistence of residual symptoms in post-COVID-19 patients has been identified as a factor that negatively affects quality of life, especially in aspects related to oral health. The purpose of the study was to determine the quality of life-related to oral health in primary care patients who had overcome the COVID-19 infection. A descriptive, non-experimental study was developed with the participation of 361 post-COVID-19 patients, to whom the survey was applied: Impact of oral health on Quality of Life (OHIP-14). The participants were mostly women (52.9%), and adults (55.4%), with occupations in the field of health (16.6%), and higher education (76.5%). Data were collected on history of COVID-19, severity of infection, hospitalization, comorbidities, risk perception, fear of the virus, presence of post-COVID-19 sequelae, and adult life stage. The analysis revealed that oral health-related quality of life in post-COVID-19 primary care patients is significantly lower. The perception of dental and oral problems during the period is correlated with a greater impact on quality of life in terms of oral health. Homogeneous distribution of the average and median values was observed in dimensions such as functional limitation, physical pain, social disability, and handicap. However, in comparison, the dimensions of physical and psychological disability stand out as the most affected. The results indicate that oral problems in this phase significantly impact the quality of life, highlighting the need for specific interventions to improve recovery and well-being. A comprehensive approach can help manage sequelae and improve the quality of life for these patients.

Keywords: Quality of Life, Oral Health, COVID-19, Primary Care

Introduction

The global health crisis due to the COVID-19 pandemic implies a high risk of morbidity and mortality [1, 2, 3], and post-COVID-19 patients continue to present residual symptoms that contribute to a worse quality of life [4, 5, 7], altering oral health-related quality of life (HRQoL) [8, 10, 11, 12, 13, 14, and 15]. The World Health Organization (WHO) conceptualizes quality of life as a complex concept that involves personal aspects of health, culture, autonomy, values, satisfaction, norms, and concerns that an individual has about his or her place in life [16].

Likewise, [6, 17, 18, 19, 20, 21, 22, 23, 24, and 25] report that the COVID-19 pandemic presents lasting effects in the form of signs and symptoms that affect activities of daily living. and the quality of life [8]. They refer to oral changes in patients who have presented post-COVID-19, such as dental caries, post-COVID-19 orofacial mucormycosis, and microcirculation disorders of periodontal tissues causing endothelial damage [8]. Likewise, there are manifestations in the oral cavity and face [9] and osteonecrosis of the jaw related to COVID-19.

The choice of primary care population in the study is based on convenience, accessibility, preventive focus, and the ability to obtain a comprehensive view of post-COVID-19 patients' health.
This research will be the basis for future studies and the development of care and monitoring protocols in the medical and dental care of post-COVID-19 patients. Functional limitations, psychological distress, physical, psychological, and social disability, and post-COVID-19 disability can have a significant impact on patients' oral quality of life. Therefore, the purpose of this research was to know the quality of life-related to oral health in primary care patients who have overcome COVID-19 infection.

Methodology

Within the framework of this descriptive, non-experimental research, the population of interest was made up of 28,569 patients from various primary care health centers in the health network of Ica, Peru. The study sample was selected using the algorithmic formula for finite populations, a population proportion with properties of interest (50%), confidence level (95%), and security level 1-α (5%), made up of 361 patients of ages 18 and older. and 80 years old, the inclusion criterion considered for the sample was patients who have overcome COVID-19 infection

in the different health centers of ICA. Data collection was carried out using the survey technique, and the instrument was a questionnaire that covered sociodemographic aspects as well as eight self-perception variables in the post-COVID-19 situation. The OHIP-14 is an instrument that uses questionnaires to measure oral health output in relation to patients' quality of life. Examines seven dimensions: functional limitations, physical pain, mental discomfort, physical disability, mental disability, social disability, and obstacles.

In addition, the OHIP-14 questionnaire, validated in Peru, evaluates the impact of oral health on the quality of life of adults. This questionnaire consists of 14 questions distributed in seven dimensions, with answers categorized into five options: Neck (N) = 0; rarely (CN) = 1; sometimes (A) = 2; frequently (F) = 3; and very frequently.
The analysis of the components of this instrument allowed us to use three indicators: a summary of the functional and psychological consequences of oral health problems in post-COVID-19 primary care patients (see Table 1).

Table 1. Oral Health Indicators

No	Oral health indicators	Operational definition
1	Prevalence	Percentage of individuals who report one or more items as frequently or very frequently;
2	Extension	Number of items reported as frequently or very frequently;
3	Severity	The sum of all the ordinal values of the responses and scores in a range from 0 to 56, the higher the value, the greater the impact of oral health on quality of life.

Low scores reflect better self-perceived oral quality of life after COVID-19, and therefore higher scores reflect worse self-perceived oral quality of life [27, 28] after COVID-19. These oral quality-of-life scores are recognized worldwide [28].

The method used to select the sample is probabilistic, and the sampling units were estimated randomly. Data collection was carried out through a face-to-face survey. Permission was requested from the directors of the Ica Health Centers to carry out the survey. Once the schedule was coordinated, the purpose of the study was explained to post-COVID-19 patients, and the survey would be anonymous. Those post-COVID-19 patients who wished to participate in the study were asked to sign their informed consent (Annex 2), and the information was collected.
The statistics of the relationship between variables were analyzed with the Kolmogorov-Smirnov statistical test. The statistical package IBM SPSS Statistics for Windows Verse was used. 25.0, Microsoft Office Excel 2016 spreadsheet. A statistical analysis was carried out at a descriptive level through univariate analysis of the variables of interest, for which their absolute frequency (N) and relative frequency (%), as well as averages and deviations, were described. standard, minimums, maximums, etc. The results were shown in statistical tables.
The entire research process was consistent with the precepts established in the Declaration of Helsinki regarding the ethical aspects of research with human beings. The study was approved by the CEI, UNICA RRNº 005/09-2022, Research Ethics Committee of the Universidad Nacional Mayor de San Luis Gonzaga (Annex 3). Patients were informed and asked for informed consent to participate voluntarily and anonymously

Results

361 post-COVID-19 primary care adults were surveyed. The majority were adults (55.4%), women (52.9%), and health personnel (16.6%). Of the total sample, 76.5% have a higher educational level, and 78.9% have been diagnosed at least once with COVID-19, with a diagnosis of mild severity (62.3%). 93.9% were not hospitalized, without previous comorbidity (63.4%), with a high perception of risk of contracting COVID-19 (42.7%), fear of COVID-19 (62%), did not perceive sequelae post-COVID-19 (77.3%) and were in the adult stage of life (55.4%). The average age of the adults surveyed was 40 years old.

Statistic Analysis

Regarding the distribution of absolute and relative frequencies of the items that make up the OHIP-14, the questions with the highest percentage of responses in the frequently (F) and very frequently (MF) categories are those identified with numbers 7 and 8 of the physics question. disability dimension, and 9 and 10 of the psychological disability dimension.

Table 2. Quality of life indicators related to oral health according to associated factors in a sample of post-COVID-19 primary care adults.

Factors associated with oral health		Indicators		
		Prevalence (%)	Extension ($\bar{x}$ / $ic_{95\%}$)	Gravity ($\bar{x}$ / $ic_{95\%}$)
Sex				
	Male	53,5%	,8 (7-1,0)	13,5 (12,3-14,7)
	Female	55,0%	1,2 (,9-1,5)	14,3 (13,0-15,5)
Life stage				
	Young adult (18-29 years)	51,2%	,8 (,6-1,1)	13,0 (11,6-14,3)
	Adult (30-59 years)	57,5%	1,1 (,8-1,3)	14,7 (13,6-15,9)
	60 years or more	47,5%	1,4 (,6-2,1)	12,9 (9,6-16,1)
Occupation				
	Housewife	50%	1,1 (,5-1,8)	15,9 (13,2-18,7)
	Businessman	61,9%	1,5 (,7-2,2)	16,1 (13,1-19,2)
	Teacher	70,6%	1,0 (,7-1,2)	15,7 (13,9-17,5)
	aiadle	41,4%	,8 (,2-1,5)	13,9 (10,5-17,3)
	Administrative worker	57,7%	1,0 (,5-1,5)	13,2 (9,6-16,8)
	Health personnel	53,3%	1,2 (,6-1,7)	11,1 (8,5-13,7)
	Engineer	47,8%	,7 (,3-1,2)	12,0 (8,6-15,3)
	Worker/driver	42,3%	,6 (,2-1,0)	15,9 (12,9-18,9)
	Student	48,0%	,8 (0,5-1,1)	12,5 (10,9-14,1)
	Other occupations	69,0%	1,2 (,6-1,8)	14,4 (11,9-17,0)
Degree of instruction				
	No instruction-Primary	25,0%	,25 (-,5-1,0)	12,7 (-4,2-29,7)
	Secundary	58,0%	1,1 (,7-1,5)	16,1 (14,4-17,9)
	Superior	53,6%	1,0 (,8-1,2)	13,3 (12,3-14,3)
Number of times diagnosed with COVID-19				
	One	55,8%	1,0 (,8-1,2)	13,9 (12,9-14,9)
	Two	48,5%	1,1 (,6-1,7)	14,0 (12,0-16,0)
	Three	50,0%	1,0 (-,4-2,4)	14,2 (5,7 - 22,7)
Severity of COVID-19				
	Serius	62,5%	1,3 (,4-2,3)	13,5 (9,9-17,1)
	Moderate	57,1%	1,4 (1,0-1,7)	16,2 (14,7-17,7)
	Mild	52,0%	,8 (,6-1,0)	12,8 (11,8-13,9)
Hospitalization				
	No	54,3%	1,0 (,8-1,0)	14,1 (13,2-15,0)
	Yes	54,5%	,8 (,3-1,2)	11,5 (7,6-15,4)
Previous Comorbidity				
	No	45,4%	,6 (,5-,7)	12,2 (11,3-13,1)
	Yes	69,7%	1,7 (1,4-2,1)	16,9 (15,3-18,5)
Perception of the risk of contracting COVID-19				
	Low	38,5%	,7 (,3-1,0)	14,2 (12,3-16,2)
	Moderate	53,5%	,6 (,5-,8)	12,9 (11,7-14,1)
	High	61,7%	1,5 (1,2-1,9)	14,7 (13,2-16,2)
Far of COVID-19				
	No	50,0%	,7 (,5-,9)	12,8 (11,4-14,1)

	Yes	57,0%	1,2 (1,0-1,5)	14,6 (13,5-15,7)
Post COVID.19 sequelae				
	No	49,8%	,8 (,7-1,0)	13,5 (12,6-14,5)
	Yes	69,5%	1,6 (1,1-2,1)	15,3 (13,3-17,3)
The economic situation affected by the pandemic				
	No	52,1%	,8 (,6-1,1)	14,8 (13,4-16,2)
	Yes	55,1%	1,1 (,9-1,3)	13,6 (12,5-14,7)
	Full scale	54,3%	1,06 (,9-1,6)	13,9 (11,6-16,9)

The prevalence indicator revealed that 54.3% of respondents reported one or more items as frequently or very frequently. The prevalence was higher in female sex (55%), adult life stage (57.5%), teacher occupation (70.6%), secondary education level (58%), and adult life stage (54.9%), once diagnosed with COVID-19 (55.8%), severe COVID-19 (62.5%), hospitalized (54.5%), previous comorbidity (69.5%), high-risk perception to contract COVID-19 (61.7%), fear of COVID-19 (57%), and consequences of COVID-19 (69.5%).

The extension indicator on average is 1.06 (95% CI 0.9–1.6) for items reported as frequently or very frequently; the degree of extension was greater in the female sex (1.2) (95% CI.9–1.5), life stage 60 years or more (1.4) (95% CI.6-2.1), and merchant occupation (1.5) (95% CI.7–1.2), among others.

The severity indicator on average was 13.9 (95% CI 11.6–16.9). The greatest impact of oral health on quality of life was observed in females at 14.3 (95% CI 13.0–15.5), adults at 14.7 (95% CI 13.6–15.9), and merchant occupations at 16.1 (95% CI 13.1–19.2), among other relevant findings. (see Table 4). When analyzing the scores of the seven domains proposed by the OHIP, a homogeneous distribution of the average and median values was found in the dimensions: functional limitation, physical pain, social disability, and handicap, except for physical and psychological disability, which showed higher scores (Table 3).

Table 3. OHIP-14 dimension scores

OHIP_14 DIMENSIONS	**x̄ (±DE)**	**Me (RIC)**
Functional limitation	1,89(±1,74)	2,0 (0,0-3,0)
Physical pain	1,73(±1,71)	2,0 (2,0-4,0)
Psychological discomfort	0,96(±1,30)	0,0 (2,0-5,0)
Physical disability	2,65(±1,64)	2,0 (0,0-4,0)
Psychological disability	3,42(±1,96)	4,0 (1,0-4,0)
Social disability	1,84(±1,63)	2,0 (0,0-4,0)
Handicap	1,41(±1,55)	1,0 (0,0-3,0)
Total, score	13,97(±8,32)	14,0 (8,0-24,0)

Legend: x = mean; SD: standard deviation; Me: median; IQR: interquartile range

The characteristics: condition of having a higher education degree (p = 0.004); not having an occupation (p = 0.026); moderate severity of COVID-19 (p = 0.021); Previous comorbidity (p = 0.000) is associated with a greater impact of oral health on quality of life.

The objective of the study was to determine the quality of life-related to oral health in primary care patients who have overcome the COVID-19 infection. whose results are shown in Table 4.

Table 4. Factors associated with oral health and their impact on quality of life

Factors associated with oral health	Impact on quality of life			Raw model		Adjusted model	
	No	Yes	p[a] value	RPc (IC 95%)	P value	RPa (IC 95%)	P value
Sex							
Male	94(55,3)	76(44,7)	,795	Ref.		Ref.	
Female	103(53,9)	88(46,1)		1,03 (0,82-1,29)	,795	-	-

Life stage							
Young adult (18-29 years)	75(62,0)	46(38,0)	,059	,75(,58 -,98)	,041	1,30 (,84-2,0)	,234
Adult (30-59 years)	98(49,0)	102(51,0)		1,32(1,04-1,68)	,021	1,35 (,95-1,93)	,090
60 years or more	24(60,0)	16(40,0)		Ref.		Ref.	
Occupation							
Housewife	17(40,5)	25(59,5)	,082	1,36 (1,03-1,80)	,028	1,11 (,81-1,52)	,489
Businessman	20(47,6)	22(52,4)		1,17(,86-1,61)	,309	-	-
Teacher	16(47,1)	18(52,9)		1,18 (,84-1,66)	,325	-	-
aiadle	12(41,4)	17(58,6)		1,32 (,95-1,83)	,094	-	-
Administrative worker	17(65,4)	9(34,6)		,74 (,43-1,28)	,293	-	-
Health personnel	38(63,3)	22(36,7)		,77 (,54-1,10)	,162	-	-
Engineer	12(52,2)	11(47,8)		1,05 (67-1,64)	,808	-	-
Worker/driver	13(50,0)	13(50,0)		1,10 (,74-1,65)	,613	-	-
Student	35(70,0)	15(30,0)		,62 (,40-,97)	,037	0,71 (,45-1,14)	,163
Other occupations	17(58,6)	12(41,4)		Ref.	,659	Ref.	
No instruction-Primary	3(75,0)	1(25,0)	,003	,54 (,10-3,00)	,488	-	-
Secundary	31(38,3)	50(61,7)		Ref.		Ref.	
Superior	163(59,1)	113(40,9)		1,50 (1,20-1,87)	,000	1,41 (1,11-1,79)	,004
Number of times diagnosed with COVID-19							
One	152(53,3)	133(46,7)	,646	Ref.		Ref.	
Two	40(58,8)	28(41,2)		,88 (,65-1,20)	,448	-	-
Three	5(62,5)	3(37,5)		,82 (,33-2,02)	,670	-	-
Severity of COVID-19							
Serius	16(66,7)	8(33,3)	,004	Ref.		Ref.	
Moderate	47(42,0)	65(58,0)		1,46 (1,17-1,81)	,000	2,01 (1,11-3,66)	,021
Mild	134(59,6)	91(40,4)		,75 (,60-,94)	,013	1,57 (,87-2,85)	,133
Hospitalization							
No	182(53,7)	157(46,3)	,186	Ref.		Ref.	
Yes	15(68,2)	7(31,8)		,68 (,36-1,28)	,237	-	-
Previous Comorbidity							
No	146(63,8)	83(36,2)	,000	Ref.		Ref.	
Yes	51(38,6)	81(61,4)		1,69 (1,36-2,10)	,000	1,67 (1,33-2,10)	,000
Perception of the risk of contracting COVID-19							
Low	35(53,8)	30(46,2)	,233	Ref.		Ref.	
Moderate	85(59,9)	57(40,1)		,81 (,63-1,04)	,103	-	-
High	77(50,0)	77(50,70)		,98 (,72-1,34)	,942	-	-
Far of COVID-19							
No	83(60,1)	55(39,9)	,094	Ref.		Ref.	
Yes	114(51,1)	109(48,9)		1,22 (,96-1,56)	,103	-	-
Post COVID-19 sequelae							
No	156(55,9)	123(44,1)	,344	Ref.		Ref.	
Yes	41(50,0)	41(50,0)		1,13 (,88-1,46)	,331	-	-
The economic situation affected by the pandemic							
No	49(51,0)	47(49,0)	,418	Ref.		Ref.	
Yes	148(55,8)	117(44,2)		,90 (,70-1,15)	,408	-	-

Legend: p* = statDiscusión stical significance obtained through binary logistic regression. 95% CI = 95% confidence interval.

Discussion

According to the objective of the study, when analyzing the scores of the seven domains proposed through the instrument, a homogeneous distribution of the average and median values was found in the dimensions of functional limitation, physical pain, social disability, and handicap, except in physical disability. and psychological disability, where they showed higher scores.

Regarding prevalence in this study, 52.9% of respondents were mostly women from a sample of 361 adults (57.5%) who were on average 40 years old. The personal health occupation predominates (16.6%), as does the level of higher education (76.5%).

In relation to COVID-19, 78.9% were diagnosed with this disease at some point; 62.3% had mild severity; 93.9% did not reach hospitalization; and 63.4% had no previous comorbidity. On the other hand, the high perception of the risk of contracting COVID-19 was 42.7%; fear of this disease (COVID-19) was 62%; and those surveyed did not perceive post-COVID-19 sequelae (77.3%). Regarding the distribution of absolute and relative frequencies of the items that make up the OHIP-14, the questions with the highest percentage of responses in the frequent and very frequent categories are those identified with numbers 7 and 8 of the physical disability dimension and 9 and 10 from the psychological disability dimension.

Thirunavukkarasu *et al.* (2023) [11] state that 52.7% of the 677 patients included in their study had poor OHRQoL. Roman Montes *et al.* (2023) [28] also state that 76% of patients were affected by the five dimensions of post-COVID quality of life, showing an increase in pain or discomfort (67 vs. 39%, p = 0.001) and difficulties performing usual activities (39.2 vs. 20.3%, p =0.03). Qamar (2022) [6] *et al.* mention that 42% of those surveyed at work had a worse quality of life after the SARS-Cov-2 infection, with the residual symptoms being body pain (39.9%), bad mood, and cough (30.2%).

Regarding HRQoL indicators, based on the OHIP-14, the prevalence indicator revealed that 54.3% of respondents reported one or more items as frequently or very frequently. The prevalence was higher in the female sex (55%), stage of adult life (57.5%), teaching occupation (70.6%), and level of secondary education (58%). The prevalence of being diagnosed with COVID-19 was 55.8%, with 62.5% in serious condition; 54.5% were hospitalized and had previous comorbidities (69.5%). The perception of a high risk of contracting COVID-19 was 61.7%, followed by fear of COVID-19 (57%), and consequences of COVID-19 (69.5%).

The perception of a high risk of contracting COVID-19 was 61.7%, followed by fear of COVID-19 (57%), and consequences of COVID-19 (69.5%). The extension indicator on average is 1.06 (95% CI 0.9-1.6) of items reported as frequent or very frequent, with the degree of extension being greater in the female sex (1.2) (95% CI %.9-0.5), life stage of 60 years or more (1.4) (95% CI.6-2.1), and merchant occupation (1.5) (95% CI.7-1, 2), among others. The average severity indicator was 13.9 (95% CI 11.6–16.9). The greatest impact of oral health on quality of life was observed in women with 14.3 (95% CI: 13.0–15.5), in adults with 14.7 (95% CI: 13.6–15.9), and in commercial occupations with 16.1 (95% CI: 13.1–19.2). , among other relevant findings.

In the multivariate logistic model, it was found that the factors of having a higher education degree (p = 0.004), not having an occupation (p = 0.026), moderate severity of COVID-19 (p = 0.021), and previous comorbidity (p = 0.000) are associated with a greater impact of oral health on quality of life. Likewise, Hussein *et al.* (2023) [12] state in their work that in the sampling period developed, 100% of patients presented different manifestations. In 210 patients, manifestations in the oral cavity were greatly influenced by COVID-19. A similar result was obtained by the work of Alabsi Ram *et al.* (2022) [20], who mentioned 62%, and likewise, El Kady *et al.* [29], who affirmed that 67.2%. Lima *et al.* (2023) [16] report that of the 5,834 adults studied, 9% had a negative impact of oral conditions on OHRQoL.

Of the oral conditions detected, taste alteration was one; thus, 56.2% in the work of Huseein *et al.* (2023) [12], 68% in Alabsi Ram *et al*. (2022) [20], 25.9% in El Kady *et al.* (2021) [29]; other conditions were burning sensation (43.3% in Huseein *et al.* (2023) [12], 39.7% in El Kady *et al.* (2021) [28], oral candidiasis (40%) in Huseein *et al.* (2023) [12]; periodontal disease in Lima *et al.* (2023) [16], Pedrosa *et al.* in their work from 2020 [30], 7% in El Kady *et al.* Dziedzic (2021) [31] states that due to the action of COVID-19 therapies, some oral conditions of autoimmune etiology could be aggravated by this disease.

Conclusions

Oral health-related quality of life (ORQoL) in post-COVID-19 primary care patients is poorer. The perception of having teeth and mouth problems in a post-COVID-19 situation is associated with a greater impact of oral health on quality of life.

There is a homogeneous distribution of the average and median values in the dimensions of functional limitation, physical pain, social disability, and handicap, except in physical and psychological disability, which showed higher scores.

The problems in the oral cavity with the greatest perception are, on a descending scale, difficulty resting, the perception of embarrassment, and changing foods due to pain and/or discomfort when eating. The conditions of having a higher level of education, not having an occupation, moderate severity of COVID-19, and previous comorbidity are associated with a greater impact of oral health on quality of life. Evaluating the quality of life-related to oral health is valid knowledge for the diagnosis and treatment of the patient, and this ensures the success of its application since the patient-dentist relationship is strengthened.

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