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Self-perception of health among adults with missing teeth, based on the biopsychosocial model of the International Classification of Functioning, Disability and Health

Autopercepção de saúde entre adultos com ausência dentária, a partir do modelo biopsicossocial da Classificação Internacional de Funcionalidade, Incapacidade e Saúde

Autopercepción de la salud entre adultos con ausencia de dientes, basada en el modelo biopsicosocial de la Clasificación Internacional del Funcionamiento, de la Discapacidad y de la Salud

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Abstract:
Objective: to identify the functionality of adults with missing teeth, through their self-perception of oral health, in a dental emergency service. **Methods:** observational, cross-sectional and quantitative research, carried out in 2021, through interviews, in the dental emergency service of the Universidade Estadual de Londrina, PR/Brazil. The evaluation of functions and structures, limitation of activities and restriction of participation of users with missing teeth was carried out using the Oral Health Impact Profile-14 questionnaire and adapted to the Umakoshi framework, which related it to the International Classification of Functioning, Disability and Health. To compare independent samples, the nonparametric Mann-Whitney U, Kruskal-Wallis ANOVA and Chi-Square tests were performed. A significance level of 5% was considered. **Results:** 85 users participated, with an average age of 38.96 years, female (57.65%), in a civil union (54.12%), completed primary education (35.29%), employed (51.76%) and with an income equivalent to 1 to 3 minimum wages (64.71%). In 96.5%, they self-reported impairment of pain-related function, 91.8% some impairment in the ingestion function and 96.5% alteration in the temperament and personality function. In the gustatory function, 74.11% responded that there was no alteration. **Conclusion:** according to their self-reports, individuals who attend the Dental Emergency Room of the Universidade Estadual de Londrina have a worse perception of functionality when it comes to pain, as well as the temperament and personality functions, the act of eating and dealing with stress due to the absence of teeth were the greatest limitations of activity.
Keywords: Oral Health; Tooth Loss; International Classification of Functioning, Disability and Health; Sickness Impact Profile; Indicators of Quality of Life.

Resumo:
Objetivo: identificar a funcionalidade de adultos com ausência dentária, através de sua autopercepção de saúde bucal, num serviço de pronto-socorro odontológico. **Método:** pesquisa observacional transversal e quantitativa, realizado em 2021, através de entrevista, no serviço de pronto socorro odontológico da Universidade Estadual de Londrina. A avaliação das funções e estruturas, limitação das atividades e restrição da participação dos usuários com ausências dentárias foi realizada por meio do questionário *Oral Health Impact Profile-14* e adaptado ao quadro de Umakoshi, que relacionou com a Classificação Internacional de Funcionalidade, Incapacidade e Saúde. Para comparação de amostras independentes foram realizados os testes não paramétricos de Mann-Whitney U, ANOVA de Kruskal Wallis e Qui-Quadrado. Foi considerado um nível de significância de 5%. **Resultados:** participaram 85 usuários, com média de idade de 38,96 anos, sexo feminino (57,65%), em união estável (54,12%), fundamental completo (35,29%), com emprego (51,76%) e com renda de 1 a 3 salários mínimos (64,71%). 96,5% autorrelatam comprometimento da função relacionada à dor, 91,8% algum comprometimento na função de ingestão e 96,5% alteração na função de temperamento e personalidade. Na função gustativa 74,11% responderam não ter alteração. **Conclusão:** os indivíduos que frequentam o Pronto Socorro Odontológico da Universidade Estadual de Londrina, segundo seus autorrelatos, possuem uma pior percepção de funcionalidade quando se refere à dor, assim como as funções de temperamento e personalidade, o ato de comer e lidar com estresse pela ausência dentária foram as maiores limitações de atividade.
Palavras-chave: Saúde Bucal; Perda de Dente; Classificação Internacional de Funcionalidade, Incapacidade e Saúde; Perfil de Impacto da Doença; Indicadores de Qualidade de Vida.

Resumen:
Objetivo: Identificar la funcionalidad de adultos con ausencia de dientes, a través de su autopercepción de salud bucal, en un servicio de emergencia odontológica. **Método**: investigación observacional transversal y cuantitativa, realizada en 2021, a través de entrevistas, en el servicio de urgencias odontológicas de la Universidad Estadual de Londrina, PR/Brasil. La evaluación de las funciones y estructuras, limitación de las actividades y restricción de la participación de los usuarios con ausencia de dientes se llevó a cabo utilizando el cuestionario *Oral Health Impact Profile-14* y adaptado al cuadro de Umakoshi, relacionado con la Clasificación Internacional del Funcionamiento, de la Discapacidad y de la Salud. Se utilizaron pruebas no paramétricas U de Mann-Whitney, ANOVA de Kruskal Wallis y Chi-cuadrado para comparar muestras independientes. Se utilizó un nivel de significación del 5%. **Resultados**: Participaron 85 usuarios, con una edad media de 38,96 años, de sexo femenino (57,65%), en pareja de hecho (54,12%), con estudios primarios completos (35,29%), con empleo (51,76%) y con ingresos de entre 1 y 3 salarios mínimos (64,71%). El 96,5% informó alteración en la función relacionada con el dolor, el 91,8% alguna alteración en la función de deglución y el 96,5% alteración en la función de temperamento y personalidad. En cuanto a la función gustativa, el 74,11% no informó de ninguna alteración. **Conclusión**: De acuerdo con sus autoinformes, los individuos que acuden al Servicio de Urgencia Odontológica de la Universidad Estadual de Londrina tienen una peor percepción de funcionalidad en lo que se refiere al dolor, así como en las funciones de temperamento y personalidad, el acto de comer y lidiar con el estrés debido a la falta de dientes fueron las mayores limitaciones de actividad.
Palabras-clave: Salud Bucal; Pérdida de Diente; Clasificación Internacional del Funcionamiento, de la Discapacidad y de la Salud; Perfil de Impacto de Enfermedad; Indicadores de Calidad de Vida.

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INTRODUCTION

Oral health goes beyond the concept of keeping teeth healthy, and is an important aspect of ensuring the well-being of people, affecting their quality of life[1,2]. Surrounded by its complex social and health determinants, cavities, periodontal disease, low income, low coverage of services and mutilating practices are all risk factors for edentulism[3]. Cultural factors also impact tooth loss, as it is assimilated in different ways in different societies[4,5].

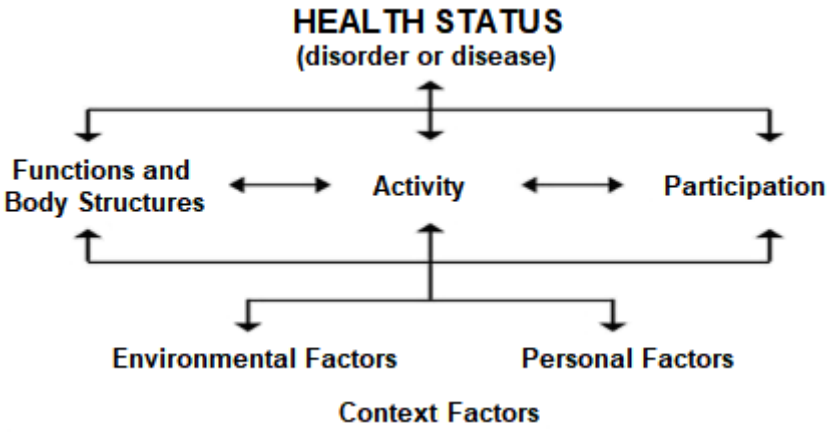
Tooth extraction is the result of experiences of oral diseases throughout life, with biological, social and behavioral risk factors[6]. Studies indicate an average age of 18.7 years for the first tooth extraction in the country and a high rate of edentulism, in which 22.4% of the population no longer has functional teeth, with less than 21 teeth present in their mouth[1,7]. These data challenge health professionals and services to overcome this scenario through effective prevention and treatment strategies[5,8,9].

The International Classification of Functioning, Disability and Health (ICF) is a classification system that complements health information previously provided only by the International Statistical Classification of Diseases and Related Health Problems (ICD), used globally for morbidity and mortality statistics. In addition to morbidity data used for planning, managing and evaluating health policy programs, the inclusion of functionality data provides a complete health record, generating an important source of epidemiological data and qualifying the available health information[10-15].

The biopsychosocial model of the ICF represents the integration of the medical model and the social model, obtaining a synthesis that allows a comprehensive view of the various dimensions of health[10,12-14,16,17]. Based on Figure 1, the ICF Interactive Model, created by the World Health Organization (WHO), can be seen in terms of functionality, which can be influenced not only by the disorder or disease and the body's function and structure, but also by contextual (environmental) factors, which can interact and have an impact to impair or facilitate the individual's condition, interfering with the performance of activities and participation[13].

The classification is organized into body functions (b), body structures (s), activities and participation (d), and environmental (e) and personal factors. Body functions and structures are related to the disease, activities and participation are related to functionality, how individuals will cope with this change in their task routine, and contextual factors (environmental and personal) represent the impact of negative or positive factors in people's context on health[13].

Figure 1. ICF Interactive Model[13].



There is an attempt to create a set of ICF categories that describe the functionality of people with certain health conditions for oral health in ICF[18]. It is in this context that missing teeth, which interfere with the individual's quality of life, can be included and generate codes in the ICF that can contribute to the analysis of the disease and the planning and promotion of oral health.

This study aims to identify the functionality of adults with missing teeth, through their self-perception of oral health, in a dental emergency service.

METHODS

The study was cross-sectional, observational and quantitative in nature and was conducted at the emergency dental service of the Universidade Estadual de Londrina (PSO/COU-UEL). Individuals aged 19-59 with missing teeth were interviewed. The assessment of functions and structures, activity limitations and restricted participation of users with missing teeth was performed using the Oral Health Impact Profile (OHIP-14) questionnaire in its reduced version[19-21].

The Oral Health Impact Profile (OHIP) - in its simplified form, OHIP-14 - is a questionnaire for assessing quality of life in relation to oral health conditions[19-21]. It was developed as a comprehensive self-report measure of dysfunction, discomfort and disability attributed to oral health conditions. These impacts were intended to complement traditional oral epidemiological indicators of clinical disease, thus providing information on the "burden of disease" in populations and the effectiveness of health services in reducing this burden of disease[22-24].

The OHIP instrument is important to help clarify oral health needs and develop strategies to control/reduce diseases and promote oral health with a positive impact on quality of life[25]. Clinical indicators are not capable of capturing problems such as pain and interference with chewing and self-esteem. Inferences about these aspects are made through questionnaires that measure the impact of oral health on quality of life[26].

The instrument includes seven dimensions of impact to be measured: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Responses are given according to a Likert scale such as: 0 = never, 1 = rarely, 2 = sometimes, 3 = often and 4 = always. The higher the value attributed by the respondent, the worse the self-perception of the impact of oral health on quality of life; the maximum score is 56 points.

Umakoshi's proposal[24], which related the OHIP-14 questions to the ICF, was used and adapted to the authors' perspective. The adaptations made sought to broaden the view of the ICF categories that involve activity and participation based on ICF[13]. The inclusions made were:
d330 Speech: Producing words, phrases, and longer sentences in spoken messages with both literal and implied meaning, such as stating a fact or telling a story in spoken language;
d240 Coping: with stress and other psychological demands: Performing and coordinating simple or complex actions to manage and control the psychological demands necessary to perform tasks that require significant responsibilities and that involve stress, distraction, or crisis, such as driving a vehicle in heavy traffic or taking care of many children;
d550 Eating: Performing the tasks and coordinated actions of eating food, bringing it to the mouth and consuming it in a culturally acceptable manner, cutting or breaking the food into pieces, opening bottles and cans, using utensils, activities related to meals, banquets and dinners;
d710 Basic interpersonal interactions: Interacting with people in a contextually and socially appropriate manner, such as showing consideration and esteem when appropriate or responding to the feelings of others;
d799 Interpersonal relationships and interactions, unspecified;
b117 Intellectual functions: General mental functions, necessary to understand and constructively integrate the different mental functions, including all cognitive functions and their development throughout life replaced in "question 13" by b152 Emotional functions: Specific mental functions related to feeling and the affective components of mental processes[13].

Table 1 shows the OHIP-14 questions, the related topics and the ICF categories for each question.

Chart 1. ICF categories in the OHIP-14 questionnaire. Londrina/PR, Brazil, 2021.

OHIP-14 QUESTIONS	TOPICS	ICF Category
1. Have you had trouble pronouncing any words?	Speech Activity	b320 Articulation functions d330 Speech
2.Have you felt the taste of food getting any worse?	Taste	b250 Taste function
3. Have you felt pain in your mouth or teeth?	Pain	b280 Pain s320 mouth structure
4. Have you felt uncomfortable when eating any food?	Chewing Activity	b510 Ingestion function b5102 Chewing b126 Temper and personality functions d550 Eating
5. Have you been worried?	Anxiety	b152 Emotional functions
6. Have you been nervous?	Humor Activity	b126 Temper and personality functions d240 Coping with stress and other psychological demands
7. Have your eating habits been affected?	Chewing Swallowing Activity	b510 Ingestion functions b5101 Biting d550 Eating
8. Have you had to stop eating?	Chewing Food	b510 Ingestion functions e110 Products or substances for personal consumption e1100 Food d550 Eating
9. Have you felt difficulty resting?	Rest	b134 Sleeping functions
10. Have you felt shame?	Personality Activity	b126 Temper and personality functions d799 Interpersonal relationships and interactions, unspecified
11. Have you felt annoyed with people?	Temper Activity	b152 Emotional functions d710 Basic interpersonal interactions
12. Do you find it difficult to perform your daily activities?	Activity	d230 Perform daily routine
13. Do you feel you live have gotten worse?	Function Activity Level	b152 Emotional functions
14. 14. Have you been unable to do your daily chores?	Activity	d230 Perform daily routine

Source : Adapted by the authors from Umakoshi and WHO[13,24].

Quantitative data were assessed using descriptive and inferential statistics. The nonparametric Mann-Whitney U and Kruskal-Wallis ANOVA tests were used. The Chi-square test was used to determine the association between the two nominal categorical variables. A significance level of 5% was considered. The analyses were performed using Microsoft Office Excel and Jamovi Software Version 1.6.23.0.

The study was approved by the Human Research Ethics Committee of the Federal Universidade de São Paulo, through the Brasil platform, CEP approval number: 0521.0021.05/2019, CAAE: 13008419.2.0000.550.

RESULTS

The study involved a total of 117 people, of which 12 did not want to answer the questionnaire, 13 did not sign it when it was completed and seven did not meet the inclusion criteria, therefore, the research had a total of 85 participants. The average age was 38.96 years old. Table 1 shows a greater participation of women (57.65%), in a civil union (54.12%),

complete and incomplete primary education (35.29%/30.59% respectively), employed (51.76%) and with an income equivalent to 1 to 3 minimum wages (64.71%).

Table 1. Interviewees regarding sex, marital status, educational level, employment and family income. Londrina/PR, Brazil, 2021.

Characteristics	Categoria	Participants	Relative frequency (%)
Sex	Female	49	57.65
	Male	36	42.35
Marital status	Single/Divorced/Widower	39	45.88
	Married/Civil union	46	54.12
Educational level	Incomplete Primary Education	26	30.59
	Complete Primary Education	30	35.29
	Complete Secondary Education	22	25.88
	Complete Higher Education	07	8.24
Employment	Student	05	5.88
	Employed	44	51.76
	Unemployed	30	35.29
	Pensioner	06	7.06
Family income	Under 1 minimum wage	25	29.41
	Between 1 to 3 minimum wages	55	64.71
	Over 3 minimum wages	05	5.88

Table 2 presents the results according to the Function (b) and Structure (s) categories of the ICF, with their central codes indicated in the research, and the relative frequency of "never" responses in the OHIP-14 regarding self-perception. That is, the percentage of individuals who self-reported not having any impairment in the suggested function.

It can be observed that only 3.50% of the interviewees reported not having any impairment in the function related to pain (b280), which indicates that 96.5% self-reported some impairment in this function. It can also be seen that 91.8% of the interviewees self-reported some impairment in the ingestion function (b510) and 96.5% reported changes in the temper and personality function (b126); the taste function was the least perceived in relation to the absence of teeth (b250), in which 74.11% responded as absent.

Table 2. ICF and Frequency relative to the perception of non-disability. Londrina/PR, Brazil, 2021.

ICF Category Function (b) and Structure (s)	**Answers 0 (zero) - self-reported non-disability**
s320 Mouth structure	3.50%
b510 Ingestion function	8.20%
b126 Temper and personality function	3.50%
b152 Emotional function	12.95%
b320 Articulation function	64.70%
b250 Taste function	74.11%
b280 Pain	3.50%
b5102 Chewing	10.59%
b5101 Biting	29.41%

Note: ICF codes based on category Function (b) and Structure (s).

Table 3 shows the results according to the ICF Activity category (d), with its central codes, and the relative frequency of "never" (0) responses of self-perception related to these codes. That is, the percentage of individuals who self-reported having no activity limitation or participation restriction. It can be observed that only 8.20% self-reported having no limitation when eating (d550), which shows that 91.8% of the interviewees feel some limitation when they have missing teeth. Speech (d330) is not felt as a limitation and does not restrict participation in 67.40% of the interviewees.

Table 3. ICF and Frequency related to non-perception of activity limitation. Londrina/PR, Brazil, 2021.

ICF Category Function (b) and Structure (s)	Relative frequency - no limitations
d550 Eating	8.20%
d230 Performing daily activities	44.75%
d330 Speech	67.40%
d240 Coping with stress	12.94%
d799 Interpersonal relationships and interactions, unspecified	31.76%
d710 Basic interpersonal interactions	42.75%

Note: CICF codes based on the activity and participation category (d).

Table 4 shows the results, according to the Environmental Factors (e) of the ICF, with their central codes, and the relative frequency of the "never" responses according to the OHIP-14 on self-perception, indicating no limitations related to the environmental factors presented. Both in products or substances of personal consumption and food, 55.30% had barriers.

Table 4. CIF and relative frequency of non-perception of barrier. Londrina/PR, Brazil, 2021.

ICF Category environmental factors (e)	Answer "no limitations"
e110 Product or substance for personal consumption	44,70%
e1100 Food	44,70%

Note: ICF codes based on the environmental factors category (e).

DISCUSSION

From the results found, it can be observed that the structure and function are affected by the absence of teeth, mainly perceptions related to pain, mouth structure, temper and personality functions, which can influence the negative impacts on quality of life. Corroborating the present findings, the study with interviewees from the Public Health Service undergoing treatment to replace lost teeth through prosthetics, indicated psychological discomfort and pain as dimensions with the greatest impact on the quality of life of its interviewees[7]. The study on the impact of oral and mental health on the quality of life of the elderly also showed pain and psychological incapacity as dimensions with the greatest impacts that affect quality of life[27].

In the category related to activity, the most affected was the act of eating, showing that only 8.20% of the interviewees did not feel limitations in this activity due to the absence of

teeth, all the rest (91.8%) reported some impact on eating with the absence of teeth, whether from discomfort in eating some food, with impaired nutrition, to having to stop eating. In a study on the impact of tooth loss on the quality of life related to oral health in adults, it was found that there is an association between high tooth loss and quality of life, relating it to physical disability[28].

Dealing with stress was the second activity with limitations reported by 87.06% of the interviewees who perceived limitations. The same occurred when dealing with emotional functions. Only 12.94% answered never for these impacts, showing that the absence of teeth affects life emotionally, producing a negative emotional response. These findings are comparable to research on the impact of oral health conditions on the quality of life of workers, which states that changes related to the stomatognathic system trigger painful stimuli or psychological and emotional changes[26]. In a review on tooth loss and the expectation of prosthetic rehabilitation, it was shown that the absence of teeth compromises the daily routine and socialization of individuals, with physical and psychological repercussions[4]. To improve the understanding of the subjectivity of the individual's self-perception regarding their oral health, it is suggested that some data related to the OHIP-14 questionnaire be expanded; perhaps a new questionnaire could be developed to further the purpose. This greater analysis refers to pain and limitations related to daily tasks.

The OHIP-14 issue regarding pain is broad and can be better studied in future research so that the pain reported by the interviewee at different times can be analyzed, such as in relation to daily life after extraction and pain prior to extraction. A study on instruments for measuring quality of life related to oral health showed that instruments, such as OHIP-14, are valuable tools for developing public policies, enriching information, indicating the self-perception of individuals in the questionnaires[8].

The bibliometric survey of the ICF in elderly individuals shows the importance of evaluating, planning and implementing rehabilitation strategies based on functionality[29]. In this study, we sought to broaden our perspective based on functionality, assessing the absence of teeth through the individual's self-perception, with a view to supporting health planning.

Research on the use of the ICF in workers' oral health indicates that, with the use of the ICF, the identification of environmental factors that affect an individual's oral health condition can favor the definition of priority areas for planning oral health education actions at work[14]. This study reinforces this idea.

In a study on the ICF in an inclusive school context, a scarcity of studies on the subject was found and the importance of mastering its application was affirmed, since the ICF does not

classify the individual, but describes their functionality and disability, mapping their activities and participation within their environment[30]. The study shown here corroborates this view, agreeing that there are few studies on the ICF in the context of oral health, in addition to the lack of training for its use.

Bringing more of the ICF to dentistry and understanding the functionality behind oral conditions is to broaden the view on socio-dental determinants and promote biopsychosocial dentistry, in addition to encouraging professionals to deal with their patients integrated into their environment, with their functional and social needs met. Bringing dentistry closer to the principles of comprehensiveness and equity, and conducting new and assertive health actions.

A study using the ICF biopsychosocial model to enhance therapeutic care argues that the association of the singular therapeutic project with the ICF biopsychosocial model will help multidisciplinary teams to conduct planning and actions centered on the subject's needs[8]. This biopsychosocial perspectivein dentistry will enrich research and provide more concrete data for assertive public policies.

CONCLUSION

In this study, it was observed that individuals with missing teeth who attend the PSO-UEL have a worse perception of functionality when it comes to pain, which also affects their temperament and personality functions, with their greatest activity limitations being the act of eating and dealing with stress due to missing teeth.

The study had as a methodological limitation the adapted association between the OHIP-14 questionnaire and the ICF components, since there is still no validation of this relationship. Therefore, validation is suggested, since it is believed that the ICF association is a fundamental step that will help multidisciplinary teams to conduct planning and actions focused on the needs of the subject.

There are ample possibilities for future research on the subject, since each ICF code can be explored individually for greater understanding, such as the issue of pain, which can be further explored and understood in terms of limitations of function, activity, and participation.

This biopsychosocial perspective on dentistry will enrich research and provide more tangible data for assertive public policies.

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