Development of a quality of life instrument to evaluate oral mucositis in cancer patients

Desenvolvimento de um instrumento de qualidade de vida para avaliação de mucosite oral em pacientes com câncer

Desarrollo de un instrumento de calidad de vida para evaluar la mucositis oral en pacientes con cáncer

Nayara Fernanda Pereira
ORCID: https://orcid.org/0000-0001-5400-5075
University of São Paulo, Brazil
E-mail: nayara_nfp@hotmail.com
Gustavo Hermes Soares
ORCID: https://orcid.org/0000-0001-6122-4399
The University of Adelaide, Australia
E-mail: gustavo.soares@adelaide.edu.au
Amanda Silva Aragão
ORCID: https://orcid.org/0000-0003-0797-4214
University of São Paulo, Brazil
E-mail: amandaaragao@alumni.usp.br
Edgard Michel-Crosato
ORCID: https://orcid.org/0000-0001-8559-9769
University of São Paulo, Brazil
E-mail: michelcrosato@usp.br
Maria Gabriela Haye Biazevic
ORCID: https://orcid.org/0000-0001-6326-5805
University of São Paulo, Brazil
E-mail: biazevic@usp.br

Abstract
Oral mucositis is a side effect of cancer treatments, a limiting condition and of great impact on quality of life (QOL). The objective was to develop an instrument to evaluate QoL related to oral mucositis. Research through mixed methods, starting with qualitative interviews analyzed by the Bardin method and Reinert method, with the IRaMuTeQ software, followed by the Delphi method in four rounds of interviews and discussions with experts. The first version of the instrument underwent a pre-test with 10 patients, with quantitative and qualitative analysis, followed by another round of experts. The material of the qualitative interviews pointed out the terms pain and feeding as central in the experience of oral mucositis, besides providing several keywords for definition of constructs. Then 4 experts formulated 34 questions sent to 10 other experts from different regions and Brazilian institutions who analyzed the clarity, spelling and need of each question for the questionnaire. The relevant changes were made, reviewed and discussed again. The first version of the Oral Mucositis Impact Scale in Cancer Patients (EIMOPO) was presented to 10 patients who did not participate in the qualitative interviews and answered the degree of understanding and need of each question. The final analysis of the pre-test reformulated some tenses and words difficult to understand, forming the final version of the instrument. Although there are good instruments to measure QoL and oral mucositis, we present new questions about financial impacts, treatment interruption, saliva alteration, weight loss directly related to oral mucositis and psychosocial aspects.
Keywords: Surveys and questionnaires; Indicators of quality of life; Mucositis; Oncology.

Resumo
Mucosite oral é um efeito colateral dos tratamentos oncológicos, sendo conhecida como condição limitante e de grande impacto na qualidade de vida (QV). O objetivo foi elaborar um instrumento para avaliar a QV relacionada à mucosite oral. Pesquisa através de métodos mistos, iniciando com entrevistas qualitativas analisadas pelo método de Bardin e método Reinert, com o software IRaMuTeQ®, seguido do método Delphi com quatro rodadas de entrevistas e discussões com especialistas. A primeira versão do instrumento passou por um pré-teste com 10 pacientes, com análise quantitativa e qualitativa, seguido de outra rodada de especialistas. O material das entrevistas qualitativas apontou os termos dor e alimentação como centrais na experiência de mucosite oral, além de fornecerem várias palavras-chave para definição dos constructos. Baseado nesse material e na literatura, 4 especialistas formularam 34 perguntas enviadas para outros 10

especialistas de diferentes regiões e instituições brasileiras que analisaram a clareza, ortografia e necessidade de cada pergunta para o questionário. As alterações pertinentes foram realizadas, revisadas e novamente discutidas. A primeira versão da Escala de Impactos da Mucosite Oral em Pacientes Oncológicos (EIMOPO) foi apresentada a 10 pacientes que não participaram das entrevistas qualitativas e responderam o grau de entendimento e necessidade de cada pergunta. A análise final do pré-teste reformulou alguns tempos verbais e palavras de difícil compreensão, dando forma a versão final do instrumento. Embora existam bons instrumentos para mensurar QV e mucosite oral, apresentamos novas questões sobre impactos financeiros, interrupção de tratamento, alteração de saliva, perda de peso relacionada diretamente com a mucosite oral e aspectos psicossociais.

Palavras-chave: Inquéritos e questionários; Indicadores de qualidade de vida; Mucosite; Oncologia.

Resumen
La mucositis oral es un efecto secundario de los tratamientos contra el cáncer, siendo conocida como una condición limitante con un gran impacto en la calidad de vida (CdV). El objetivo fue desarrollar un instrumento para evaluar la CV relacionada con la mucositis oral. Investigación a través de métodos mixtos, comenzando con entrevistas cualitativas analizadas por el método Bardin y el método Reinert, con el software IRaMuTeQ®, seguido por el método Delphi con cuatro rondas de entrevistas y discusiones con expertos. La primera versión del instrumento se sometió a una prueba previa con 10 pacientes, con análisis cuantitativo y cualitativo, seguida de otra ronda de especialistas. El material de las entrevistas cualitativas señaló los términos dolor y alimentación como centrales en la experiencia de la mucositis oral, además de proporcionar varias palabras clave para definir los constructos. Con base en este material y en la literatura, 4 expertos formularon 34 preguntas enviadas a otros 10 especialistas de diferentes regiones e instituciones brasileñas que analizaron la claridad, ortografía y necesidad de cada pregunta para el cuestionario. Los cambios pertinentes se hicieron, revisaron y discutieron nuevamente. La primera versión de la Escala de Impactos de la Mucositis Oral en Pacientes con Cáncer (EIMOPO) fue presentada a 10 pacientes que no participaron en las entrevistas cualitativas y respondieron al grado de comprensión y necesidad de cada pregunta. El análisis final de la prueba previa reformuló algunos tiempos y palabras difíciles de entender, dando forma a la versión final del instrumento. Aunque existen buenos instrumentos para medir la CV y la mucositis oral, presentamos nuevas preguntas sobre los impactos financieros, la interrupción del tratamiento, la alteración de la saliva, la pérdida de peso directamente relacionada con la mucositis oral y los aspectos psicosociales.

Palabras clave: Encuestas y cuestionarios; Indicadores de calidad de vida; Mucositis; Oncología.

1. Introduction

Oral mucositis (OM) is a side effect that can affect cancer patients causing oral changes ranging from erythema to extensive ulcers, bringing risks to the patient by limiting oral feeding. The prevalence is so high that it has been described in 100% of patients who are irradiated in the head and neck region (Maria, et al. 2017) and 75% of patients who receive ablative chemotherapy (Sonis, et al. 2000). This side effect is defined by the World Health Organization from 1 to 4, with one erythema and 4 extensive ulcers that prevent oral feeding. Because of this condition, some patients require an enteral diet. It can also occur the spread of oral infections, causing systemic infections, since the epithelial barrier was ruptured (Ariyawardana, et al., 2019).

Direct or indirect complications of OM such as pain, bleeding, malnutrition and infection increase the need for systemic analgesics, parenteral nutrition and prolonged hospitalization, affecting the quality of life and longevity of these patients, costs of the treatment. With so many side effects, it is inherent that the patient has the affected quality of life and for this it is necessary that there are instruments capable of measuring such impacts and subjective complaints.

The literature presents several types and models of instruments, some are comprehensive, with generic questions and are used for various conditions, are ideal for comparing studies and conditions (Kolator, et al., 2017). Others are formulated for specific situations or diseases may cover peculiarities of diseases or treatments. Studies on OM and quality of life show the great interrelationship of these themes, therefore, measuring quality of life is an important tool for treating not only diseases and symptoms, but the patient as a whole, including their complaints and values in the treatment, evaluation of prognosis and survival (Oba, et al., 2021). When analyzing research that used three instruments (OHIP14, OMQoL and PROMS Scale) to evaluate the impacts of oral mucositis on the quality of life of patients undergoing hematopoietic stem cell transplantation (Pereira, et al., 2018) the need for a more precise instrument that was compatible with the routine of hospital services. Thus, the objective of the study was to develop a compact, self-explanatory and rapid application instrument within dental evaluations to assess the impact

of oral mucositis on the quality of life of cancer patients.

2. Methodology

Mixed methods of research involving the triangulation of the findings of quantitative and qualitative research, with specific methodological rigor for this type of design (Harrison, et al., 2020). Based on the good practices manual of the Office of Behavioral and Social Sciences National Institutes of Health, the sequential exploratory technique was used from qualitative to quantitative research (Creswell, et al.,2011).

This research was approved by the Research Ethics Committee of the Faculty of Dentistry of the University of São Paulo (FOUSP) as a proposing institution and by the Research Ethics Committee of the Pró-Cardiaco Hospital, responsible for ethical assessments of the Hospital Paulistano, interviews and the pre-test. All respondents received the explanation and signed the free and informed consent form in person at the Hospital Paulistano. The work is approved (Approval number 4.191.380).

Ten patients were invited to individual qualitative face-to-face interviews, either via telephone or video calls, at the discretion of the volunteer. The interviews were recorded on a single cell phone to facilitate transcription. The names were modified and the images were not reproduced in order to preserve the participants.

Patients were randomly selected from a pre-established list that included being a patient in the hospital's oncology sector, having oral mucositis or having oral mucositis in the year of the interview, and being over 18 years old. All interviews were done and transcribed manually by a single evaluator, already performing a pre-analysis on intonation, increased pauses, crying and laughter, in addition to non-verbal sayings.

The first analysis of the material was performed based on the method of Bardin (Bardin,2016), in three stages: pre-analysis, exploration of the material and treatment of the results. The first step happened through the floating reading that addresses several readings, with exhaustive contact with the content for analysis of the material, with preparation of hypotheses and preparation of the material. After this step, the coding and categorization of the information was performed by unlocking the material (Silva & Fossá, 2015). The second textual analysis was performed using the free software IRaMuTeQ® (program developed by Laboratoire d'Études et de Recherches Appliquées en Sciences Sociales, University of Toulouse, France), R interface, making simple and multivariate analysis of the texts, with hierarchical classifications (Reinert method) (Arditi, et al., 2011).

Delphi technique

The analysis of the interviews allowed the creation of questions that were sent to specialists in the care of cancer patients, in order to find a consensus on the items and formulations of the instrument. For this it was used the Delphi method, which aims to launch a scientific base from the knowledge of specialist area (Linstone & Turf, 1975).

First round

The definition of the specialists of the first round was based on theoretical training and clinical experience in mucositis. For the definition of constructs and formulation of items and for the design and metric part of the questionnaire, experts were invited who deal directly with questionnaires and metric (Fayers & Machin, 2007). After analyzing the interviews, four experts read and made a survey of the symptoms, complaints and impacts that appeared in the texts, and thus, the most relevant items were generated based on this information and those collected in the literature. From this phase, a questionnaire was developed in order to define the constructs and formulate items. Construct can be defined as a psychological aspect, not quantifiable, but that can be approximated by an answer (Boulkedid, et al., 2011). This definition was made based on the literature and the terms used in the routine to define what one wants to ask, since the concepts can bring doubts or duality.

Second round

The questionnaire was sent to a group of ten experts composed of researchers with knowledge in the area of health, scientific methodology, linguistics and who were well aware of the two concepts, 'quality of life' and 'oral mucositis'. The committee answered about the clarity, orthography and the importance of the questions that were arranged on a five-point Likert scale (where 1 = totally disagree, 2 = disagree, 3 = indifferent, 4 = agree and 5 = totally agree) and were encouraged to justify their answers. In addition, they could suggest other items and suggestions in a text box.

Third round

It was conducted with the same four experts from the first round, who performed statistical and qualitative analysis of the responses sent. Changes were suggested, creating dimensions, the order and provisions of the questions were also discussed. This questionnaire was sent to the fourth round of responses in a discussion group, where the same researchers of this round were invited to an individual reading and analysis of each question, reallocating issues in dimensions and making necessary changes taking into account the metric and semantics.

Fourth round

There was a new evaluation with the four experts discussing each question and its necessity, and a consensus among all the answers. As well as presentation, header and scale. In the event of not reaching an agreement, a meeting would be held with other specialists working with cancer patients in order to generate a consensus. This last step was not necessary.

Quantitative research (pre-test)

After the elaboration of the instrument, it was applied in 10 volunteer patients who were not part of the qualitative interviews. As cancer patients were in the risk group for Covid-19 (data collection was carried out between May and June 2021), a convenience sample was used, recruiting volunteers who had undergone dental consultation, with the following characteristics: Onco-hematological patients, preferably hospitalized, older than 18 years, who had oral mucositis in less than a year, literate, without cognitive deficits, of both sexes, native Brazilians and who agreed to sign the consent form. The interviews were conducted individually after the invitation and signature of the term. Each interviewee indicated the level of understanding through the pre-established answers: 'I understood everything', 'I understood, but it needs to be clearer' and 'I could not understand'. In addition to having a space to respond if you would like to add any comment or suggestion for improvement. At the end of the questions, the patient had space to mark the overall impression of the instrument, about the scale used and about adding or removing questions. The answers were presented with the absolute number of agreement of each question analyzed and the suggestions made by the volunteers were discussed in a new committee of experts who defined the final version, as well as the name of the instrument.

3. Results

The sample included ten patients, presented in Table 1. The same table presents the most emphatic sentences of each patient during the qualitative interviews and the pain score collected by the visual analog scale in which striking reports about the experience of oral mucositis are observed.

Table 1 - Profile of patients who participated in qualitative interviews: socio-demographic, diagnosis, degree of mucositis, pain scale and experience related to mucositis symptoms.

Partic.	Age (years)	Skin color	Sex	Diagnosis	Profession	Mucositis grade	Pain score (0-10)	Experience with mucositis
P1	58	White	Male	Non-Hodking lymphoma	Car salesman	3	8-9	"I couldn't eat anything, only pasty, oh and without seasoning, I couldn't put spice because it burned"
P2	29	White	Male	Testicular cancer	Civil Engineer	1	5-7	"Aahhh, it already came to look like I had burned my tongue with coffee, it's... but I didn't get to feel a strong pain, it just felt like it had burned."
P3	47	White	Male	Burkit lymphoma	Insurance broker	2	5-6	"It (the pain) is boring, but as the staff says so much I wanted to prevent it."
P4	66	White	Female	Mouth cancer	Administrator	3	9	"Mucositis is unbearable."
P5	53	Yellow	Male	Leukemia Myeloid	Systems Analyst	2	5-6	"It's hard to eat."
P6	54	Black	Female	Breast cancer	Home cook	2	8	"The feeling I had is that I was in living flesh, that was the feeling."
P7	74	White	Female	Breast cancer	Retired	3	8-9	"It was horrible!"
P8	59	White	Male	Mouth cancer	Lawyer	3	-	"Thick and bitter saliva, weakness, depression and discouragement..."
P9	74	White	Male	Oropharyngeal cancer	Retired	3	-	-
P10	24	White	Male	Kaposi's sarcoma	Physical Educator	3	10	"It's a very big discomfort, that you can't even move your tongue, inside your mouth, ... it's like it's really a burn."

Souce: Authors.

The first step was through the fluctuating reading of the interviews given by the 10 patients, which addressed several readings, with exhaustive contact for analysis of the material. From this was being defined what oral mucositis was, what it meant and manually were found the keywords. The encoding is described in Table 2 and the categorization of the information in Table 3.

Categorizations were made directed by the phrases, quotes or examples found in the speeches, grouping the words into similar groups. These elements were necessary for the formulation of the questionnaire items, marking the central themes addressed. The final grouping is illustrated in Table 3.

Table 2 - Codification of the findings of the qualitative interviews.

Initial categories
1. Pain
2. Strong/unbearable pain
3. Taste
4. Dry mouth
5. Mucositis
6. Candidiasis
7. Insecurity
8. Burning sensation
9. Food
10. Fatigue
11. No longer wearing prostheticse
12. Wound
13. Impossibility of sleeping
14. Fragile teeth
15. Temperature
16. Food consistency
17. Hunger
18. Laser
19. Red mouth/vermilion
20. Hygiene
21. Spit
22. Fear of losing your teeth
23. Strong remedies
24. Changes
25. Weight Loss
26. Discomfort
27. Anxiety
28. Speech

Souce: Authors.

As already mentioned, the textual analysis of the interviews was also performed using the Reinert method (IRaMuTeQ and R software). The words "food", "pain" and "mouth" presented the highest frequency of citation, so they have central positions in the Similitude Analysis, showing that the connection passes through the word pain (Graphic 1). Based on these analyses, in the second round, the instrument was elaborated with 34 questions, with four sub-items, the first three about the spelling, clarity and necessity of the question for the questionnaire, with answers evaluated on a Likert scale with 5 options: 1 = I totally disagree; 2 = I disagree; 3 = No opinion; 4 = I agree; 5 = I totally agree. The fourth sub-item allowed the rewriting of the sentence or opinions justifying the answer. At the end of the questionnaire was an answer box for experts to suggest new questions or constructs.

Table 3 - Final categorization of the EIMOPO Instrument.

Final category	Initial categories	Guiding concept
A. Symptom	1.Pain	Symptom of greater citation and emphasis on discourses
	2. Strong/unbearable pain	Expressing the great impact of this symptom
	3. Palate	Referring to alteration or lack of taste
	4. Dry mouth	Indicating the discomfort of lack of salivation
	8. Burning sensation	Sensation of strong burning, with the intention of denoting the intensity of the symptom
	17. Hunger	Impact on a basic need, in addition to bringing great suffering
	21.Spit	Attempt to accurately define symptoms
	26. Discomfort	Physical symptom milder than pain and to characterize sensations
B. Diagnosis	5. Mucositis	Diagnosis pointing out the complaint in question
	6. Candidiasis	Referring to another diagnosis that hindered/worsened the situation of the mouth
C. Psychological	7. Insecurity	Feeling about symptoms
	22.Fear of losing your teeth	Thought that teeth may fall out like hair
	27. Anxiety	Referencing stress in the face of treatment
D. Limitation	9. Food	Impact on diet, difficulty and/or concern about lack of it
	10. Fatigue	Physiological or psychological
	11. Stopped using prosthesis	Due to pain or insecurity, they had to remove the prostheses causing an impact on their diet.
	13. Impossibility of sleeping	Expressing an intense disturbance
	20. Hygiene	Worry about not being able to accomplish something basic and fear of making the situation worse
	24. Changes	Showing the great need to change everything in your life
	28. Speech	Important social aspect
E. Physical alteration	12. Wound	Attempt to define the aspect of the injury and also to express the severity of the injury
	14. Fragile teeth	Enveloped by fear of losing teeth
	19. Red mouth / vermilion	Describing the perception of the mouth
	25. Weight loss	Concern associated with loss of health or validating major dietary restriction
F. Adequation	15.Temperature	Need for adequacy
	16. Food consistency	Need for adequacy
G. Treatment	18. Laser	Treatment carried out that helped a lot
	23. Strong remedies	Showing the gravity of the situation

Souce: Authors.

Among the ten specialists answered the first questionnaire, of them three are university professors, two of whom teach content on oral mucositis and coordinate dental services for cancer patients and one who teaches and guides graduate students on the elaboration and validation of instruments on quality of life, two dentists exclusively serve cancer patients, two nurses are specialists, one in oncology and one in hematology and bone marrow transplants, a nutritionist and a psychologist both specialists in oncology, as well as a doctor. This sample included professionals from public and private institutions, composed of specialists who carry out their activities in São Paulo (capital and interior), Minas Gerais, Paraíba, Recife and Piauí. They were invited to participate for their lines of research or performance. The experts' responses were analyzed quantitatively and qualitatively.

In the third round in a new debate with the four researchers, all questions were read and adjusted according to the recommendations made by the experts, some questions needed to be read individually and passed in later discussion, since they

presented some disagreement. After this process, the sentences were placed and distributed according to the domain they fit so that they were ordered in a clear and logical way, both for the respondents and for the researchers to apply the instrument. They are classified into seven domains: pain, daily activities, saliva, diet, social impact of oral mucositis and effects of oral mucositis on cancer treatment.

In the fourth round, the questions were renumbered and transcribed to fit with the chosen scale, the Likert frequency scale, numbered from 0 to 4, indicating how much each statement was present during the treatment. The choice was based on the literature with psychometric studies (Whiting, et al., 2011; Trakman, et al., 2011). The instrument header and instructions to researchers and patients were also formulated.

In the pre-test phase, the instrument was evaluated by a small group of volunteers, 10 participants, to assess understanding, difficulties and suggestions. They were given, for each question, a board to mark the options: "I understood everything", "I understood, but it needs to be clearer" or "I didn't". After each question there were lines for suggestions and/or doubts. At the end of the questionnaire there were questions about the general understanding of the questionnaire and about the model of the answers. Finally, the patient was invited to talk if there were any suggestions, complaints or tips that could be added. The choice of volunteers followed the criteria of having oral mucositis, over 18 years of age and literate, drawn from the list of patients of the day and who had time to read calmly and answer the questions.

In the fifth round, the last round of experts rewrote the questions with the pre-test suggestions, disregarding only the suggestion to leave the definition of mucositis in the first question that was suggested by a participant, it was only relocated in the header. In addition, of the 28 items proposed, 4 were suppressed, generating the final instrument. The name of the instrument was also defined as the Scale of Impacts of Oral Mucositis in Cancer Patients (EIMOPO). The questions of the final version are in table 4.

The Final version

SCALE OF IMPACTS OF ORAL MUCOSITIS IN ONCOLOGICAL PATIENTS (EIMOPO)

Instructions (these will not be read to the patient):

• The instrument must be applied to patients undergoing treatment who at some point had oral mucositis.

• Before being applied, the interviewer must define oral mucositis as sores/injuries that appeared in the mouth due to chemotherapy and/or radiotherapy.

• Important: the researcher must inform, in the table below the statement, the period of time he wants to measure the responses, and may use phrases such as: since the beginning of radiotherapy/chemotherapy; since the last cycle; last week; since you started treatment at this institution or as per the study design.

• In longitudinal studies using this instrument, it should be made clear to patients that the questions refer to the time between the last interview and the current moment.

Statement (to read to the patient):

Oral mucositis are wounds/injuries or pain in the mouth resulting from cancer treatment, based on this experience, we would like you to mark the frequency with which each of these effects occurred. Remember to choose only one item in each question.

Graphic 1 - Similitude Analysis.
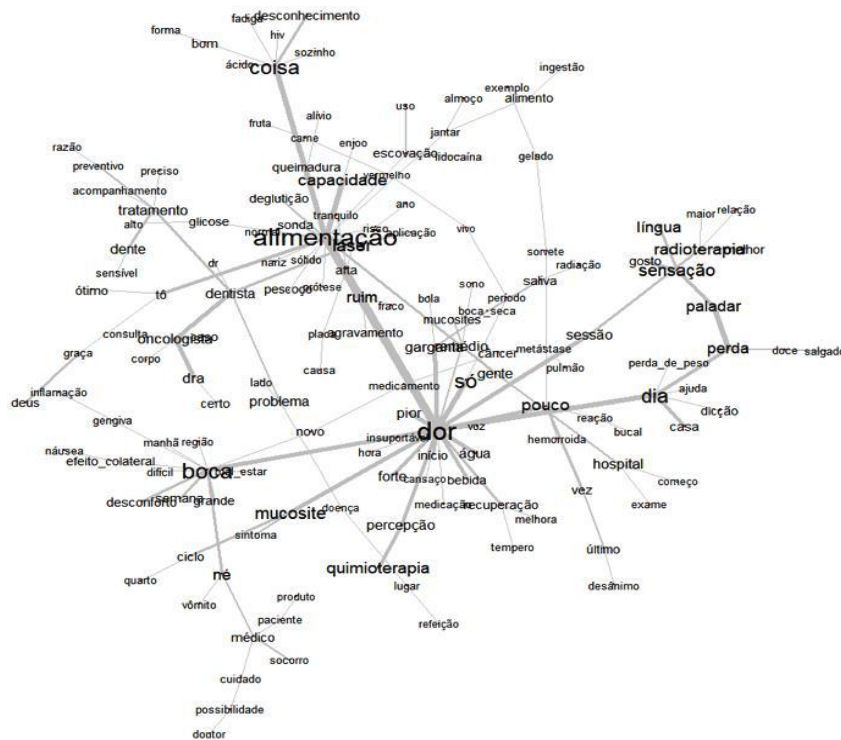
Source: IRaMuTeQ and R software.

Table 4 - The Final version in Portuguese.

You will answer the questions below considering your experience with MO _____(time period)
Responda de acordo com a numeração
0 ( ) Nunca   1 ( ) Raramente   2 ( )Ocasionalmente   3 ( ) Frequentemente   4 ( ) Muito frequentemente
1.Você sentiu ou sente dor na boca por ter mucosite oral?
2. Você sentiu ou sente dor na boca no momento de escovar os dentes por ter mucosite oral?
3. Você sentiu ou sente dor na boca no momento de se alimentar por ter mucosite oral?
4. Você sentiu ou sente dor para engolir por ter mucosite oraL?
5.   Você teve ou tem dificuldade de dormir, ou acordou à noite por ter mucosite oral?
6. Você teve ou tem dificuldade de higienizar a boca por ter mucosite oral?
7. Você teve ou tem dificuldade de abrir a boca por ter mucosite oral?
8. Você teve ou tem dificuldade de comer por ter mucosite oral?
9. Você sentiu ou sente sua boca seca por conta do tratamento oncológico?
10. Você sentiu ou sente sua saliva mais pegajosa ou grossa por conta do tratamento oncológico?
11.   Você sentiu ou sente mudança no sabor dos alimentos por conta do tratamento oncológico?
12.   Você tem comido menos por não sentir o sabor dos alimentos por conta do tratamento oncológico?
13.   Você sentiu ou sente sabor salgado, amargo ou metálico na boca por conta do tratamento oncológico?
14. Você preferiu ou prefere comer alimentos batidos ou líquidos por conta do tratamento oncológico?
15. Você deixou ou deixa de conversar por conta da mucosite oral?
16. Você ficou ou fica irritado/impaciente por conta da mucosite oral?
17. Você ficou ou fica triste/desanimado por conta da mucosite oral?

18. Você deixou ou deixa de conviver com as pessoas ou ir à compromissos por conta da mucosite oral?
19. Você sentiu ou sente que os efeitos da mucosite oral foram a parte mais difícil do tratamento oncológico?
20. Você pensou ou pensa em adiar/parar de fazer quimioterapia ou radioterapia por conta da mucosite oral?
21. Você teve ou tem alguma dificuldade financeira por conta do tratamento em oncológico?
22. Você teve ou tem medo de que o tratamento oncológico afete seus dentes?
23. Você teve ou tem medo de que o tratamento oncológico afete sua língua, lábios e/ou gengivas?
24. A mucosite oral contribuiu para que você perdesse peso durante o tratamento oncológico?

Souce: Authors.

4. Discussion

The centrality of the word pain was observed in the discourse analyses, indicating in a pragmatic way how unpleasant the experience of OM is. During the qualitative questions, a quantitative question was applied to ask about pain in order to analyze the patient's relationship with a numerical scale, since the purpose of the research was to present a quantitative instrument and to relate the perception of pain. The numerical classification was very high, with an average of 7.7 pain, and grade 3 of mucositis with a score of 9 of 10. Pain from the neurobiological point of view can be divided into three types, as a system of protection directly against harmful stimuli. Inflammatory pain in injured tissues that serves for repair and to protect from further damage and finally, neuropathic or dysfunctional pain such as fibromyalgia. This information is very important for all oral mucositis analyses, as it requires researchers and clinicians great sensitivity to receive this information, quantify it and address it, either directly or with the conduct of new studies. The findings show oral mucositis as synonymous with pain and that go beyond the physical dimension of the patient.

Food was reported as important from the nutritional point of view - which improves the performance, well-being and functioning of the body, ensuring better responses to treatment, which like mucositis, is linked to dehospitalization - and from the sociocultural point of view, because it has the diet and choice of foods as a lifestyle (Wiseman, 2019) and on social relationships, because in several cultures social meetings involve food and drinks, or coexistence that requires going out to eat (Lo Monaco G & Bonetto, 2019) and this directly affects the concepts of QoL, since it deprives the patient of performing the routine activities of the day-to-day. The dysgeusia (taste alteration) or ageusia (absence of taste), very frequent symptoms in cancer patients also contributed to this impact, removing the pleasant experience during feeding (Hovan, et al., 2010). These symptoms were already well known in the field of oncology, but gained great focus in the coronavirus pandemic, by the frequency of these symptoms (17) and the impact on QoL, so a much larger portion of the population, including health professionals could understand the importance of the lack of taste and the change in salivary flow that was also noticed in patients with Covid-19.

Patients reported complaints of xerostomia and change in consistency, generating difficulty during chewing, with increased chewing time and feelings of shame. This impact is reported in the literature as one of the main complaints of patients (Mehraeen, et al., 2010)

. The symptoms of pain, dysgeusia or ageusia, xerostomia added result in weight loss, loss of muscle mass that consequently will interfere in the performance of the patient during the treatment and impacts on the possibility of performing physical activities or daily life (Fontanele & Pedrosa, 2021).

Asleep interruption was reported more than once, this complaint was related to wear and tear, stress and as a factor of great systemic importance for good physiological status in the face of cancer treatment. Studies confirm the relationship between sleep deprivation and cancer showing exacerbation of symptoms and side effects (Aguilar-Ponce, et. Al., 2013). The instrument also makes a financial reflection/measurement, since the socioeconomic aspect and cancer are so interconnected that the region in which a person lives in the city of São Paulo can define the prognosis of the disease; although the central regions of the city of

São Paulo report a higher incidence, the peripheral regions were responsible for higher mortality (Antunes, et al., 2001). Treatment for cancer and its side effects is very costly for both the healthcare system and patients and each side effect can make treatment more expensive and more exhausting. Since 2011, the expression financial toxicity is used that alludes to the other toxicities of the treatment and is a sum between objective expenses, directly linked to the costs of the treatment and also the losses and subjective linked to the loss of wealth by the hours spent with the treatment and components of anxiety (Carrera & Olver, 2015). Emotional aspects permeate the entire instrument from the first response, because the painful experience interferes with the patient's emotions and self-perception. Thus, questions such as 'Have you become irritated/impatient because of oral mucositis?' and 'Have you become sad or are sad/discouraged because of oral mucositis?' are the most explicit and clearly make the interviewee reflect on coping with OM and in addition to the measurement for the studies, can help the professionals who apply this instrument to refer the patient to mental health professionals.

Other query question psychic sensitization in a more subtle way: 'Have you had or are you afraid that cancer treatment will affect your teeth?', 'Have you had or are you afraid that cancer treatment will affect your tongue, lips and/or gums?'. Fear is characterized by worry, caution, and increased tension about something known and/or something that is known to happen; culturally it is associated with illness and death (Gilam, et al., 2020). Carefully the term 'fear' and not 'anxiety' was used to address the concern for a threat identified and shared by other people's experiences (Gilam, et al., 2020), since in the qualitative part were found phrases such as: 'the staff talks so much about mucositis that I already wanted to prevent'. Some questions had a psychosocial character: 'Have you stopped talking or do you stop talking because of oral mucositis?'; 'Have you left or do not live with people or go to appointments because of oral mucositis?' For one can notice social interactions as basic activities of human beings where their lack can accentuate various mental disorders.

One of the domains established in the Scale of Impacts of Oral Mucositis in Cancer Patients (EIMOPO) is the impact of mucositis in relation to oncological treatment that can be illustrated by the questions: 'Did you feel or feel that the effects of oral mucositis were the worst part of the oncological treatment?'; "Have you thought or are you thinking about postponing/stopping chemotherapy or radiation therapy because of oral mucositis?" Exploratory questions that attempt to analyze OM within the totality of cancer treatment. The interruption of chemotherapy and/or radiotherapy can affect the prognosis of treatment, a fact known by professionals and patients, but sometimes the effect of OM is so intense that it is considered the only possibility to provide care support to patients.

The process of illness has individual value, permeated by cultural aspects, composed of experiences and beliefs and that confronts the patient with the possibility of finitude and naturally triggers feelings of sadness and anguish (Aldhouse, et al., 2020). Changes in the body and side effects are expected and it is up to the professional to help and respect the time of each patient. Communication plays an essential role in this mediation both to treat symptoms and to welcome them. Communication barriers influence all treatment, as they cause a distance between professionals and patients. One of the main risks is to minimize side effects or complaints that are important for treatment. Exploring the scientific literature we can find accounts like this, which titled a relevant article: "'You lose your hair, what's the big deal?' I was so embarrassed, I was so self-conscious, I was so depressed, "'You lose your hair, what's the problem?' 'I was so embarrassed, I was so embarrassed, I was so depressed'" (Aldhouse, et al., 2020). This report is impactful, because something that seems superficial or unworthy of being considered a problem is of great importance for the patient who suffers from hair loss and is fragile and does not find support or empathy. Applying scales of symptoms or QoL can generate greater approximation by bringing to the patient the idea that the professional is interested in their feelings and complaints and precisely for this reason, the scales, questionnaires or instruments need to have a clear, inclusive language that can better capture the complaints of patients, with an appropriate and validated format (Greenhalgh, et al., 2018).

The rounds of experts, following the Delphi method were fundamental for the language adjustment, because they

exchanged ambiguous, difficult or dubious words. This part of the work was also fundamental to reduce the selection bias, since the data collections were made in a single hospital, the selected specialists work in different services, public and private, universities and hospitals, researchers and non-researchers, trained in different institutions, and who work in several regions of the country, in addition to contributing to the definitions of construct and possible complaints not reported in the qualitative interviews. Thus, it was possible to eliminate regional expressions, soften technical terms, find other complaints both for the diversity of professions within the health area and for the inherent differences of each institution.

Three instruments, Oral Health Impact Profile short form (OHIP-14), Oral Mucositis Quality of Life (OMQoL) and Patient-Reported Oral Mucositis Symptom (PROMS) were used in a two-year longitudinal study of interviews, with almost one thousand questionnaires answered (4) in São Paulo. During the interviews, conducted by the team of the present study, some patients reported important complaints that they would like to be measured, but that were not included in the questions of the instruments applied. This motivated the idealization of the present research, with the purpose of contemplating complaints and notes of patients and specialists.

The main limitation of this study is the interviews with patients seen only in an Oncology center in the city of São Paulo. However, considering that this is only the stage of creation of the instrument, the next steps should consolidate the proposal. The team will work to expand the application in other locations, and with a greater number of patients, so that the results).

5. Final Considerations

The EIMOPO instrument was developed, which can be used to measure the impacts on quality of life in onco-hematological patients with oral mucositis. Our objective was completed, as the development of an instrument requires several steps, adjustments and modifications. This research group has been applying the instrument to a larger sample of patients can offer greater evidence than we initially observed in the present research: the impacts of oral mucositis; they impact the quality of life of patients undergoing cancer treatment as a whole, including psychological and financial aspects. In addition to developing a child version and validation for other languages.

References

Aguilar-Ponce J. L., Granados-García M., Cruz López J. C., Maldonado-Magos F., Alvarez-Avitia M. A., Arrieta O., et al. (2013). Alternating chemotherapy: gemcitabine and cisplatin with concurrent radiotherapy for treatment of advanced head and neck cancer. *Oral Oncol*. 49:249-54.

Aldhouse N. V. J., Kitchen H., Knight S., Macey J., Nunes F. P., Dutronc Y., et al. (2020). "'You lose your hair, what's the big deal?' I was so embarrassed, I was so self-conscious, I was so depressed:" a qualitative interview study to understand the psychosocial burden of alopecia areata. *J Patient Rep Outcomes*. 4:76.

Antunes J. L., Biazevic M. G., de Araujo M. E., Tomita N. E., Chinellato L. E., & Narvai P. C. (2001). Trends and spatial distribution of oral cancer mortality in São Paulo, Brazil, 1980-1998. *Oral Oncol*.;37:345-50.

Antunes J. L., Biazevic M. G., de Araujo M. E., Tomita N. E., Chinellato L. E., & Narvai P. C. (2001). Trends and spatial distribution of oral cancer mortality in São Paulo, Brazil, 1980-1998. *Oral Oncol*.;37:345-50.

Arditi C., Walther D., Gilles I., et al. (2020). Computer-assisted textual analysis of free-text comments in the Swiss Cancer Patient Experiences (SCAPE) survey. BMC Health Serv Res. 20:1029.

Ariyawardana, A., Cheng, K. K. F., Kandwal, A., Tilly, V., Al-Azri, A. R., Galiti, D. et al. (2019). Systematic review of anti-inflammatory agents for the management of oral mucositis in cancer patients and clinical practice guidelines. Support Care Cancer. 27: 3985-35.

Bardin L. (2016). *Content Analysis*. Edições 70.

Boulkedid R., Abdoul H., Loustau M., Sibony O., & Alberti C. (2011). Using and reporting the Delphi method for selecting healthcare quality indicators: a systematic review. *PLoS One*. 6:e20476.

Carrera P.M & Olver I. (2015). The financial hazard of personalized medicine and supportive care. *Support Care Cancer*. 23:3399-401.

Creswell J. W, Klassen A. C., Plano Clark V. L., & Smith K. C. (2011). Best practices for mixed methods research in the health sciences. National Institutes of Health; Available from: https://obssr.od.nih.gov/sites/obssr/files/Best_Practices_for_Mixed_Methods_Research.pdf

Fayers, P. M., & Machin D. (2007). Scores and measurements: validity, reliability, sensitivity. In: Quality of Life: the assessment, analysis and interpretation of patient-reported outcomes. *New Jersey:Wiley*.

Fontenele B. M. N., & Pedrosa M. D. S. (2021). Xerostomia and Taste Alterations in COVID-19. *Ear Nose Throat J*.186S-187S.

Gilam G., Gross J. J., Wager T. D., Keefe F. J., & Mackey S. C. (2020). What Is the Relationship between Pain and Emotion? *Bridging Constructs and Communities. Neuron.*107:17-21.

Greenhalgh J, Gooding K, Gibbons E, Dalkin S, Wright J, Valderas J, et al. (2018). How do patient reported outcome measures (PROMs) support clinician-patient communication and patient care? A realist synthesis. J Patient Rep Outcomes. 2:42.

Harrison R. L., Reilly T. M., & Creswell J. W. (2020). Methodological rigor in mixed methods: an application in management studies. *Journal of Mixed Methods Research.*14:473-95.

Hovan A. J, Williams P. M., Stevenson-Moore P., Wahlin Y. B., Ohrn K. E, Elting L. S., et al. (2010). A systematic review of dysgeusia induced by cancer therapies. *Support Care Cancer*.1081-7.

Kolator, M., Kolator, P. & Zatoński, T. (2018). Assessment of quality of life in patients with laryngeal cancer: a review of articles. Adv Clin Exp Med. 27: 711-5.

Linstone H. A & Turf, M. (1975). *The Delphi method: techniques and applications*. Boston:Addison-Wesley.

Lo Monaco G., & Bonetto E. (2019). Social representations and culture in food studies. *Food Res Int*.,115:474-479.

Mehraeen E., Behnezhad F., Salehi M. A., Noori T., Harandi H., & SeyedAlinaghi S. (2021). Olfactory and gustatory dysfunctions due to the coronavirus disease (COVID-19): a review of current evidence. *Eur Arch Otorhinolaryngol*. 278:307-312.

Oba, M. K., Innocentini, L. M. A. R., Viani, G., Ricz, H. M. A., de Carvalho Reis, T., Ferrari, T. C. et al. (2021). Evaluation of the correlation between side effects to oral mucosa, salivary glands, and general health status with quality of life during intensity-modulated radiotherapy for head and neck cancer. *Support Care Cancer*. 29: 127-34.

Pereira N. F., Silva P. V. R. D., Fukuoka C. Y., Michel-Crosato E., Gonçalves A. S., Alves F. A., et al. (2018). Measurement of oral health quality of life among patients who underwent haematopoietic stem-cell transplantation. *Braz Oral Res*. 32:e78.

Silva A. H.& Fossá M. I. T. (2015). Análise de conteúdo: exemplo de aplicação da técnica para análise de dados qualitativos. *Qualitas Rev Eletrônica.* 16.1

Sonis S. T., Peterson R. L., Edwards L. J., Lucey C. A., Wang L., Mason L. et al. (2000). Defining mechanisms of action of interleukin-11 on the progression of radiation-induced oral mucositis in hamsters. Oral Oncol. 36(4):373-81.

Trakman G. L., Forsyth A., Hoye R., & Belski R. (2017). Developing and validating a nutrition knowledge questionnaire: key methods and considerations. Public Health Nutr., 20:2670-9.

Whiting P. F., Rutjes A. W., Westwood M. E., Mallett S., Deeks J. J., Reitsma J. B., et al. (2011). QUADAS-2: a revised tool for the quality assessment of diagnostic accuracy studies. *Ann Intern Med.* 155:529-36.

Wiseman M. J. (2019). Nutrition and cancer: prevention and survival. *J Nutr*.122:481-487.