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Are we ready for transparency? A survey on Open Science Practices among authors of paediatric dentistry trials

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Abstract

Purpose

To evaluate the self-reported adoption and perceived barriers related to five open science practices among corresponding authors of paediatric dentistry randomised clinical trials, and to identify factors associated with their adoption and future use.

Methods

We conducted a cross-sectional online survey between March 2025 and May 2026 among corresponding authors of eligible paediatric dentistry randomised clinical trials published between 2019 and 2026. The questionnaire assessed self-reported adoption, intention, and perceived barriers for engaging in five open science practices. We performed descriptive analyses, and we used ordinal logistic regression models to investigate factors associated with self-reported adoption and intention to adopt.

Results

Forty-three completed questionnaires were analysed (response rate: 3.8%). Open-access publishing (88.4%) and protocol registration (76.7%) were the most self-reported practices, with 69.8% and 81.4% of respondents, respectively, reporting an intention to adopt these practices. Researchers affiliated with institutions other than universities or dental faculties demonstrated lower odds of adopting open science practices. The most frequently reported barriers included lack of institutional or supervisory support, limited knowledge and training, time constraints, financial costs, uncertainty regarding journal policies, and legal or ethical restrictions related to data sharing.

Conclusion

Among respondents, self-reported adoption of Open Science practices varied across practices, with greater adoption of open-access publishing and protocol registration than of protocol publication, data sharing, and preprint publication. Financial, institutional, knowledge-related, and policy-related barriers were identified. Given the low response rate, these findings should be considered exploratory and cannot be assumed to represent paediatric dentistry trial authors in general.

Introduction

Open Science has emerged as a global movement aimed at improving the transparency, accessibility, reproducibility, and trustworthiness of scientific research. Open Science encompasses several practices, including prospective protocol registration, protocol publication, open methods and data, dissemination through preprints, open-access publishing, and research data sharing (Bertram et al. 2023).

Transparency is essential for accountability, reproducibility, the assessment of research quality, and the identification of potential biases, questionable research practices, and research waste. Research waste represents the loss of scientific value arising from avoidable shortcomings throughout the research process, including inadequate reporting and limited dissemination of research findings (Ioannidis et al. 2014). Therefore, increasing awareness and implementation of OSPs may improve collaboration among researchers, enhance the trustworthiness of evidence, facilitate data sharing, and ultimately contribute to more effective evidence-based care for paediatric dental patients (Cenci et al. 2021; Acosta et al. 2024).

The adoption of OSPs has been associated with several benefits. Prospective protocol registration enhances research transparency and enables the detection of selective outcome reporting and other deviations from prespecified methods and outcome measures (Cenci et al. 2021; De Angelis et al. 2004; Elagami et al. 2023), whereas data sharing facilitates replication of the data analysis and secondary analyses (Chan et al. 2014; Moher et al. 2020). Another important aspect of Open Science is reproducibility, which concerns the ability to verify and build upon research findings. Peels and Bouter (2018) classified reproducibility into three categories: reanalysis of existing data, direct replication using the same protocol, and conceptual replication using modified protocols, highlighting the importance of both reliability and generalisability of research findings. Furthermore, open-access publishing increases the visibility and accessibility of scientific findings, while preprints accelerate research dissemination (Dote Pardo 2026). Recent evidence also suggests that preprint publication and data sharing may increase citation impact (Colavizza et al. 2024). Over the past two decades, paediatric dentistry has experienced substantial growth in the number of publications, journals, and citations (Ohta et al. 2020). Because randomised controlled trials (RCTs) represent the foundation of evidence-based dentistry and underpin systematic reviews, clinical practice guidelines, and clinical decision-making (Titler 2006; Vatkar et al. 2025), their findings should be reported transparently. Nevertheless, methodological limitations, inadequate reporting, and deficiencies in data analysis remain common in RCTs and may contribute to research waste (Cenci et al. 2021; Glasziou et al. 2014).

Despite the recognised benefits of Open Science, its implementation remains challenging (Edwards 2016; Nelson 2009; Houtkoop et al. 2018). For example, although registered study protocols and anonymised research data should be available to facilitate reproducibility, these data are frequently considered proprietary and are not routinely shared (Edwards 2016; Wilkinson et al. 2016). Previous surveys conducted in psychology and neuroimaging have identified researchers' preferences and barriers regarding data sharing and other Open Science practices (Houtkoop et al. 2018; Paret et al. 2022). Previous evidence in the field of paediatric dentistry has assessed the adoption of Open Science practices by evaluating their implementation in published clinical trials (Cenci et al. 2021). However, the researchers’ own experiences with these practices, their intentions to adopt them in future research, and the obstacles they perceive to their implementation remain unexplored. Understanding these aspects can help identify factors that could facilitate or hinder a broader adoption of Open Science practices. Therefore, this study aimed to evaluate the self-reported adoption, intentions, and perceived barriers related to five core OSPs as protocol registration, protocol publication, preprint publication, data sharing,

and open-access publishing, among corresponding authors of paediatric dentistry randomised clinical trials.

Material and Methods

For simplicity, the terms "self-reported adoption" and "intention to adopt" are used throughout this manuscript to refer to self-reported past adoption of Open Science practices and self-reported intention to adopt these practices in the future, respectively.

Protocol and registration

This survey was approved by the ethical committee of the Faculty of Dentistry, University of (blinded data) (number: blinded data) and registered in the Open Science Framework (OSF) (blinded data). The reporting of the survey results followed the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach 2004); the completed checklist is available in **Online Resource 1**.

Search strategy and deviation from protocol

Our study aimed to answer the following research questions: (1) What is the self- reported adoption of Open Science practices among authors of paediatric dentistry randomised controlled trials (RCTs)? (2) What is the intention of these authors to adopt Open Science practices in the future? (3) What are the main barriers and facilitators influencing the implementation of these practices within the research culture of paediatric dentistry?

The original protocol planned to identify corresponding authors of paediatric dentistry RCTs published between January 2019 and March 2026 through a search conducted in PubMed. The search strategy combined controlled vocabulary terms (Medical Subject Headings [MeSH]), keywords, synonyms, and terms related to paediatric dentistry and randomised controlled trials. Corresponding authors' e-mail addresses were extracted from the eligible publications, and survey invitations were sent electronically. Due to a lower-than-expected response rate, deviations from the original protocol were implemented to increase participant recruitment. First, the search was expanded to include the Web of Science database, which facilitated the identification of additional corresponding authors through its author indexing features. As the response rate remained low, additional corresponding author e-mail addresses were obtained from previously published datasets (Elagami et al. 2024) and from an ongoing meta-research project investigating randomised controlled trials in paediatric dentistry (https://doi.org/10.17605/OSF.IO/MD2NQ). The RCTs identified through these additional sources had been selected according to the same eligibility criteria applied in the primary search strategy. These modifications were introduced to enhance participant recruitment and did not affect the study objectives, eligibility criteria, survey instrument, or planned statistical analyses. The complete search strategy is presented in **Online Resource 2.**

Study selection and eligibility criteria

One reviewer (blinded data) screened the retrieved records based on titles and abstracts according to the predefined eligibility criteria. When eligibility could not be determined from the title and abstract, the full text was assessed. Any uncertainties regarding eligibility were discussed with a second reviewer (blinded data). Corresponding authors of RCTs in any area of paediatric dentistry involving participants aged up to 18 years and published between January 2019 and March 2026 were considered eligible for inclusion. Records for which no valid e-mail address could be identified were excluded.

Sample size calculation

The sample size was calculated based on the population proportion formula for surveys using OpenEpi, Version 3 (SSPropor). The sample size was initially calculated using the 7,309 records retrieved through the original PubMed search as an estimate of the target population. Assuming an expected proportion of 50%, a 95% confidence level, a 5% margin of error, and a design effect of 1, a minimum sample of 366 corresponding authors was estimated.

To minimise selection bias in the invitation process, the retrieved articles were assigned a computer-generated random sequence using MedCalc for Windows, version 19.4 (MedCalc Software, Ostend, Belgium). The corresponding author of each eligible article was identified, and each e-mail address was included only once in the invitation list, even when it appeared in more than one eligible article. Survey invitations were distributed according to the randomised sequence. Because the response rate was lower than anticipated, invitations continued until the corresponding authors of all eligible articles with valid e-mail addresses had been contacted.

Content of the survey questionnaire and data extraction

The survey was administered, and data were collected using Castor Electronic Data Capture (Castor EDC) (Castor EDC 2019). Invitations were distributed in five successive groups between September 15, 2025, and April 27, 2026, to facilitate the management of invitations and reminders. The survey closed on May 24, 2026, after the final reminder. The questionnaire comprised 77 questions/items organised across nine web pages. Corresponding authors received an invitation e-mail containing information about the study, the estimated completion time (approximately 15 ± 3 minutes), and a personalised link to the online questionnaire that allowed the participants to return to the questionnaire at any time and review, edit, or complete their responses for up to 30 days after accessing the survey. Upon accessing the survey, participants were presented with the study objectives, an introduction, and an informed consent form. The introduction provided information about the investigators, the voluntary nature of participation, the study background, data confidentiality procedures, the fact that IP addresses would not be recorded, and the estimated completion time. Participants were able to review and modify their responses before submission. Data were managed within the Digital Research Environment of the

University of (blinded data), (blinded data), and (blinded data) University Medical Center, (blinded data). All collected data were anonymised, and e-mail addresses were stored separately from survey responses to ensure participant confidentiality during the analysis of the data. E-mail addresses were deleted after completion of the recruitment process. Authors who did not access the survey link, did not complete the questionnaire within 30 days, or did not respond after four reminder e-mails sent at weekly intervals were removed from the contact database. The questionnaire comprised six sections (**Online Resource 3**) that were adapted from Paret et al. (2022), with the addition of two open science practices: preprint publication and protocol publication. Sections 1–5 focused on five open science practices: protocol registration, protocol publication, preprint publication, data sharing, and open-access publication. Section 6 collected socio-academic characteristics of the participants and information related to paediatric dentistry research. Participants were also given the option to provide their e-mail address if they wished to receive the study results after publication of the manuscript. Providing an email address was entirely voluntary and was not required to complete the survey. Data were securely stored in the Castor EDC platform (closed survey). Participants were able to review and modify their responses before submitting the survey by navigating back to previous pages using the Back button. Access to identifiable data was restricted to authorised members of the research team (blinded initials). At the beginning of each section, a brief description of the respective Open Science practice was provided to facilitate understanding. Each Open Science practice section comprised questions on self-reported adoption, measured using a three-category response scale (never, adopted once, or adopted more than once), and intention to adopt the practice, measured using a five-point Likert scale ranging from 1 (extremely unlikely) to 5 (extremely likely). Items assessing barriers to implementation were adapted from Cenci et al. (2021) and Paret et al. (2022). Barriers related to all five OSPs were assessed using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). An additional item in the data sharing section assessed whether participants were permitted to share anonymised research data. Participants who reported restrictions on data sharing were asked to indicate the reason(s) for these restrictions (e.g., ethical, legal, consent-related, institutional, stakeholder, or funding-related constraints). To distinguish legal or institutional restrictions from perceived barriers, participants with data-sharing restrictions were instructed to disregard these constraints when responding to the subsequent barrier items, which focused on modifiable barriers to data sharing. Additional barriers related to protocol publication, preprint publication, and open-access publication were developed by adapting items from the protocol registration and data-sharing domains. A pilot test was conducted with two senior academic researchers (blinded initials) and one PhD candidate (blinded data) from (blinded data) University Medical Center who were representative of the target population. These pilot testers completed the questionnaire and provided feedback on the completion time, clarity of the questions, and language, which was used to refine the final survey. Minor refinements based on participant feedback included grammatical corrections, clarification of question wording, and improvements to the formatting and organisation of the questionnaire sections. All survey responses were collected automatically through Castor EDC and exported for analysis. One investigator (blinded data) subsequently coded the responses to prepare the dataset for statistical analysis.

Statistical Analysis

All analyses were performed using Stata/SE version 15.0 (StataCorp, College Station, TX, USA). Descriptive statistics were used to summarise participants' socio-academic characteristics, self-reported adoption of Open Science practices, intention to adopt these practices, and perceived barriers to implementation. Categorical variables, including age categories, were reported as frequencies and percentages, whereas years of research experience were presented as median and interquartile range (IQR). Associations between participant characteristics and Open Science practices were initially explored using univariate ordinal logistic regression models. Independent variables included age category, years of research experience, academic career stage, primary affiliation, continent of residence, and main research area. Joint multilevel ordinal logistic regression models were used as the main analyses for self-reported adoption and intention to adopt, with Open Science practice included as an explanatory variable. Self-reported adoption was modelled using three ordinal categories (never, adopted once, and adopted more than once), whereas intention to adopt was modelled using the original five-point Likert scale (1 = extremely unlikely to 5 = extremely likely). Neither outcome was dichotomised or defined according to the number of Open Science practices adopted. Each participant contributed one response for each of the five practices and was included as a random intercept to account for within-participant correlation. Results were reported as odds ratios (ORs) and 95% confidence intervals (95% CI). Statistical significance was set at $p < 0.05$ for all analyses.

Results

Study selection and participant characteristics

A total of 8,000 records were identified from databases and a previous dataset. After removing the duplicate records, 7,752 records were screened. We invited 1,128 corresponding authors to participate in the survey. A total of 43 completed questionnaires were included in the final analysis, corresponding to a response rate of 3.8%. The participant selection process is presented in Fig. 1.

Participants were predominantly aged between 36 and 46 years (39.5%), based in Asia (55.8%), and affiliated with universities or research institute (79.0%). Most respondents held senior academic positions, with full professors representing the largest group (37.2%), followed by associate professors/lecturers (30.2%). The majority reported conducting research primarily within a single research area (67.4%). Detailed participant characteristics are presented in Table 1.

Table 1
Socio-academic characteristics of the participants.

Characteristics	**Responses (n = 43) N (%)**
Age of participants	
25–35	12 (27.9%)
36–46	17 (39.5%)
47 or older	14 (32.5%)
Continent	
Asia	24 (55.8%)
Europe	08 (18.6%)
North America	04 (9.3%)
South America	04 (9.3%)
Africa	03 (7%)
Primary affiliation	
University / Research Institute	34 (79%)
Private dental clinic/practice	03 (7%)
Governmental institutions	05 (11.6%)
Industry	0 (0%)
Others	01 (2.3%)
Career/Position	
Practitioner (Dental or Pedodontist)	02 (4.6%)
Clinical Lecturer (without a PhD or Master's degree)	00 (0%)
Master's student	00 (0%)
PhD candidate	02 (4.6%)
Postdoctoral researcher (1–3 years)	04 (9.3%)
Assistant Professor	06 (13.9%)
Associate Professor/ Lecturer	13 (30.2%)
*IQR = interquartile ranges	

Characteristics	Responses (n = 43) N (%)
Full Professor	16 (37.2%)
Others	00 (0%)
Main area of research	
One topic	29 (67.4%)
Two topics	09 (20.9%)
More than two topics	05 (11.6%)
Years of experience - Median (IQR)*	15 (7–20) years
*IQR = interquartile ranges	

Self-reported adoption and intention to adopt open science practices

Self-reported adoption of open science practices is presented in Fig. 2. Open-access publishing and protocol registration were the most frequently mentioned, with 88.4% and 76.7% of respondents, respectively, reporting adoption on one or more occasions. In contrast, preprint publication exhibited the lowest level of previous adoption, with 30.2% of respondents reporting previous use of this practice. This was followed by data sharing (39.5%) and protocol publication (55.8%), for which substantial proportions of participants also reported previous adoption. Among the five participants who reported never having published in an open-access journal, lack of funding support for article processing charges was the most frequently cited reason (n = 4), while one participant selected "other" without providing additional details.

Among respondents who reported previous protocol registration, ClinicalTrials.gov was the most frequently used registration platform (n = 26), followed by the Open Science Framework (OSF) (n = 8). Six respondents reported using other registration platforms, including PROSPERO, REBEC, ISRCTN, Zenodo, and the Clinical Trials Registry of India (CTRI).

Regarding intention to adopt (Fig. 3), protocol registration and open-access publishing demonstrated the highest levels, with 81.4% and 69.8% of respondents, respectively, reporting that they intended somewhat or extremely to engage in these practices. Favourable intentions were also observed for protocol publication (69.8%) and data sharing (37.2%). In contrast, preprint publication showed the lowest level of intended adoption, with only 20.9% of respondents reporting that they were somewhat or extremely likely to adopt this practice.

Barriers and obstacles to open science practices

Barriers are reported as the proportion of respondents who somewhat agreed, agreed, or strongly agreed that a given item represented an obstacle to the adoption of the respective Open Science Practice. For protocol registration, the most frequently reported barriers were lack of support from supervisors or institutions (53.5%), followed by the perception that preparing a registration is too time-consuming (51.2%). For protocol publication, the most commonly reported barriers were the perception that preparing a study protocol for publication is too time-consuming (51.2%) and a lack of knowledge on how to prepare a study protocol for publication (48.8%). Regarding preprint publication, concerns that target peer-reviewed journals might not accept manuscripts previously posted as preprints emerged as the most frequently reported barrier (60.5%). This was followed by concerns regarding the absence of peer review and the lack of association between preprint servers and journal impact factors (58.1%). For data sharing, the most frequently endorsed statement was a preference for sharing anonymised data under a data-sharing agreement signed by the recipient (67.4%). Regarding legal constraints to data sharing, 41.9% of respondents (n = 18) reported experiencing restrictions. Among these respondents, the most commonly reported reason was that their Institutional Review Board did not permit data sharing (55.5%), followed by restrictions imposed by funders, advisors, or supervisors (44.4%). Among respondents who did not report legal or institutional restrictions to data sharing (n = 25; 58.1%), the most frequently reported barrier was a lack of funding to prepare data for sharing (64%). This was followed by the perception that preparing data to make them suitable for sharing is too time-consuming (56%). With regard to open-access publishing, the most frequently reported barrier was the cost associated with Article Processing Charges in open-access journals (74.4%). This was followed by concerns regarding the limited availability of high-impact open-access journals (60.5%). Additional details regarding the reasons underlying the reported barriers across the different Open Science practices and legal restraints of data sharing are presented in **Online Resource 4**.

Additional barriers were identified through free-text responses. For protocol registration and protocol publication, respondents highlighted concerns regarding the perceived benefits of these practices, publication costs, and uncertainty regarding registration requirements for in vitro and ex vivo studies. For preprint publication, respondents expressed concerns about information quality, duplication of scientific content, and institutional policies that could classify preprints as prior publications. Additional barriers to data sharing included restrictions related to participant consent and institutional or platform-specific policies governing data availability. Regarding open-access publishing, respondents emphasised the high costs of article processing charges and the limited availability of affordable open-access publication venues.

Factors associated with self-reported adoption and intention to adopt OSP

In the univariate analyses (**Online Resource 5**), affiliation was significantly associated with self-reported adoption of protocol registration (OR = 0.08; 95% CI: 0.01–0.36) and protocol publication (OR = 0.05; 95% CI: 0.006–0.49), with lower odds among respondents with non-university affiliations.

In the multivariable analysis (Table 2), affiliation remained significantly associated with self-reported adoption of open science practices, with respondents from other affiliations exhibiting lower odds of adoption than those affiliated with universities or faculties (adjusted OR = 0.19; 95% CI: 0.08–0.46). This indicates that, across the five Open Science practices, respondents with other affiliations had 81% lower odds of reporting a higher level of adoption (once or more than once versus a lower adoption category) than those with university affiliations, after adjustment for the other variables included in the model. Lower odds of self-reported adoption were observed for protocol publication (adjusted OR = 0.33; 95% CI: 0.14–0.77), preprint publication (adjusted OR = 0.08; 95% CI: 0.03–0.22), and data sharing (adjusted OR = 0.17; 95% CI: 0.07–0.42). No significant associations were identified for academic position or continent.

Table 2
Exploratory multilevel ordinal logistic regression for self-reported adoption of open science practices (n = 43).

Variables	**Adjusted OR**	**95% CI**
Open science practices	Baseline	-
Protocol Registration	0.33	0.14–0.77
Protocol Publication	0.08	0.03–0.22
Preprint Publication	0.17	0.07–0.42
Data Sharing	2.04	0.83–5.05
Open-access publishing		
Affiliation	Baseline	-
University/research Institute	0.19	0.08–0.46
Other affiliations*		
Academic position	Baseline	-
Full Professor	0.89	0.43–1.85
Assistant/Associate Professor	0.71	0.27–1.87
Graduate student/clinical practitioner		
Continent	Baseline	-
Asia	1.29	0.66–2.54
Other continents**		
*Other affiliations: private practice, government institutions, industry, or others.		
**Other continents: Africa, Europe, South America, North America, and Oceania.		
Abbreviations: OR = odds ratio; 95% CI = 95% confidence interval.		

In the univariable analysis, respondents with non-university affiliations had significantly lower odds of intending to adopt protocol registration than those affiliated with universities or faculties (OR = 0.19; 95% CI: 0.04–0.78) (**Online Resource 6**). Table 3 presents the exploratory multilevel ordinal logistic regression model for intention to adopt Open Science practices. Compared with protocol registration, lower odds of reporting greater intention to adopt were observed for protocol publication (adjusted OR = 0.25; 95% CI: 0.11–0.57), preprint publication (adjusted OR = 0.05; 95% CI: 0.02–0.13), and data sharing (adjusted OR = 0.08; 95% CI: 0.03–0.20). Respondents with non-university affiliations also had lower odds of reporting greater intention to adopt Open Science practices than those with university or research institute affiliations (adjusted OR = 0.36; 95% CI: 0.15–0.87). No significant associations were observed for academic position or continent.

Table 3
Exploratory multilevel ordinal logistic regression for the intention to adopt open science practices (n = 43).

Variables	**Adjusted OR**	**95% CI**
Open science practices	Baseline	-
Protocol Registration	0.25	0.11–0.57
Protocol Publication	0.05	0.02–0.13
Preprint Publication	0.08	0.03–0.20
Data Sharing	0.61	0.26–1.41
Open-access publishing		
Affiliation	Baseline	-
University/research institute	0.36	0.15–0.87
Other affiliations*		
Academic position	Baseline	-
Full Professor	0.84	0.39–1.81
Assistant/Associate Professor	1.31	0.47–3.61
Graduate student/clinical practitioner		
Continent	Baseline	-
Asia	1.78	0.87–3.59
Other continents**		
*Other affiliations: private practice, government institutions, industry, or others.		
**Other continents: Africa, Europe, South America, North America, and Oceania.		
Abbreviations: OR = odds ratio; 95% CI = 95% confidence interval.		

Discussion

Our survey provides insights into the self-reported adoption, intention to adopt, and perceived barriers related to five open science practices among corresponding authors of paediatric dentistry randomised clinical trials between 2019 and 2026. Our findings revealed that the self-reported adoption varied considerably across practices, with open-access publishing and protocol registration being the most frequently adopted, whereas protocol publication, preprint publication, and data sharing were less commonly reported. The main barriers identified included limited knowledge and training, time constraints, financial costs, uncertainty regarding journal policies, and insufficient institutional or supervisory support. Overall, these findings indicate that the adoption of open science practices in paediatric dentistry remains variable and is accompanied by reported practical and institutional barriers. The findings regarding open-access publishing and the association between past adoption and future intention require particular consideration because the survey assessed whether respondents had ever used open-access publishing rather than the proportion of their research published open access, and past behaviour and future intention were measured concurrently within the same survey. More broadly, self-reported adoption of an Open Science practice does not necessarily indicate that it was implemented comprehensively or according to recommended standards. Aspects such as the timing, completeness, quality, and accessibility of implementation were not assessed in this survey and may vary across researchers and practices.

A previous meta-research study evaluating individual RCTs in paediatric dentistry found lower observed frequencies of protocol registration and open-access publication (Cenci et al. 2021). These estimates are not directly comparable with our findings because the previous study assessed actual implementation in individual RCTs, whereas our survey assessed researchers' self-reported experience of having engaged in these practices at least once. Notably, the previous study provides complementary evidence on how frequently these practices are implemented and documented in published RCTs, rather than researchers' reported experience. This pattern may suggest that Open Science practices already integrated into journal policies, funder mandates, or clinical trial regulations are more readily adopted because they are encouraged or required. In contrast, practices requiring additional knowledge, infrastructure, time, cultural shifts, or institutional support may remain less established and more dependent on individual and institutional resources. Beyond improving transparency and reproducibility, open science practices may also increase the visibility and dissemination of research. In dentistry, protocol registration and open-access publication have been associated with greater citation impact and higher Altmetric scores (Cenci et al. 2024). Similarly, surveys conducted in social sciences, neuroimaging, dentistry, and other biomedical fields have shown increasing support for open science, but also identified persistent barriers to implementation (Cenci et al. 2024; Ferguson et al. 2023; Linnell and Tilton 2024; Ng et al. 2024; Paret et al. 2022). A recent international survey of 3,017 researchers across 24 disciplines similarly found that open-access publishing was the most widely used Open Science practice, whereas the use of preprints, open data, and preregistration remained below 50%. The study also demonstrated that the use of Open Science practices varied considerably across disciplines, regions, and career stages (Pennington et al. 2026). Furthermore, the positive association between self-

reported past adoption and intention to future adoption was also reported in previous surveys of Open Science practices (Ferguson et al. 2023; Paret et al. 2022). However, intention should not be interpreted as an indicator of future behaviour. Together, these findings highlight the potential importance of training opportunities and institutional initiatives to promote engagement with open science practices (Haven et al. 2022).

For protocol registration and protocol publication, the main reported barriers included lack of institutional or supervisory support, limited knowledge, uncertainty regarding publication opportunities, and the perception that these practices are time-consuming. Similar barriers have been reported in surveys conducted in other disciplines (Ng et al. 2024; Paret et al. 2022). Supervisors may play an important role in promoting responsible research practices, and training in research integrity has been shown to improve their ability to foster transparency-related practices among postgraduate researchers (Haven et al. 2023). The predominance of senior academics among respondents may partly reflect the sampling frame, because corresponding authors of clinical trials are often established investigators. Differential interest in Open Science may also have influenced participation, although this could not be evaluated. Although protocol registration and publication may require additional effort, protocol development is an essential step in conducting rigorous research by prespecifying hypotheses, outcomes, and analytical approaches before data collection, thereby improving transparency, accountability, and reproducibility (Nosek et al. 2018). The Registered Report format extends protocol registration by peer reviewing protocols before data collection and granting in-principle acceptance based on the relevance of the research question and methodological quality, rather than study results (Chambers 2013). Respondents also expressed concerns that publishing study protocols could allow other researchers to use their research ideas before study completion. However, protocol publication provides a permanent, citable, and time-stamped record that establishes priority of the original research idea (Ross et al. 2012).

Preprint publication represented one of the least adopted open science practices. The main reported barriers were concerns that target journals might reject manuscripts previously posted as preprints and that preprints lack the credibility associated with peer review. Similar uncertainty regarding journal policies and limited adoption of preprints have been reported in dentistry (Cenci et al. 2022; Santos et al. 2024). Data sharing was characterised by a preference for controlled-access mechanisms, including data-sharing agreements and restricted repositories. The main reported barriers included lack of funding, insufficient knowledge regarding repositories, the time required to prepare datasets for sharing, and legal and ethical restrictions, consistent with previous studies (Linnell and Tilton 2024; Paret et al. 2022; White et al. 2022). In paediatric dentistry, these concerns may be particularly relevant because the sharing and secondary use of children's clinical data raise specific ethical considerations. Although parental or guardian consent and, where appropriate, the child's assent may be obtained at the time of participation, children's understanding of the implications of future data sharing and reuse may vary according to age and developmental maturity. Data sharing therefore requires appropriate governance, including clear consent procedures, secure data management, and controlled access when unrestricted public sharing is not appropriate. Open-access publishing demonstrated relatively high self-reported

adoption and future intention; however, publication costs remained the most frequently reported barrier, consistent with previous studies, particularly among researchers with limited institutional or grant support (Acosta et al. 2024; Kumari and Subaveerapandiyan 2025).

Researchers affiliated with private practice, governmental institutions, industry, or other non-academic settings demonstrated lower odds of open science adoption than those affiliated with universities. This finding may reflect differences in access to research infrastructure, methodological support, and institutional policies that encourage transparency practices. However, researchers in universities also operate within evaluation systems that emphasise publication output, citation metrics, and grant acquisition, creating pressures associated with the “publish or perish” culture (Rawat and Meena 2014). Such incentives may discourage engagement with practices that require additional time and effort, including protocol publication, data sharing, and preprint dissemination. Increasingly, research assessment has been encouraged to incorporate measures of research quality, transparency, openness, and societal impact (Arentoft et al. 2022; Cagan 2013). This perspective is reflected in the San Francisco Declaration on Research Assessment (Cagan 2013), the Hong Kong Principles for assessing researchers (Moher et al. 2020), and more recent guidance on implementing responsible research assessment (Allen et al. 2026), which collectively emphasise research quality, rigour, openness, and broader societal impact rather than relying predominantly on publication-based metrics.

To our knowledge, this is the first survey to investigate self-reported adoption, intention to adopt, and perceived barriers across multiple open science practices among corresponding authors of paediatric dentistry randomised clinical trials. The study employed a broad search strategy and several recruitment measures, including personalised survey links, weekly reminders, and expansion of the author identification strategy. Nevertheless, a number of limitations in our study should be considered while interpreting our results. Unfortunately, our response rate was very low, which is a common challenge in surveys targeting researchers and may reflect competing academic responsibilities, outdated contact information, or limited interest in open science practices. It is possible that researchers with little interest or engagement in open science were also less likely to participate in a survey specifically addressing these practices. This limitation was reported in Previous surveys of researchers have also reported low response rates > 9% (Paret et al. 2022; Schmidt et al. 2016; Tenopir et al. 2011). Similar to Paret et al. (2022), we did not recruit participants through our professional networks. While network-based recruitment may increase response rates, it may also disproportionately attract researchers with similar interests or perspectives on the topic, potentially introducing selection bias. The e-mail addresses of the co-authors of the present study were excluded from the invitation list to avoid potential conflicts of interest. However, other researchers from the same institutions or research groups were not excluded. Additionally, adoption of open science practices was self-reported and was not independently verified against published articles, trial registries, or repositories. Therefore, discrepancies between reported and actual practices cannot be excluded. The observed associations should be regarded as hypothesis-generating rather than as estimates of the determinants of Open Science adoption among paediatric dentistry researchers. Future studies should ideally combine survey data with objective verification of trial registration, protocol availability, open-access status, and data or code deposition.

Overall, self-reported adoption of open science practices in paediatric dentistry remained varied and was accompanied by practical, institutional, financial, and knowledge-related barriers. Educational initiatives, institutional support, clearer journal policies, and research assessment frameworks that recognise responsible research practices, including those advocated by DORA and similar organisations, may facilitate broader implementation of open science practices. Future studies should compare self-reported adoption with observed implementation and explore researchers' perceptions through qualitative approaches to better understand barriers to adoption.

Conclusion

Among respondents, self-reported engagement with Open Science varied across practices, with greater experience of open-access publishing and protocol registration and lower engagement with preprint publication and data sharing. Financial, institutional, knowledge-related, and policy-related barriers were commonly reported, and respondents with non-university affiliations showed lower levels of self-reported adoption. Given the low response rate and reliance on self-reported behaviour, these findings should be considered exploratory and warrant further studies assessing the actual implementation of Open Science practices in paediatric dentistry research.

Declarations

Competing Interests

Prof. Dr. Bouter is the Chair of the Steering Board of Open Science NL and declares a non-financial conflict of interest. The other authors declare no potential conflicts of interest.

Author Contribution

D.P.R., M.S.C., R.A.E., L.B., F.M.M., T.P.C., and M.M.B. conceived and designed the study. R.A.E., T.K.T., S.V.L., and G.M.S. acquired the data. R.A.E., F.M.M., G.M.S., T.K.T., and D.P.R. analyzed and interpreted the data. R.A.E. drafted the manuscript. All authors critically reviewed the manuscript, read, and approved the final version.

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Data Availability

The datasets generated and analyzed during the current study, together with the survey questionnaire, search strategy, CHERRIES checklist, and additional supplementary materials, have been deposited in an Open Science Framework (OSF) project and will be made publicly available upon publication. These materials are also provided as supplementary files accompanying this manuscript.

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Figures

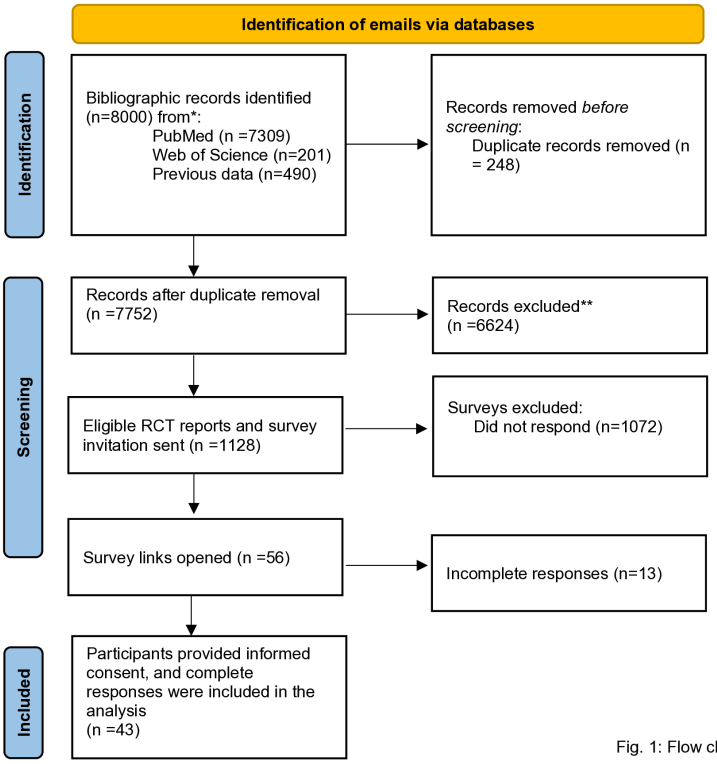


Fig. 1: Flow chart of the selection process

Figure 1

See image above for figure legend.

Figure 2. Self-reported adoption of open science practices among corresponding authors of pediatric dentistry randomized clinical trials.

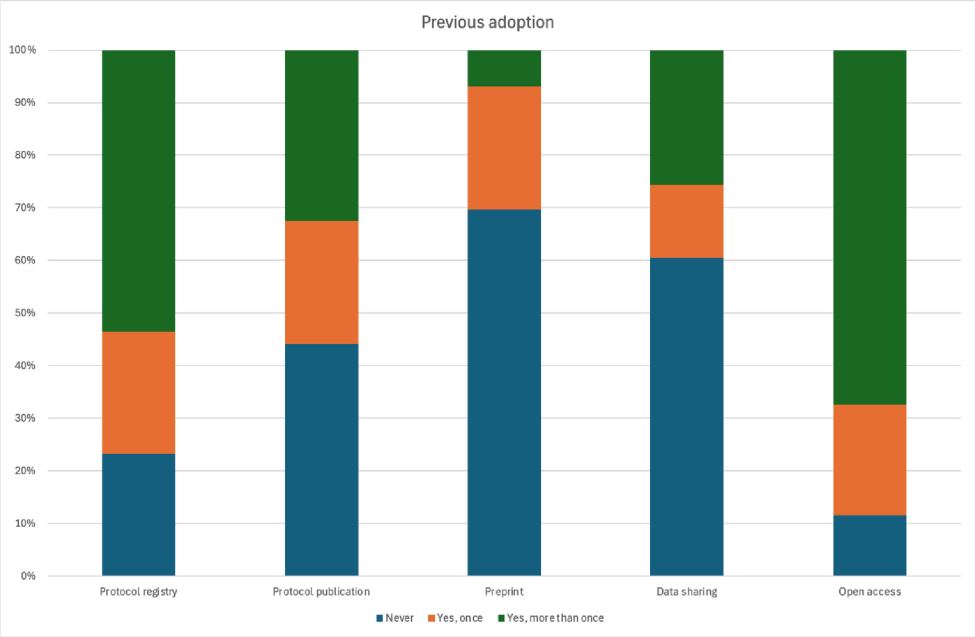


Figure 2

See image above for figure legend.

Figure 3: Intentions to adopt open science practices among corresponding authors of pediatric dentistry randomized clinical trials.

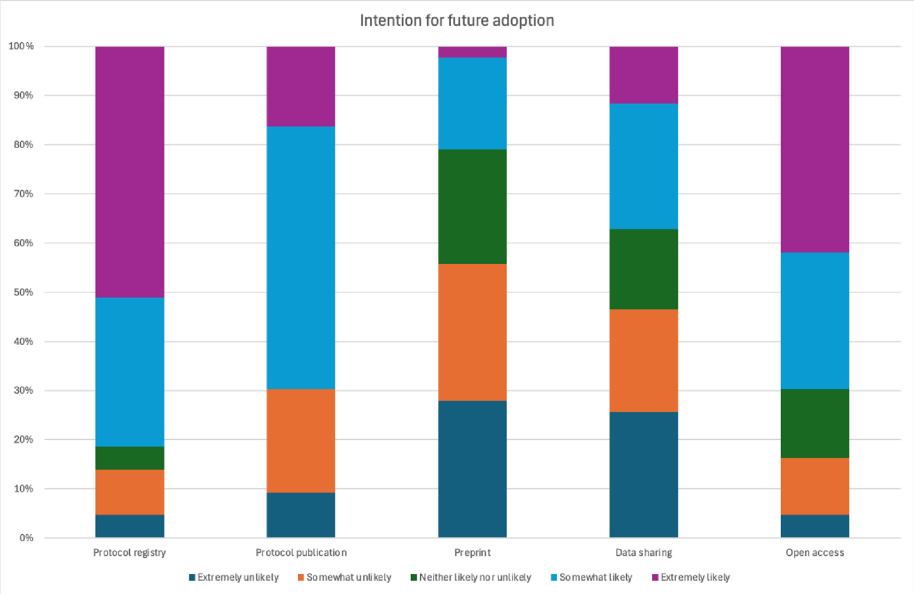


Figure 3

See image above for figure legend.

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