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Professional Training Strategies for Dental Care in the Face of a Sars-Cov-2 Pandemic Scenario

Estratégias de Treinamento Profissional para Atendimento Odontológico em um Cenário de Pandemia de Sars-Cov-2

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Abstract

The pandemic caused by the coronavirus has brought numerous challenges for higher education, especially in health courses due to the various practical activities with patients, increasing the risk of contamination. The objective of the work was to report the training process in biosafety in dental care in the face of a pandemic scenario and risk of contamination for SARS-CoV-2 and to evaluate its impact on the resumption of clinical practice. From the biosafety protocol built collectively for clinical care, remote training was applied to all 398 students and professors of the Faculty of Dentistry using the virtual environment and several different online resources. At the end, a questionnaire was applied to all participants, and to students from the last period, also practical training before returning to service. 96% participated in the activities and reported it as important. The students from the last period felt safer to return to care and were able to notice an advance regarding the biosafety procedures to be used. The process of training and updating the biosafety protocols for responsible dental care in a pandemic phase by COVID-19 was important, since it reduced anxiety and mobilized the integration of professors and students of the Dentistry course around the search for knowledge for safe dental care.

Keywords: COVID-19. Biosafety. Dental education. Education technology, E-Learning.

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Estratégias de Treinamento Profissional para Atendimento Odontológico em um Cenário de Pandemia de Sars-Cov-2

Resumo

Resumo: A pandemia causada pelo coronavírus trouxe inúmeros desafios para o ensino superior, principalmente nos cursos da área da saúde devido às diversas atividades práticas com os pacientes, aumentando o risco de contaminação. O objetivo do trabalho foi relatar o processo de capacitação em biossegurança em assistência odontológica frente a um cenário de pandemia e risco de contaminação por SARS-CoV-2 e avaliar seu impacto na retomada da prática clínica. A partir do protocolo de biossegurança construído coletivamente para o atendimento clínico, foi aplicado o treinamento à distância a todos os 398 alunos e professores da Faculdade de Odontologia utilizando o ambiente virtual e diversos recursos online. Ao final, foi aplicado um questionário a todos os participantes, e aos alunos do último período, também o treinamento prático antes do retorno ao serviço. 96% participaram das atividades e as relataram como importantes. Os alunos do último período sentiram-se mais seguros para retornar aos cuidados e puderam perceber um avanço quanto aos procedimentos de biossegurança a serem utilizados. O processo de treinamento e atualização dos protocolos de biossegurança para atendimento odontológico responsável em fase de pandemia pelo COVID-19 foi importante, pois reduziu a ansiedade e mobilizou a integração de professores e alunos do curso de Odontologia em torno da busca de conhecimentos para atendimento odontológico seguro.

***Keywords**: COVID-19. Biossegurança. Educação odontológica. Tecnologia educacional. E-Learning.*

1. Introduction

On March 11, 2020, the World Health Organization (WHO) declared a Public Health Emergency of International Importance, characterized as a pandemic. The coronavirus disease (COVID-19) caused by the new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (GORBALENYA 2020; WHO, 2020; REN, 2020; XU, 2020), is transmitted through close contact with people and by (BELSER; ROTA; TUMPEY, 2013; WEST, 2020; LU, 2020; ROTHE, 2020). In addition, some studies suggest that the virus can be transported through the air via aerosols formed during medical and dental procedures (WAX; CHRISTIAN, 2020).

Because of the high transmissibility, the lack of a preventive vaccine, and an insufficiency in drugs for the treatment of COVID-19, the most effective ways to contain the infection and reduce the number of patients and deaths are the adoption of practices involving physical isolation, social distancing, and the use of masks. These measures are believed to prevent potentially devastating impacts caused by the disease (HOERTEL, 2020). Authorities determined that schools and universities should be closed to avoid crowds (ÖLCER; YILMAZ-ASLAN; BRZOKA, 2020) a measure that directly interferes with the educational context (HOERTEL,2020; COWLING, 2020; GUERRIERO; HAINES; PAGANO, 2020).

In view of the adverse scenario that had developed, resources for the teaching-learning process were limited. For this reason, during the COVID-19 pandemic, measures such as the adoption of online classes with case studies and instructions, as well as incentives for students to engage in self-learning, were

recommended (ÖLCER; YILMAZ-ASLAN; BRZOKA, 2020; DESAI, 2020). Additionally, educational institutions were encouraged to support the academic community with psychological services (MENG; HUA; BIAN, 2020).15

Driven by the need to maintain some of their activities, educational institutions have had to take measures to increase the ability to teach remotely. Among the possibilities imposed, asynchronous activities—in which participants do not need to communicate simultaneously—have emerged as good alternatives since they offer flexibility and time optimization (DANIEL, 2020; ELLAWAY; CLELAND; TOLSGAARD, 2020). These activities allow the centralization of students and facilitate teachers' performance of administrative tasks. However, among the limitations, evaluation processes cannot be conducted during classes since feedback is not immediate. This is significant, especially in training contexts that involve the need for practical activities (DESAI, 2020; MUKHTAR, 2020).

In the dental education environment, given its particular practical nature, students and teachers must become familiar with additional protective measures concerning biosafety (PENG, 2020), thus reducing concerns and anxieties that may be generated during the return to clinical activities. With the limitations in pedagogical resources, ensuring the qualification of students and teachers as well-versed in new biosafety routines in a school clinic can be added to the numerous challenges. Therefore, the relevance of this study is justified when presenting the measures taken by a higher education institution and strategies that were mediated by remote technologies in the qualification of teachers and students for the safe resumption of dental care.

The objective of this study was to describe the training process for biosafety in dental care in the face of a pandemic and the risk of contamination with SARS-CoV-2. Another aim was to evaluate the impact of training on the resumption of clinical practice.

2. Materials and Methods

This is a descriptive study regarding the biosafety training process implemented to ensure that dental care could resume in the midst of the COVID-19 pandemic. Accordingly, online training and face-to-face training were employed.

All 346 students enrolled in the Dentistry course at a private Brazilian university and their 52 professors were invited to participate in this process. The inclusion criteria were enrollment in the Dentistry course or status as an active professor for the course. Those who did not participate in any stage of training were excluded from the study. Ethical criteria were respected according to the Declaration of Helsinki and approved by the Research Ethics Committee (CAEE: 35116220.5.0000.5515).

Initially, an online course lasting 10 days was created, made available from a virtual learning environment (AVA) used by the university, this is a platform known as Moodle, being a free system that allows you to create a learning environment as if was an online classroom; all were able to participate under the structuring and supervision of an organizing team. The content covered was based on a document prepared by the Collegiate Committee (COELHO, 2020), which was developed from a search for scientific literature and the guidelines of responsible bodies that regulate and guide biosafety practices in dentistry (ANVISA, 2020; CDC, 2020; CVS, 2020; LIDDELL; NORBO, 2020; PIRES; FONTANELLA, 2020; THOMÉ, 2020, WITZEL, 2020).

The activities in the VLE were arranged in five modules structured according to the themes listed in Figure 1. Each module was open and available for two days, and the participants were instructed to follow through an explanatory script that detailed the times and activities for their participation (steps, structure, and evaluation) (Figure 1).

The active methodology was the main means used in the teaching and learning process, as the interaction allowed students to have autonomy and compliance, with the mediation of the teacher. When accessing the VLE, the first screen displayed contained an explanatory message with the objectives to be achieved as well as the tutors who would assist participating students. This information was available throughout the training process.

Each module consisted of three consecutive steps with the following activities: (1) access to reference materials in the form of texts, video lessons, webinars, and demonstration videos; (2) training through games focused on the protocols, collaborative participation of mind maps and participation in a live doubts forum (Google Meet), and (3) a questionnaire to evaluate the teaching-learning process (Figure 1).

The games were made using the Construct 3 tool, by a master's student in Dentistry. The first game was called "Settings", in the first phase the students had to put where the correct places for the protection barriers would be, in a dental office and, in the second phase, which protective equipment should be used on the patient. In the second game, called "Aerosol Reduction Strategies", the students had to put which equipment or material should be more or less used during the Pandemic.

Activities were made available (via a script) to be carried out following the order in which they were proposed at predetermined times (Figure 1). They were available to be reviewed as many times as the participants deemed necessary. The parameter was established to proceed to the next stage after 70% of the questionnaire was correct; this action could be carried out as many times as necessary. At the end of the training, a "virtual library" was also created to give participants free access to the most recent studies on the subject.

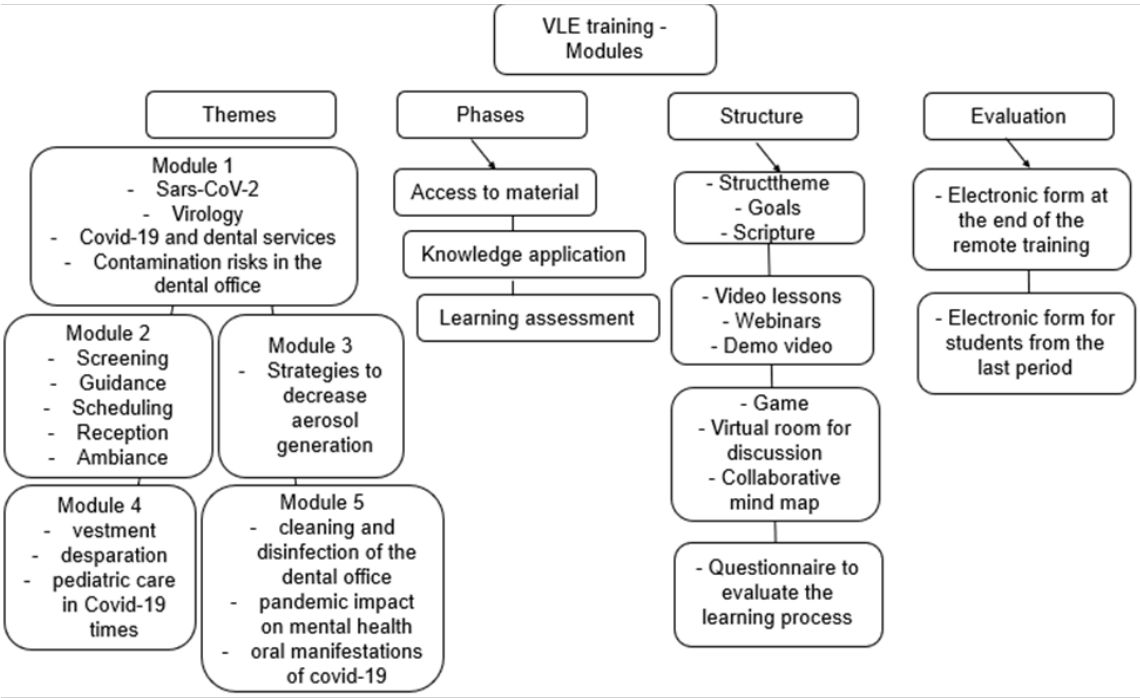

Figure 1: Scheme for structuring modules in a virtual learning environment (VLE).

At the end of the online activities, participants were invited to complete an electronic form using Google Forms. They were asked about the activities that they favored the most for achieving the objectives, difficulties in carrying out the activities, and the greatest difficulties encountered during the training program. A space was available for free comments so that the participants could voice their concerns about the new

guidelines for biosafety in the face of the pandemic and explain if the project achieved the objective of enabling the resumption of clinical dental care. Participants were also asked to indicate the activities that most favored achievement of this objective.

The calculation for the participation of students and teachers in training was based on the completion of the questionnaires and the percentage of correct answers. Participating students who completed the training were given a certificate of participation in biosafety training for dental care.

After completing the remote training, students in the last period of the course undertook face-to-face training in order to return to dental care afterward. At the end of the training program, participants completed a questionnaire regarding assessments of their perceptions about the infectivity of SARS-CoV-2, their main concerns before and after training, their sense of security for performing dental care, care acquired after training, the training aspects considered correct in terms of biosafety, their level of anxiety before and after training, and their degree of satisfaction with the face-to-face training.

The data obtained from the completed questionnaires were tabulated, and a descriptive statistical analysis was performed. A similarity analysis was also carried out to verify the aspects that resulted in the most favorable responses regarding the training process. For this, R and IRAMUTEQ software were used.

3. Results

After the proposed training period, of the 398 participants invited and enrolled in the VLE, 96% (n = 382) participated in at least one module. All questionnaires were answered by 78% of the participants included in the study (i.e., 63% of teachers and 73% of students). The 4% who did not participate in the activities corresponded to 13% and 2.3% of the teachers and students, respectively (Figure 2).

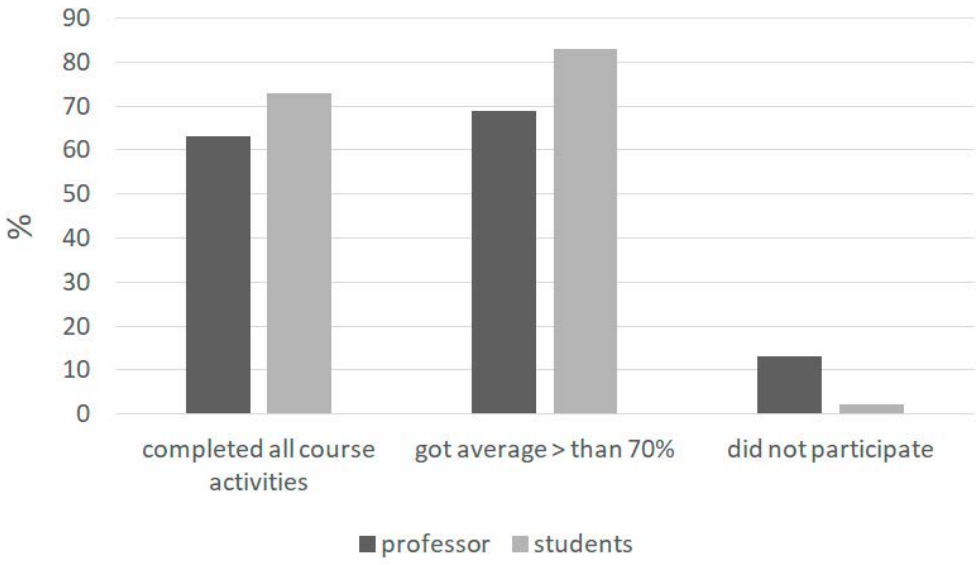

Figure 2: Percentage distribution in relation to participation in and value of the course.

Regarding questionnaires for assessments of learning completed at the end of each module, the average number of attempts to answer the questionnaire was 1.46 ± 1.50. The value of the course was evaluated by the percentage of correct answers in the questionnaires; 81% of the participants (n = 325) obtained a performance equal to or greater than 70% (i.e., 69% of teachers and 83% of students) (Figure 2).

The course feedback questionnaire disseminated at the end of online training was answered by 161 participants (i.e., 36 teachers and 125 students).

Among the activities carried out that participants said facilitated achievement of the learning objectives were the video classes available (88% of participants), followed by the demonstration videos (76% of participants), questionnaires at the end of the modules (61% of participants), reference material (29% of participants), games (28% of participants), webinar (27% of participants) forum of doubts (17% of participants).

Regarding difficulties in carrying out the activities, 88% of the participants said that they had not encountered any. Among those who cited difficulties, especially students new to the university and teachers with academic training in areas other than dentistry, understanding some processes related to dental care was problematic.

The reported concerns were related to remembering all details of the biosafety rules, such as the order for placing and removing personal protective equipment (PPE) and the order for cleaning and disinfecting after dental care. Concerns about assimilating the new reality of the clinical routine resulting from the pandemic were also stated, particularly since most students had not had contact previously with new mandatory PPE items that were inserted in this new context. Furthermore, they were not familiar with the practical implementation of the new standards of biosafety. Another concern was how to apply strategies for decreasing aerosol production, as it is more complex in actual practice.

When asked about achievement of the objectives outlined for the training process, 85% of participants reported that they were achieved, whereas 15% viewed them as partially achieved. No participants thought that objectives were not achieved. Regarding what was especially effective for achieving the objectives, the following were cited: the various ways of providing content, the objective classes, videos relating theory to practice, the application of knowledge in questionnaires (even if the information was not known), the adequate selection of content, up-to-date information, widely explained content, articles made available to complement the theme, games promoting learning, schedule flexibility for attending classes—including the opportunity to attend several times—, and the organization of ideas according to a mind map.

Participants commented that the return to the clinic should be preceded by practical training. They also stated that the training program promoted knowledge about SARS-CoV-2 and stimulated appropriate behavior during dental care. They also mentioned that the training was applicable beyond practical activities in the field of dentistry; it also facilitated rigor in biosafety care and the adoption of and guidance regarding habits that favor collective health care. A feeling of greater security was recurrent and indicative of the importance of protection for dentists, assistants, and patients. The participants suggested that this training process be reviewed at least once per year to continue the same focus.

In total, 79 students from the last period of the course took part in face-to-face practical training in order to resume clinical activities. The questionnaire distributed after completion of this training was answered by 54 students (68% of graduates). Regarding the perception of students about the infectivity of the SARS-CoV-2 virus, 63% considered the virus to be very dangerous, 33% considered it dangerous, 2% expressed indifference, and 2% viewed it as not very dangerous. Regarding biosafety in dental care, the greatest concern before the pandemic was the possibility of cross-infection; after training, there was an increased concern about becoming infected with the virus after treating a patient (Figure 3).

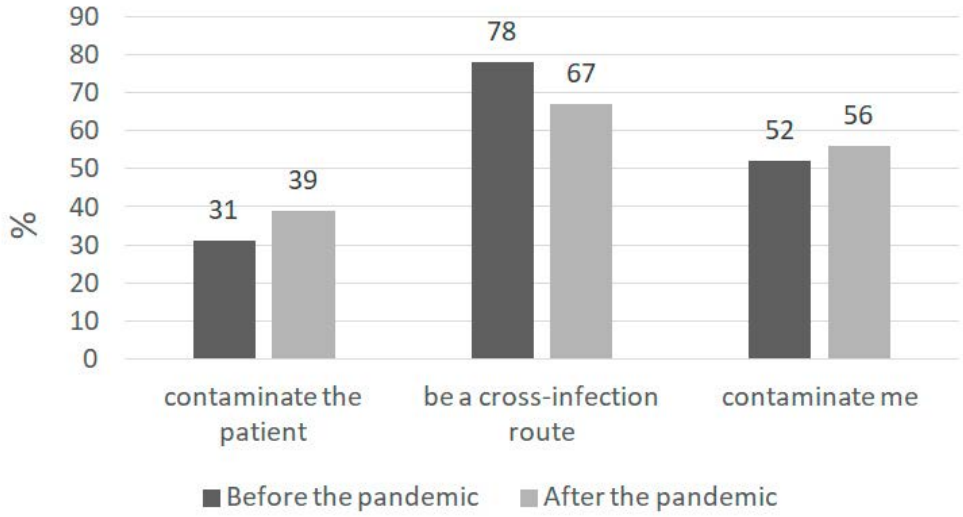

Figure 3: Concerns of students from the last period regarding contamination before and after the pandemic.

In relation to what participants considered correct in terms of biosafety, autoclaving the high-speed pen prior to caring for each patient was the attitude toward biosafety least cited as correct among the trainees, whereas hand hygiene (i.e., use of 70% alcohol hand sanitizer), cleaning and disinfection of critical areas, and the use of PFF2 respirators and facial protectors were cited the most by students (Figure 4).

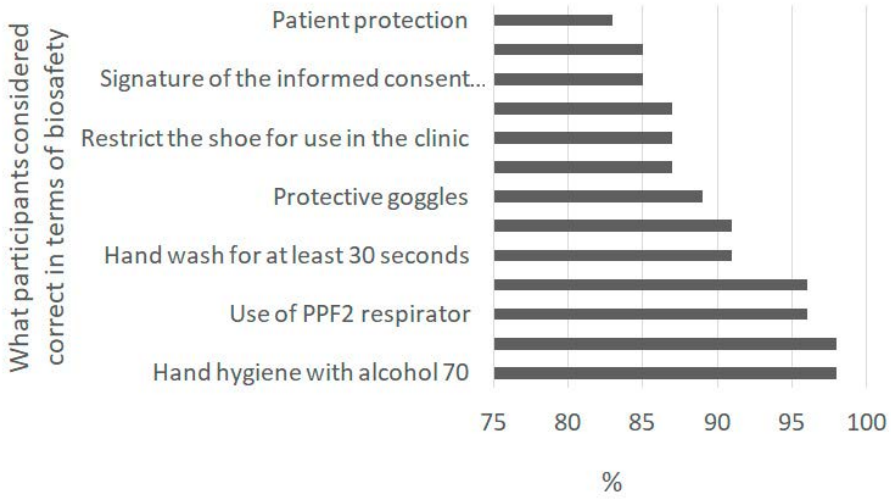

Figure 4: Biosafety attitudes considered correct for dental care according to the questionnaire distributed to students about to graduate.

Regarding biosafety care acquired after qualification and training, the participants considered that the procedures they had adopted had changed significantly. For example, the use of face shields intensified, as did care in dressing and de-dressing and greater frequency in practicing hand hygiene and using a PFF2 respirator, in addition to already adopted precautions.

Asked about the level of anxiety in relation to dental care before and after training, study participants acknowledged that they were beginning to feel calmer about performing in clinical situations (Figure 5).

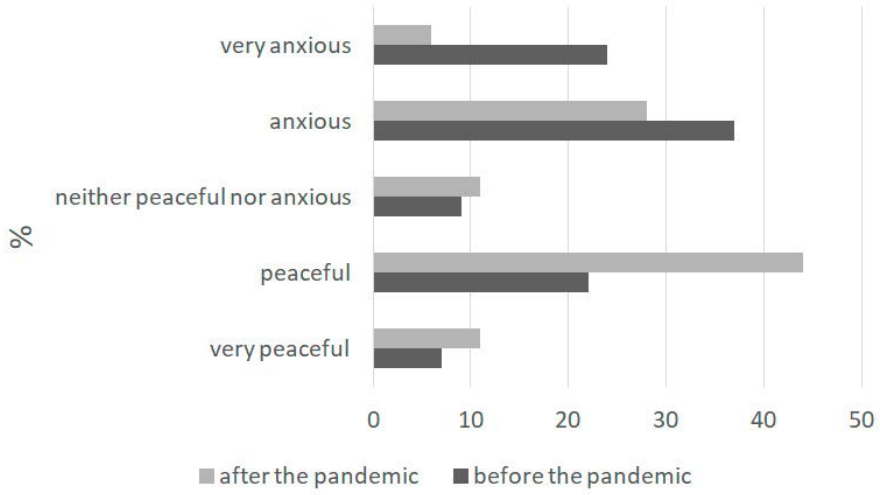

Figure 5: Anxiety level among students in the last period before and after training.

Regarding the degree of satisfaction with online and face-to-face training, face-to-face training was slightly more popular. In terms of the online mode, one participant was very dissatisfied, one was indifferent, 13 were satisfied, and seven were very satisfied. For the face-to-face training, 10 participants reported being satisfied and 12 were very satisfied.

When asked about the importance of online training for returning to clinical care, 6% reported being very dissatisfied or dissatisfied, 11% were indifferent, and 35% and 46% were satisfied and very satisfied, respectively. Regarding the face-to-face training that took place after the online training, 100% were either satisfied (35%) or very satisfied (65%).

Regarding the analysis of textual corpora by similarity, based on graph theory, it is possible to identify the occurrences between words and the connection between them. Two terms that stood out most in the interviews with participants were “video classes” and “Bem.” They branched out from others with significant expressions, such as “demonstrative,” “clarifying,” “explanatory,” and “didactic.” At the end of the ramifications, there was a relationship between “knowledge” and ““teacher” and between “explanation” and “clear” (Figure 6).

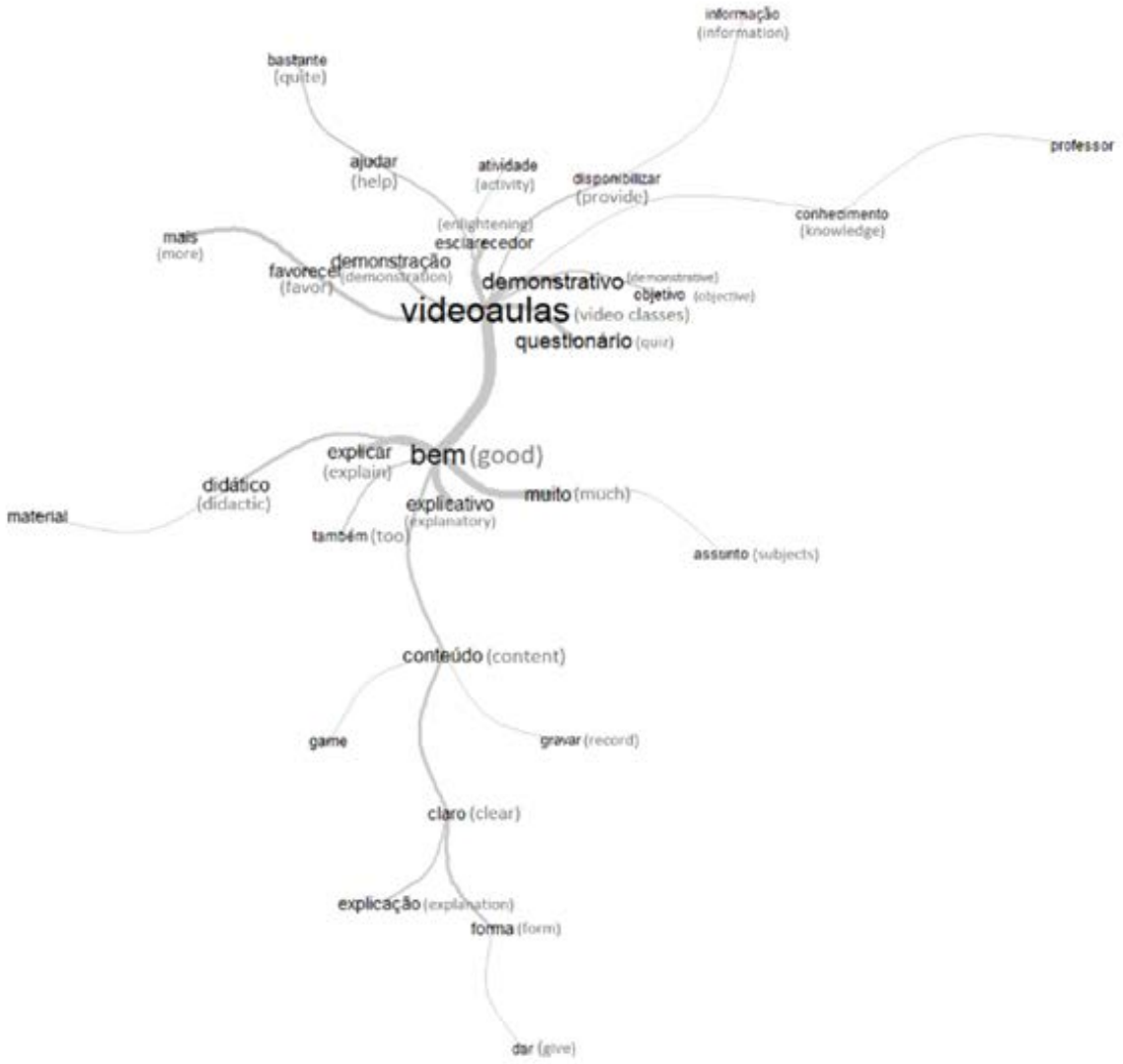

Figure 6: Similitude analysis about the corpus, "What favored the most learning?"

4. Discussion

The results of this study demonstrated that the process undertaken in biosafety training for the resumption of dental care at the school clinic was essential for ensuring the safety of students, teachers, auxiliary staff, and patients, thus preventing the spread of the virus and cross-contamination. An understanding of the new requirements for dental care, precautions, and the responsibility of the dental surgeon in the prevention and transmission of SARS-CoV-2 in the context of the COVID-19 pandemic has a preponderance in reducing the spread of the virus.

At this time, the dentist plays an especially important role in controlling the spread of the SARS-CoV-2 virus in the clinical environment.19 Dentists are classified in the very high-risk category because of the potential exposure to the SARS-CoV-2 virus in aerosol generation procedures (DEERY, 2020), since the virus is transmitted primarily through saliva (XU, 2020). Moreover, the amount of aerosol produced in the dental office is high, enabling cross-infection (BENTLEY; BURKHART; CRAWFORD, 1994; CHIRAMANA, 2013; EARNEST; LOESCHE, 1991; RAUTEMAA, 2006). The transmission of SARS-CoV-2 aerosols and fomites is plausible since the virus can remain viable and infectious in aerosols for hours and on surfaces for days (VAN DOREMALEN, 2020). Prevention strategies are fundamental for controlling the transmission route of this and other viruses (PENG, 2020; AHMAD, 2020; HARREL; MOLINARI, 2004; KAMPF, 2020). Dentists are trained

to prevent aerosol-borne diseases, but they still face many unknown factors in relation to COVID-19 (IYER; AZIZ; OJCIUS, 2020). Although there is much to learn about the virus, universities must implement a series of measures to slow its spread (SAHU, 2020), using the seriousness of this crisis as an opportunity for revisiting the incorporation of biosafety in dental care and maintaining it even after the pandemic is overcome.

The extraordinary production of information and its dissemination on the Internet has made it difficult to discern and select accurate and sustained knowledge based on good evidence, especially for academics whose critical thinking skills and scientific knowledge are developing (LIDDELL; NORBO, 2020). Thus, by promoting access to a course structured collectively according to the best available evidence, noise is avoided, and more effective processes are instituted.

The participants were highly committed to this study, which demonstrated the relevance and interest in the theme (possibly motivated by the fear of contamination). Social isolation has been a necessity during the COVID-19 pandemic (COWLING, 2020; AHMAD, 2020; CLELAND, 2020). Which ended up causing several universities to intensify online access to classes with their students (CLELAND, 2020; COULTHARD, 2020). Several technologies are being used to mediate the teaching-learning process.28 The establishment of an institutional team capable of structuring a training process, selecting information from scientific references, and organizing and planning the return to clinical care is important for maintaining safety, mental health, and well-being (COULTHARD, 2020).

The methods used and the ways in which the themes were made available favored the formative process, and the remote format of the course provided a reduction in the time spent by students in onsite training. Therefore, the risks of virus transmission were reduced (GE, 2020). In addition, most students reported having achieved the proposed training objectives; additionally, they favored the methods used and ways of making the themes available, revealing how appropriate and efficient the methodology was given the pandemic scenario (RYAN; POOLE, 2019). Among the possibilities of using remote tools in an asynchronous mode, such as concept maps, games, and participation forums (DANIEL, 2020), the active promotion of learning was important. The teacher was no longer the center of all knowledge and the student became responsible for the development of his/her skills (RYAN; POOLE, 2019). However, the use of demonstrative games and videos with educational intent seems to provide an advantage in fixing previously acquired theoretical knowledge (AWAN, 2019; COURTIER, 2016).

The difficulties presented were mainly related to the lack of knowledge about dental practices by students enrolled in their initial course terms, which is reasonable given the fact that learning requires a path to be followed. There was also a concern about the application of biosafety measures because of the number of details to be remembered regarding the sequence of dressing and cleaning when resuming appointments with patients. In this sense, the analysis of the speeches uncovered characteristics that pointed to the value of the video lesson, since it allowed the participants to design their own learning path, making the process more pleasant and profitable without excluding the important relationship with the teacher in the construction of knowledge. It is necessary to consider the need for complementing lessons with practical training before returning to face-to-face activities. Practitioners would also benefit from the availability of periodic training.

The lower adherence of the faculty compared to that of academics to the training course might be related to the self-confidence gained from actual clinical practice. Overconfidence, however, can lead to a relaxation in the implementation of preventive measures adopted by dentists and, consequently, an increase in the transmission of COVID-19 (CAGETTI, 2020).

The perception that training overcomes the technical characteristics of biosafety steps, in a way, meets the challenges imposed on education in the pandemic period. A broader scope is necessary to protect the health of students, teachers, and employees; guarantee the continuity and quality of dental education; and inspire confidence in health and safety protection measures (DEERY, 2020).

Adaptation to new methods of educational instruction and fear for one's health security can generate anxiety (IYER; AZIZ; OJCIUS, 2020) as well as a certain perception of reality. Therefore, adequate preparation for returning to classes plays a crucial role in controlling anxiety. This was revealed among the participants of the present study; despite considering the SARS-CoV-2 virus to be dangerous, they felt safe in administering dental care. Such confidence can be attributed to the training process. With the emergence of confirmed cases of COVID-19 in the United States and stay-at-home orders implemented in many states, dental schools have had to manage a growing anxiety among students, teachers, and patients (IYER; AZIZ; OJCIUS, 2020). Accordingly, seminars on COVID-19 could be included in the distance learning experience to facilitate open discussions and address anxiety among teachers and students (IYER; AZIZ; OJCIUS, 2020). Another powerful initiative in controlling anxiety is the provision of a psychopedagogical support service for students and teachers, as adequate counseling services contribute to maintaining mental health and well-being (SAHU, 2020).

Among the limitations of the present studies is the fact that when providing recorded classes, it was not possible to be sure that the participants had accessed the content completely. To overcome this limitation, the combination of learning strategies was important and used in this study. Examples of these strategies were the live discussion forums, interactive and educational games, guidelines regarding correct behaviors, the creation of a virtual collective mural with colleagues and teachers, and questionnaires. Another limitation was access to teachers and students only. Mechanisms for access to dental clinic employees should be created so that they can interact during the training process. The study with trainees was carried out shortly after their return to the clinic. Monitoring the students who returned to clinical activities after a longer period had transpired would be important for verifying whether knowledge was solidified and whether effective measures were still being employed.

The training process changed students' levels of concern and care for patients and caused them to be less anxious in the face of the pandemic. Face-to-face training was important for reinforcing acquired learning and care related to the implementation of biosafety measures in dental clinics.

This training program demonstrated the commitment of everyone to the same purpose; further, it contributed to the safety and knowledge of participating students and teachers.

5. Conclusion

Instituting training and updating the biosafety protocols for responsible dental care in a pandemic—triggered by COVID-19—was important. This effort reduced anxiety and mobilized the integration of professors and students of the Dentistry course around the search for knowledge for safe dental care.

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