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ORIGINAL ARTICLE

Development of a Questionnaire to Describe Endodontic Treatments in Primary Teeth among Brazilian Dental Practitioners: Face and Content Validity

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ABSTRACT

Objective: To develop a questionnaire to describe endodontic treatments in primary teeth among Brazilian dental practitioners, focused on face and content validity (FCV). **Material and Methods:** An online validation process involved ten judges (panel of experts) and 32 dental practitioners (pre-test). The initial questionnaire (33 items) was developed after a literature review and divided into two parts: 7 questions for characterizing Brazilian dental practitioners (Part 1) and 26 questions for characterizing the endodontic treatment in primary teeth carried out by them (Part 2). The questionnaire was assessed for appearance, comprehension, and relevance using a 4-point Likert scale. Validity was achieved when the Validity Index was equal to or greater than 80% (0.8), considering responses 3 or 4 acceptable. **Results:** Two rounds were necessary for all items of the data collection instrument to be validated. The Validity Index for the entire instrument was established at 0.97 among the experts and 0.95 among the pre-test participants. The appearance, comprehension, and relevance criteria within the panel of experts achieved Validity Indices of 0.94, 0.97, and 0.99, respectively. The pre-test participants' values were 0.97, 0.94, and 0.94, respectively. The approximate response time for the data collection instrument ranged between 5-6 minutes. Within the expert panel, 70% of the judges rated the difficulty of filling it out as "easy." Among the pre-test participants, 56.3% judged it "very easy." **Conclusion:** After this validation process, the questionnaire has acceptable face and content validity and is uncomplicated and quick to fill out.

Keywords: Pediatric Dentistry; Endodontics; Tooth, Deciduous; Surveys and Questionnaires.

Introduction

The performance of endodontic treatments, whether conservative or radical approaches, is often challenging for dental practitioners. Furthermore, it is noteworthy that there are several possible therapeutic dental procedures in Endodontics, including various operative techniques and valuable dental materials [1,2]. Considering the clinical practice in Endodontics and its relevance in Dentistry, in addition to the constant scientific advancements in this dental specialty, studies have sought to understand the features of endodontic treatments carried out by dental practitioners worldwide [3,4]. There is a constant concern regarding the heterogeneity of these treatments, including evidence-based endodontic practice and the development of theoretical and practical skills required in this dental specialty [5,6]. Therefore, considering the state of the art, it is reasonable to question whether dental practitioners carry out adequate endodontic treatments.

Moreover, when considering the performance of endodontic treatments in primary teeth, new challenges are added to this context, particularly the routine need to perform behavior management techniques concurrently with the operative steps, along with specialized knowledge of the pulp therapies applicable in this dentition (including clinical guidelines and proper dental materials) [7,8]. Indeed, it is known that the profile of dental practitioners (including specialized training in Pediatric Dentistry) influences the clinical decisions regarding endodontic treatment in primary teeth [9], which implies the need to assess the features of pulp therapies carried out by dental practitioners with different profiles.

Two studies conducted in Brazil have shown the limited consistency in clinical practices concerning endodontic treatments in primary teeth among specialists in Pediatric Dentistry [10] and general dental practitioners [11]. However, both were conducted in specific contexts aside from the time frame. To our knowledge, no comprehensive national investigation has been conducted, and a validated data collection instrument has yet to be identified for this purpose. Then, as the first step, this study aimed to develop a questionnaire to describe endodontic treatments in primary teeth among Brazilian dental practitioners focused on face and content validity (FCV).

Material and Methods

Design and Ethical Clearance

A study was conducted to validate a data collection instrument (questionnaire), obtaining primary data from human subjects. All stages of the study were performed online. Forty-two participants were included in the study stages (n = 42). All participants were adequately informed through the Informed Consent Form (ICF) and provided their electronic agreement. Furthermore, the study was approved by the Research Ethics Committee of the institution where it was conducted (Opinion Number: 6.138.147), as well as planned and developed per the current and applicable resolutions for research involving human subjects in Brazil. The participation was anonymous. All stages were conducted between July and December 2023.

Development

The initial version of the data collection instrument was developed collaboratively by two researchers (both dentists/dental practitioners). This stage was based on proper methodological references regarding questionnaire design for health surveys [12,13]. Then, six stages were performed: (1) establishment of the objectives of the data collection instrument and axes, (2) review of relevant literature, (3) selection of topics and items for each axis, (4) selection of measurement/response scales, (5) arrangement of items, and (6) definition of layout and distribution format.

The literature review to support the axes of the data collection instrument was conducted in two international databases (MEDLINE and Web of Science) to retrieve references in any language and in Google Scholar to retrieve references in Portuguese. Eight search strategies were employed using different keywords and Boolean operators. Studies were included based on their relevance to the axes and full-text availability from 2000 to 2022 until the necessary theoretical-scientific basis for the initial development (first version) was achieved. The literature review procedure was based on previous guidelines [14,15]. In addition, two new books on endodontic treatments (one general and one specific to primary teeth) were added, resulting in 43 references.

The initial version of the data collection instrument was structured in an online format (Google Forms, Google Inc., Mountain View, CA, USA), self-administered, containing 33 items divided into two axes/parts: 7 questions for characterizing Brazilian dental practitioners in social, demographic, academic, and professional aspects (Part I, items A.1-A.7), and 26 questions for characterizing endodontic treatments in primary teeth carried out by them (Part II, items B.1-B.26). Part I addressed the following topics: gender, age, macro-region, sector of health service, specialized education in Pediatric Dentistry, years of professional experience, and continuing education on endodontic treatments in primary teeth. Continuing, Part II addressed performing radical and conservative treatments on primary teeth, knowledge about endodontic treatments in primary teeth (self-assessment), availability of dental materials, referrals, direct and indirect pulp capping, pulpotomy, and pulpectomy in primary teeth.

Validation

The process of validating the data collection instrument was directed towards face and content validity (FCV), aiming to enhance the collected information regarding the study object: endodontic treatments in primary teeth [16,17]. All the procedures described here to obtain FCV were based on previous evidence [16-20]. The FCV process was based on three criteria to ensure the necessary robustness of the items in the data collection instrument: appearance, comprehension, and relevance. These criteria reflect, respectively, the acceptability of the question and response format for each item, whether both are adequately understandable to the intended subjects of the data collection instrument, and whether they are relevant considering what is intended to be described with each item (considering its respective axis) [18].

For the panel of experts, 42 judges were initially invited (all were dentists aged 18 years or older, holding doctoral degrees, and working in higher education institutions). Among them, 21 were from Pediatric Dentistry, and 21 were from other dental specialties related to the study object (Endodontics, Public Health, Stomatology/Oral Pathology, Special Care Dentistry, and Dental Radiology). All were selected after exploratory consultation of institutional profiles and curriculum analysis, prioritizing those with research lines/areas of expertise related to the study object. All were individually approached via e-mail, provided with study information and methodological procedures, and electronically signed the ICF [19,20].

The judges who accepted the invitation to participate assigned a judgment for each item, expressed on a 4-point Likert scale based on the criteria of appearance (1 = "unsatisfactory," 2 = "little satisfactory," 3 = "satisfactory," and 4 = "very satisfactory"), comprehension (1 = "incomprehensible," 2 = "little comprehensible," 3 = "comprehensible," and 4 = "very comprehensible"), and relevance (1 = "irrelevant," 2 = "little relevant," 3 = "relevant," and 4 = "very relevant"). In addition, for the entire data collection instrument, judges assigned a judgment for the criteria: (1) difficulty in completing the questionnaire (1 = "very difficult," 2 = "difficult," 3 = "reasonable," 4 = "easy," and 5 = "very easy"), (2) time to complete the questionnaire (in minutes, approximately), and (3) suggestions (an open box, directed to items evaluated with 1 or 2 points on the Likert scale, in case the judge wished to suggest modification or elaborate on their considerations) [18,21].

The procedure was planned in rounds, with the first involving all items submitted to the FCV process. The FCV of the data collection instrument was established when the evaluated items reached acceptability equal to or greater than 80% (0.8) among the experts for each criterion considered in the validation process (appearance, understanding, and relevance), making them suitable for the proposed objective [18]. The Validity Index for each item and criterion was determined by dividing the number of acceptable judgments (3 or 4 points on the Likert scale) by the number of ratings (all judgments) [21].

Subsequently, when FCV was achieved in the panel of experts, 32 participants (Brazilian dental practitioners aged 18 years or older) were recruited for the pre-test (power set at 80% and 5% (0.05) as problem prevalence) [22]. The pre-test participants were invited via e-mail (request for research dissemination in higher education institutions, dentists' associations, and professional organizations) and messaging apps and Instagram until the sample size was reached, similar to other studies [23,24]. After adequate clarification about the study and the methodological procedure, all participants responded to the data collection instrument and were assigned an overall judgment for appearance, comprehension, and relevance. The same response model and FCV score were applied. The descriptive analysis was conducted using the JAMOVI statistical package (version 2.4.11, Sydney, Australia).

Results

Out of the 42 invited, ten accepted to participate in the panel of experts (response rate approximately 23.8%). Among them, 6 (60%) were women, 6 (60%) were from Pediatric Dentistry, and 4 (40%) were from related dental specialties. In addition, 7 (70%) were in the age range of 36 to 45 years, 8 (80%) had been practicing as dentists for 10 years or more, 7 (70%) were working in the Southeast macro-region of Brazil, and 9 (90%) were linked to public higher education institutions. Overall, experts from six different institutions were included in this stage. Regarding the difficulty level in completing the data collection instrument, 7 (70%) judged it as "easy." The approximate response time was 6 minutes.

Moreover, after the first round, items B.4, B.5, B.7, B.8, B.13, and B.23 were not validated (6 out of the 33, approximately 18.2%). As suggested by the experts, in B.4, a distinction was made between the response items "non-cooperative/difficult-behaving children" and "children with special needs." In B.7, B.8, B.13, and B.23, the "Mineral Trioxide Aggregate" response item was corrected in Portuguese. Also, in B.23, the response item "other antibiotic pastes" was added. At last, in B.5, the question was enhanced to include both direct and indirect pulp capping. Then, the reformulated items were sent back for a second round of judgments by the experts (all criteria), in which 7 out of the ten who contributed in the first round agreed to participate again. After the adjustments, all items achieved an acceptable FCV, as presented in Tables 1 and 2. The Validity Index of each item (all criteria) ranged from 0.90 to 1 (perfect agreement among the experts). Relevance showed the best agreement, accompanied by comprehension and appearance, respectively.

Table 1. The Validity Index for each item of the data collection instrument after the second round of judgments by the panel of experts.

Items	Criterion			All
	Appearance	Comprehension	Relevance	
A.1	1	1	1	1
A.2	1	1	1	1
A.3	0.90	1	0.90	0.93
A.4	0.90	1	1	0.97
A.5	0.90	1	1	0.97

A.6	1	1	1	1
A.7	1	1	1	1
B.1	0.90	0.90	1	0.93
B.2	0.90	0.90	1	0.93
B.3	1	1	1	1
B.4	1	1	1	1
B.5	1	1	1	1
B.6	0.90	0.90	1	0.93
B.7	1	1	1	1
B.8	1	1	1	1
B.9	0.90	0.90	1	0.93
B.10	1	1	1	1
B.11	0.80	0.90	1	0.90
B.12	0.90	1	1	0.97
B.13	1	1	1	1
B.14	1	1	1	1
B.15	1	1	1	1
B.16	0.90	0.90	1	0.93
B.17	1	1	1	1
B.18	0.90	0.90	0.90	0.90
B.19	0.90	0.90	0.90	0.87
B.20	0.90	1	1	0.97
B.21	0.90	1	1	0.97
B.22	0.90	1	1	0.97
B.23	1	1	1	1
B.24	0.90	0.90	1	0.93
B.25	0.90	1	1	0.97
B.26	1	1	1	1

Table 2. The Validity Index for all items of the data collection instrument after the second round of judgments by the panel of experts.

Items	Criterion			All
	Appearance	Comprehension	Relevance	
A.1 - A.7	0.96	1	0.99	0.98
B.1- B.26	0.94	0.96	0.99	0.96
A.1 - B.26	0.94	0.97	0.99	0.97

Subsequently, in the pre-test, after the study was disseminated through the mentioned means, the first 32 responses were considered. Among them, 6 (65.6%) were women, and 15 (46.9%) were pediatric dentists (specialists). In addition, 19 (59.4%) were in the age range of 26 to 35 years, 19 (59.4%) had been practicing as dentists for less than 5 years, 11 (34.4%) were working in the Southeast macro-region of Brazil, and 17 (53.1%) in the private sector. Regarding the level of difficulty in completing the data collection instrument, 18 (56.3%) judged it as "very easy." The approximate response time was 5 minutes. The data collection instrument also achieved an acceptable Validity Index among the pre-test participants. Appearance showed the best agreement, accompanied by comprehension and relevance (which were comparable), as presented in Table 3.

Table 3. The Validity Index for all items of the data collection instrument by the participants of the pre-test stage.

Items	Criterion			All
	Appearance	Comprehension	Relevance	
A.1 - B.26	0.97	0.94	0.94	0.95

Discussion

This study demonstrated the face and content validation processes of a questionnaire designed to describe the endodontic treatments in primary teeth carried out by Brazilian dental practitioners. During the process, some outcomes emerged as noteworthy and deserve further discussion.

Among them, the response rate among the panel of experts was relatively low. However, it is worth noting that the quality of expert panels (suitable profile for the study's object) is more relevant than quantity (an aspect that is not uniform in the literature) [25]. Indeed, selecting experts is a critical step, and priority should be given to those who closely align with the content addressed in the data collection instrument under validation. Quantitatively, other methodological references suggest that the minimum number of experts should be between five and six [20]. Furthermore, considering that professors of Dentistry were invited to the panel of experts, it is important to consider their responsibilities and the workload (academic and administrative), which may lead to lower availability than expected [24], although the number of participants was adequate.

Another important outcome was the ease and short time required to complete the questionnaire and the acceptability of the electronic format. Considering the development of data collection instruments in virtual environments (online), time is an important factor in effectively reaching the target population and achieving the desired sample size. Electronic surveys (e-surveys) have recently been highly relevant in the COVID-19 pandemic, and their use has persisted in academic settings, especially to overcome geographical limitations. In fact, e-surveys using online questionnaires may facilitate the completion of items/questions, reducing the time required for participation [23,26].

Addressing the content, it is important to highlight that the questionnaire has a descriptive nature and does not seek to quantitatively measure the level of evidence-based practice related to endodontic treatments in primary teeth. However, the questions and answers will help provide insights into the features of these treatments among Brazilian dental practitioners, as it covers a wide range of clinical aspects, from the performance to the main operative steps, allowing for comparisons between different profiles and contexts of clinical practice.

Among such aspects, it is important to highlight the items that address specialized training in Pediatric Dentistry and continuing education in endodontic treatments in primary teeth. The literature has already demonstrated the impact of dental education on developing skills necessary for performing endodontic treatments. This reinforces the need to continue exploring the interface between training/practice in Dentistry [27]. In this data collection instrument, as it concerns primary teeth, it will be possible to differentiate between specialists in Pediatric Dentistry, allowing for comparison of variables with general dental practitioners (who do not have this specialty). In addition, the questionnaire addresses continuing education on the topic, which will also be valuable for understanding this scenario among all Brazilian dental practitioners (*e.g.*, recent graduates *versus* experienced dental practitioners).

Moreover, it is also important to investigate the sector of practice and the need for referrals of children requiring endodontic treatments in primary teeth. The dynamics of access and effectiveness of public and private dental services may vary when it comes to performing endodontic treatments, including their outcomes among children and adolescents [28]. Furthermore, Brazil has one of the largest public healthcare systems in the world (Brazilian Unified Health System), which provides dental treatment for all citizens. However, there needs to be more consistent information regarding the provision of endodontic treatments in primary teeth compared to the private sector. In addition, it is necessary to continue exploring the factors that interfere with the execution of endodontic dental procedures in primary teeth, such as the availability of resources (*e.g.*, dental materials) and the referral of patients to other oral healthcare services, such as Dental Specialty Centers (secondary care) [29,30].

In the pre-test stage, it is highlighted that a convenience sampling method was employed until the minimum number of responses/participants was reached. This represents a limitation of the approach itself, as the study's dissemination relied on the engagement of Brazilian dental practitioners with the means used to promote the study (e-mails, messaging apps, and Instagram). Nevertheless, it is important to note that dentist associations and professional organizations from all macro-regions of Brazil were contacted, and no distinction was made regarding the profiles of messaging apps or Instagram users. These strategies may help mitigate certain discrepancies or homogeneities in the sample, but it was impossible to prevent them completely.

Conclusion

The questionnaire has acceptable face and content validity subsequent to the validation procedure. Moreover, it is easy to complete, requires a brief time commitment, and can be readily disseminated within online environments. The application of this questionnaire may provide valuable information for understanding the provision of endodontic treatments in primary teeth in Brazil, considering Brazilian dental practitioners nationwide and describing features and patterns among them.

Authors' Contributions

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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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