












Impact of COVID-19 on Oral Healthcare for Oncopediatric Patients: The Setting in a Reference Hospital in Northeast Brazil

Lecidamia Cristina Leite Damascena¹, Paula Maria Maracajá Bezerra², Fabio Gomes dos Santos²,
Nyellisonn Nando Nóbrega de Lucena¹, Thiago Isidro Vieira², José Maria Chagas Viana Filho²,
Paulo Rogério Ferreti Bonan², Isabella Lima Arrais Ribeiro², Eliane Batista de Medeiros Serpa²,
Simone Alves de Sousa², Ana Maria Gondim Valença²

¹Postgraduate Program in Decision Models and Health, Statistics Department, Federal University of Paraíba, João Pessoa, PB, Brazil.

²Postgraduate Program in Dentistry, School of Dentistry, Federal University of Paraíba, João Pessoa, PB, Brazil.

Correspondence: Ana Maria Gondim Valença, Rua Miguel Satyro, 350, apt. 2301, Cabo Branco, João Pessoa, PB, Brazil. 58045-110. E-mail: anamvalenca@gmail.com

Academic Editor: Alessandro Leite Cavalcanti

Received: 17 November 2021 / **Review:** 27 December 2021 / **Accepted:** 18 January 2022

How to cite: Damascena LCL, Bezerra PMM, Santos FG, Lucena NNN, Vieira TI, Viana Filho JMC, et al. Impact of COVID-19 on oral healthcare for oncopediatric patients: the setting in a reference hospital in Northeast Brazil. *Pesqui Bras Odontopediatria Clín Integr.* 2022; 22:e210211. <https://doi.org/10.1590/pboci.2022.035>

ABSTRACT

Objective: To describe the impact of the COVID-19 pandemic on dental care provided to pediatric cancer patients assisted in a referral hospital. **Material and Methods:** This is an observational, retrospective study based on secondary data extracted from worksheets of dental procedures for patients aged between 0 and 19 years assisted in the pediatric oncology sector of a hospital in João Pessoa, PB, Brazil. Dental procedures performed by the interdisciplinary team of researchers from August 2018 to February 2020 (19 months prior to the pandemic) and from April 2020 to October 2021 (19 months during the pandemic) were totaled and compared. A descriptive analysis of the data was performed. **Results:** There was a reduction of 80.2% in dental interventions implemented in the sector during the pandemic, with the number of procedures decreasing from 6,210 (the period before the pandemic) to 1,229 (during the pandemic). Most procedures in both periods were performed for patients assisted in beds, for whom there was a reduction of care provided for 81.2% from 5,275 to 994 procedures. Dental procedures in the outpatient clinic decreased by 74.9%, from 935 to 235. **Conclusion:** The COVID-19 pandemic negatively impacted dental care provided to pediatric oncology patients by restricting dental procedures to emergency demands, compromising performance prevention and health promotion actions.

Keywords: COVID-19; Oncology Service, Hospital; Oral Health; Child Care.

Introduction

A serious global scenario occurred due to the new coronavirus disease (COVID-19), being considered a world public health emergency by the World Health Organization on January 30, 2020 [1]. There was an unprecedented demand on health systems in this growing scenario of COVID-19 cases [2], which restricted the offer of clinical procedures to uninfected patients, concentrating the care aimed at these priority patients in emergency interventions [3]. This redefinition of priorities also affected cancer patients, with a decline in the number of patients undergoing cancer treatment during the COVID-19 pandemic [4]. At the same time, such restrictions compromised dental care, which was suspended or severely reduced in several countries [5,6], given the risk of transmitting SARS-CoV-2 infection through droplets and aerosols [7], with the postponement of non-urgent or non-emergency dental procedures being recommended [8]. Such discontinuity of dental care affected all patients, including those undergoing cancer treatment [9,10].

This scenario is worrisome because dental care is essential for patients who will undergo antineoplastic therapy, and these patients should receive prior conditioning of the oral cavity [9] with a view to reducing the microbial load and avoiding unfavorable clinical outcomes such as death due to nosocomial infection [11].

Among the adverse effects of antineoplastic therapy for pediatric cancer patients, oral complications such as mucositis, viral infections, and fungal infections are frequent, with the oral cavity being the most common source of sepsis during cancer treatment [12].

Furthermore, it was demonstrated the multiple challenges that the COVID-19 pandemic created for childhood cancer care in institutions around the world [2-4,6,9,13]. Regardless of the long-term effects of these challenges on childhood cancer outcomes that are not yet clear, it is important to determine changes in paediatric oncology care during this pandemic, considering that unfavorable clinical outcomes could be associated with the restriction of health care, including disruptions of dental care.

Thus, in this context of care restriction for cancer patients, it is relevant to identify the impact of the COVID-19 pandemic on dental care for pediatric cancer patients. These findings could be useful to explain the clinical evolution of paediatric oncology patients in further studies on this topic.

Given the above, this study aimed to describe the impact of the COVID-19 pandemic on oral healthcare offered to pediatric cancer patients assisted in a reference hospital in the Northeast region of Brazil.

Material and Methods

Study Design and Ethical Considerations

This is an observational retrospective study with a quantitative approach based on secondary data extracted from worksheets of dental procedures in the Pediatric Oncology sector of a reference hospital for cancer treatment. This study was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Paraíba (CAAE: 64249317.3.0000.5188).

Study Scenario

The study was carried out in the Pediatric Oncology sector of the Napoleão Laureano Hospital (HNL, in Portuguese), located in João Pessoa, capital of the state of Paraíba, a state located in the Northeast region of Brazil. This sector consists of an outpatient clinic with a dental office, a ward with twelve rooms, which supports 21 inpatient beds, and the Pediatric ICU with six beds.

Data Collection

Data were extracted from worksheets of dental procedures performed in patients between 0 and 19 years attended at the pediatric oncology sector of the HNL. These spreadsheets consolidate the procedures performed by the multidisciplinary team composed of professors, graduate students, and undergraduates, working with researchers in dentistry, nursing, physiotherapy, biology and statistics. The children and adolescents were cared for by this multidisciplinary team in the dental office, the ward or the Intensive Care Unit (ICU) beds.

The dental procedures routinely performed by this team included educational (dental guidance consultation; oral hygiene instruction), preventive (supervised brushing, professional prophylaxis, topical application of fluoride; preventive photobiomodulation) and therapeutic (restorative procedures, surgical procedures; therapeutic photobiomodulation) interventions being developed in the outpatient setting (dental office and chemotherapy room) and at bedside (infirmery and ICU).

Dental care was restricted to treating oral mucositis (preventive and therapeutic photobiomodulation) due to safety measures to reduce the advance of COVID-19 and the resolution of odontogenic pain cases or its referral to other sectors/services. The number of researchers in the multidisciplinary team and the frequency of face-to-face assistance reduced from 3 team members working five days a week to 1 member working two days a week, with remote monitoring of cases by telephone being instituted on other days.

Dental procedures performed from August 2018 to February 2020 (19 months prior to the pandemic) and from April 2020 to October 2021 (19 months during the pandemic) were totaled and compared.

The month of March 2020 was not included because it was declared an Emergency situation in the State of Paraíba due to the COVID-19 pandemic and the hospital managers and health professionals in the pediatric oncology sector were discussing and implementing decisions to face the pandemic in line with national and state public health recommendations at that time.

Data Analysis

Data were organized in a Microsoft Office Excel® spreadsheet (Microsoft Corp., Redmond, Washington, USA) and descriptively analyzed by comparing the number of dental procedures performed before the pandemic and during the COVID-19 pandemic through absolute and relative frequencies.

Results

Table 1 shows the distribution of dental procedures performed in pediatric cancer patients before and during the pandemic, totaling 6,210 and 1,229 procedures, respectively. These values indicate an 80.2% reduction in dental care in the pediatric oncology sector.

Most procedures in the two periods considered were performed for pediatric cancer patients admitted to the ward and ICU, with 5,275 interventions being developed before the pandemic and 994 procedures during the pandemic, resulting in an 81.2% reduction in the dental care offered. In addition, dental procedures performed in the outpatient clinic were reduced from 935 to 235, representing a reduction of 74.9% in the interventions provided at the outpatient level during the pandemic (Table 1).

Figure 1 illustrates the monthly dental care offered to patients in the periods prior to the pandemic and during the pandemic, with a noticeable reduction in the number of procedures performed and an upward trend in the number of procedures performed in the last months of the pandemic context when compared to the initial months of the same period.

Table 1. Distribution in absolute values and percentages of dental procedures performed in the periods prior to the pandemic and during the pandemic.

Period	Hospitalized (Ward and ICU)		Ambulatory		Total	
	N	%	N	%	N	%
Prior to the pandemic	5,275	84.9	935	15.1	6,210	100.0
During the pandemic	994	80.9	235	19.1	1,229	100.0

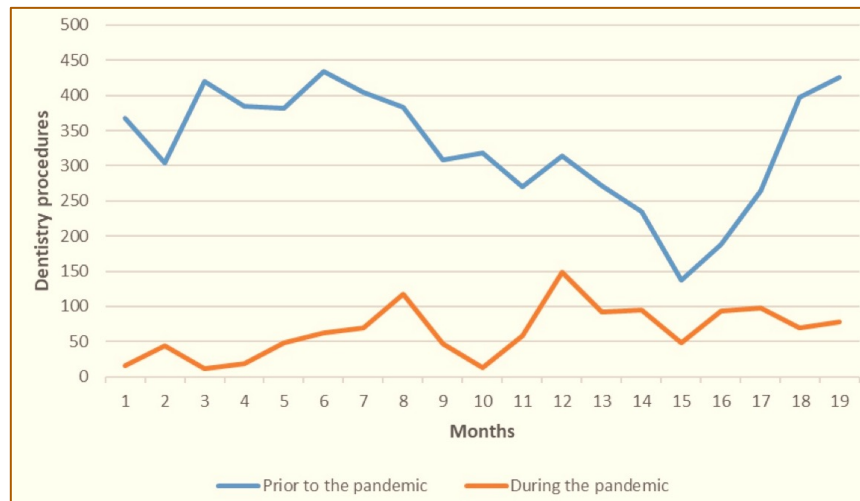


Figure 1. Distribution in absolute values of monthly dental procedures performed in the periods prior to the pandemic and during the pandemic.

Discussion

The present study demonstrated the impact of the COVID-19 pandemic on the oral healthcare offered to pediatric cancer patients in a reference hospital in northeastern Brazil, identifying an 80.1% reduction in dental procedures performed in these children and adolescents.

Corroborating these findings, it is clear that the COVID-19 pandemic scenario has strongly affected the management of cancer patients worldwide [13-15], not only in relation to making therapeutic decisions but also regarding supportive care, as pointed out by the Mucositis Study Group of the Multinational Association for Supportive Care in Cancer/International Society of Oral Oncology (MASCC/ISOO). In this challenging context, it is necessary to rethink new approaches to acute side effects resulting from antineoplastic treatment, such as oral mucositis [14].

In the present study, the understandable restrictions in oral healthcare compromised the performance of prevention and health promotion actions for children and adolescents undergoing antineoplastic therapy, particularly for patients cared for in the ward and ICU beds, for whom an 81.2% reduction in dental procedures was performed. It is noteworthy that such restrictions, as mentioned above, resulted in a decrease in the number of members of the interprofessional team working in the pediatric oncology sector and the days when researchers were present at the hospital, impacting the number of dental procedures performed. These measures were adopted by hospital managers to minimize the infection risk of patients with SARS-COV2; it is important to consider that pediatric cancer patients are commonly immunocompromised [16] and that unfavorable clinical outcomes in affected children and adolescents with cancer by COVID-19 are more frequent when compared to the general pediatric population [17].

It is important to emphasize that the months of the year are not the same in the two periods. For example, a smaller number of dental procedures were observed in the months 10 (May 2019) and 15 (October

2019) prior to the pandemic. Furthermore, we clarify that during these months, there were pediatric chemotherapy interruptions in the hospital due to the unavailability of some chemotherapy agents, with pediatric patients being referred to other hospitals. In contrast, the months 10 (January 2021) and 15 (June 2021) correspond to periods in which there are often fewer patients in the sector due to vacations and holidays in Brazil.

An alternative for monitoring cancer patients during the COVID-19 pandemic used in cancer treatment centers in several countries has been telemonitoring [18-20]. Although this remote communication enables live interaction with the patient allowing them to understand better the recommendations made by the multidisciplinary team, it also has weaknesses and limitations [14]. These shortcomings include, among others, the reluctance of some patients to use this application because they were unfamiliar with the new technology or preferred human contact [21], the limited examination since palpation and percussion are impossible, and difficulties in visualizing certain mucosal areas [14].

It is noteworthy that the discontinuity in providing oral healthcare and health surveillance can lead to greater frequency and severity of oral comorbidities [22,23], as well as affect the quality of life of children and adolescents undergoing cancer treatment [24]. Therefore, our findings, in addition to being able to be used in further studies to explain unfavorable clinical outcomes due to the disruptions of dental care, could help us understand these patients' health needs and plan for more severe conditions of oral comorbidities and dental emergencies in the future.

Additionally, reports emphasized the impact of the pandemic on healthcare team training health, addressing the repercussions, for example, for the development of pediatric residency programs [25], pediatric postgraduate programs [26], and complications in training the students on practical skills [27]. Given the profile of our multidisciplinary team, which includes graduate students and undergraduates, it is reasonable to assume that practical training and quality of learning could be harmed.












The present study has limitations. One of them is that it does not consider the decrease in patients admitted to the pediatric oncology sector, particularly during the initial months of the pandemic. This smaller number of pediatric cancer patients would influence the reduction in dental procedures performed. Another aspect to be considered is the possible fluctuations in the flow of patients in different months of the year. Since the 19 months of the year included in the comparative analysis between the two periods (prior to the pandemic and during the pandemic) in this study were not the same, we must consider possible variations in the admission of patients to the sector due to differentiated demand by health services being higher or lower in certain months of the year.

Despite these limitations, this study reveals the significant reduction in oral healthcare offered to pediatric cancer patients resulting from the COVID-19 pandemic, bringing important reflections on the possibility of unfavorable clinical outcomes due to the interruption and/or reduction of comprehensive dental care.

Conclusion

The COVID-19 pandemic had a negative impact on the provision of oral healthcare to pediatric cancer patients, with a significant reduction in dental procedures performed on children and adolescents attended to in a reference hospital.

Authors' Contributions

LCLD 	https://orcid.org/0000-0002-2128-4757	Conceptualization, Methodology, Formal Analysis, Investigation and Writing - Original Draft.
PMMB 	https://orcid.org/0000-0002-9705-8959	Conceptualization, Methodology, Formal Analysis, Investigation and Writing - Review and Editing.
FGS 	https://orcid.org/0000-0002-6612-1134	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
NNNL 	https://orcid.org/0000-0002-6524-0908	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
TIV 	https://orcid.org/0000-0003-4824-9131	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
JMCVF 	https://orcid.org/0000-0002-5922-1217	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
PRFB 	https://orcid.org/0000-0002-4449-4343	Conceptualization, Methodology, Formal Analysis, Investigation and Writing - Review and Editing.
ILAR 	https://orcid.org/0000-0001-6538-6811	Conceptualization, Methodology, Formal Analysis and Writing - Review and Editing.
EBMS 	https://orcid.org/0000-0002-9119-4079	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
SAS 	https://orcid.org/0000-0002-3254-9036	Conceptualization, Formal Analysis, Investigation and Writing - Review and Editing.
AMGV 	https://orcid.org/0000-0001-8460-3981	Conceptualization, Methodology, Formal Analysis, Resources, Data Curation, Writing - Review and Editing and Supervision.

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

Financial Support

Paraíba State Research Foundation (*Fundação de Apoio à Pesquisa do Estado da Paraíba - FAPESQ*) - Term No. 010/19-23038.004264/2015-03; Coordination of Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES* - Finance Code 001).

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.

References

- [1] World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). 2020. Available from: [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)). [Accessed on October 13, 2021].
- [2] El Bcheraoui C, Weishaar H, Pozo-Martin F, Hanefeld J. Assessing COVID-19 through the lens of health systems' preparedness: time for a change. *Global Health* 2020; 16:112. <https://doi.org/10.1186/s12992-020-00645-5>
- [3] McCabe R, Schmit N, Christen P, D'Aeth JC, Løchen A, Rizmie D, et al. Adapting hospital capacity to meet changing demands during the COVID-19 pandemic. *BMC Med* 2020; 18(1):329. <https://doi.org/10.1186/s12916-020-01781-w>
- [4] Araujo SE, Leal A, Centrone AF, Teich VD, Malheiro DT, Cypriano AS, et al. Impact of COVID-19 pandemic on care of oncological Patients experience of a cancer center in Latin American pandemic epicenter. *Einstein (São Paulo)* 2021; 19:eAO6282. https://doi.org/10.31744/einstein_journal/2021AO6282
- [5] Suri S, Vandersluis YR, Kochhar AS, Bhasin R, Abdallah M. Clinical orthodontic management during the COVID-19 pandemic. *Angle Orthodont* 2020; 90(4):473-84. <https://doi.org/10.2319/033120-236.1>
- [6] Coulthard P, Thomson P, Dave M, Coulthard FP, Seoudi N, Hill M. The COVID-19 pandemic and dentistry: the clinical, legal and economic consequences - part 2: consequences of withholding dental care. *Br Dent J* 2020; 229(12):801-05. <https://doi.org/10.1038/s41415-020-2406-9229>
- [7] Amiri A, Qi F, Alonso MBCC, Núñez NS, Kozyk O. Evaluation of the droplets and aerosols, posing potential risks of covid-19 disease infection transmission in dentistry: a systematic review and meta-analysis of observational studies. *Pesqui Bras Odontopediatria Clín Integr* 2021; 21:e0262. <https://doi.org/10.1590/pboci.2021.126>
- [8] American Dental Association. Available from: <https://www.ada.org/en/press-room/news-releases/2020-archives/march/ada-calls-upon-dentists-to-postpone-elective-procedures/>. [Accessed on November 07, 2021].
- [9] Kochhar AS, Bhasin R, Kochhar GK, Dadlani H. Provision of continuous dental care for oral oncology patients during & after COVID-19 pandemic. *Oral Oncol* 2020; 106:104785. <https://doi.org/10.1016/j.oraloncology.2020.104785>.
- [10] Tong NR, Park J, Carlisle S, Poh CF. Characteristics of emergent and essential dental services in university and hospital-based settings during COVID-19 pandemic in Vancouver, Canada. *J Can Dent Assoc* 2021; 87:113.
- [11] Biswal S, Godnaik C. Incidence and management of infections in patients with acute leukemia following chemotherapy in general wards. *Ecancermedalscience* 2013; 7:310. <https://doi.org/10.3332/ecancer.2013.310>
- [12] Allen G, Logan R, Gue S. Oral manifestations of cancer treatment in children: a review of the literature. *Clin J Oncol Nurs* 2010; 14(4):481-90. <https://doi.org/10.1188/10.CJON.481-490>

- [13] Graetz D, Agulnik A, Ranadive R, Vedaraju Y, Chen Y, Chantada G, et al. Global effect of the COVID-19 pandemic on paediatric cancer care: a cross-sectional study. *Lancet Child Adolesc Health* 2021; 5(5):332-40. [https://doi.org/10.1016/S2352-4642\(21\)00031-6](https://doi.org/10.1016/S2352-4642(21)00031-6)
- [14] Bonomo P, Elad S, Kataoka T, Bossi P, Mucositis Study Group of MASCC/ISOO. The impact of the COVID-19 outbreak on supportive care for oral mucositis: current concepts and practice. *Support Care Cancer* 2021; 29(5):2255-8. <https://doi.org/10.1007/s00520-020-05966-0>
- [15] Sharma J, Mahajan A, Bakhshi S, Patil V, Verma N, Radhakrishnan V, et al. The impact of COVID-19 pandemic on access to treatment for children with cancer in India and treating center practices. *Cancer* 2022; 128(3):579-86. <https://doi.org/10.1002/cncr.33945>
- [16] Millen GC, Arnold R, Cazier JB, Curley H, Feltbower RG, Gamble A, et al. Severity of COVID-19 in children with cancer: Report from the United Kingdom Paediatric Coronavirus Cancer Monitoring Project. *Br J Cancer* 2021; 124:754-9. <https://doi.org/10.1038/s41416-020-01181-0>
- [17] Meena JP, Kumar Gupta A, Tanwar P, Ram Jat K, Mohan Pandey R, Seth R. Clinical presentations and outcomes of children with cancer and COVID-19: a systematic review. *Pediatr Blood Cancer* 2021; 68(6):e29005. <https://doi.org/10.1002/pbc.29005>
- [18] Manuballa S, Abdelmaseh M, Tasgaonkar N, Frias V, Hess M, Crow H, et al. Managing the oral health of cancer patients during the COVID-19 pandemic: perspective of a dental clinic in a cancer center. *J Clin Med* 2020; 9(10):3138. <https://doi.org/10.3390/jcm9103138>
- [19] Muniz IAF, Santos FG, Valença AMG, Sousa AS, Medeiros-Serpa EB, Bonan PRF. Oral care on oncopediatric patients during COVID-19 pandemic: what's changing?. *Rev Bras Cancerol* 2020; 66:e-1215. <https://doi.org/10.32635/2176-9745.RBC.2020v66nTemaAtual.1215>
- [20] Silva HEC, Santos GNM, Leite AF, Mesquita CRM, Souza Figueiredo PT, Reis PED, et al. The role of teledentistry in oral cancer patients during the COVID-19 pandemic: an integrative literature review. *Support Care Cancer* 2021; 29(8):1-15. <https://doi.org/10.1007/s00520-021-06398-0>
- [21] Ferrua M, Mathivon D, Duflot-Boukobza A, Abbas M, Charles C, Barraïs A, et al. Nurse navigators' telemonitoring for cancer patients with COVID-19: a French case study. *Support Care Cancer* 2021; 29(8):4485-92. <https://doi.org/10.1007/s00520-020-05968-y>
- [22] Kostak MA, Semerci R, Eren T, Kocaaslan EN, Yildiz F. Effects of oral health care education on the severity of oral mucositis in pediatric oncology patients. *Turk Onkol Derg* 2020, 35:422-9. <https://doi.org/10.5505/tjo.2020.2366>
- [23] Bezerra PMM, Sampaio MEA, Santos FG, Ribeiro ILA, Santiago BM, de Sousa SA, et al. The effectiveness of an oral health education and prevention program on the incidence and severity of oral mucositis in pediatric cancer patients: a non-randomized controlled study. *Support Care Cancer* 2021; 29(12):7877-85. <https://doi.org/10.1007/s00520-021-06387-3>
- [24] Cheng KK, Lee V, Li CH, Yuen HL, Epstein JB. Oral mucositis in pediatric and adolescent patients undergoing chemotherapy: the impact of symptoms on quality of life. *Support Care Cancer* 2012; 20(10):2335-42. <https://doi.org/10.1007/s00520-011-1343-1>
- [25] Gunadi, Balela N, Kalim AS, Widadjarso W, Fahri F, Tedja AK, et al. The COVID-19 pandemic impact on pediatric surgery residency programs. *Heliyon* 2021; 7(6):e07199. <https://doi.org/10.1016/j.heliyon.2021.e07199>
- [26] Mallineni SK, Nuvvula S, Goyal V, Seymen F. COVID-19 effect on education in Pediatric Dentistry. *Front Pediatr* 2021; 9:666501. <https://doi.org/10.3389/fped.2021.666501>
- [27] Farrokhi F, Mohebbi SZ, Farrokhi F, Khami MR. Impact of COVID-19 on dental education - a scoping review. *BMC Med Educ* 2021; 21(1):587. <https://doi.org/10.1186/s12909-021-03017-8>