

## Profiling of the published scientific research articles on Paedodontics, endodontics, dental restorative materials and direct restorative dentistry in SADJ over a period of ten years (2008 - 2018)

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**Abstract:** The study explored the dynamics of published scientific research articles on Paedodontics, endodontics, dental restorative materials and direct restorative dentistry in South African Dental Journal (SADJ) over a period of ten years (2008 - 2018). A descriptive study design was conducted by reviewing published Paedodontics, endodontics, dental restorative materials and direct restorative dentistry articles in SADJ. A total of 100 journals were reviewed. A total number of 197 research articles were published in the SADJ between the years 2008 and 2018 according to the field of expertise (Paedodontics, endodontics, dental restorative materials and direct restorative dentistry). For the 11-year period, a total of 59 (30%) articles in Endodontics, 51 (26%) in direct restorative material, 48 (24%) in direct restorative dentistry, with Paedodontics having the least number at 39 (20%) published in the SADJ. It was observed that all the publications in SADJ (according to field of expertise) showed a palpable diminishing trend between 2008 and 2018. In particular, the number of articles in Paedodontics decreased significantly from a peak of 13 recorded in 2008 to nil in 2016.

**Keywords:** Dental materials, Direct restorative dentistry, Endodontics, Paedodontics.

### 1. Introduction

Dentistry, a field of care in health sciences that has evolved tremendously over the past years, is a growing branch of science in terms of research and innovation. Its evolution stems from evidence-based scientific knowledge as well as clinical practice [1, 2]. Evidence-based oral health care includes the search for the best clinical practice, critical evaluation of scientific knowledge, as well as the integration of this evidence with the practitioner's experience and expertise. Dentistry has its footprint with its interrelation with other fields in science, such as microbiology, pathology, physiology, anatomy, dental materials, roentgenology, and anesthesiology. Scientific readership informs healthcare providers, researchers, academics, and students on how to develop and improve healthcare services [2]. Improvement of healthcare services is enhanced by critical analysis of scientific research published in biomedical journals such as the South African Dental Journal (SADJ).

The SADJ is an independent, scientific, peer-reviewed journal that aims to disseminate scientific and evidence-based knowledge for dental professionals. The SADJ provides a platform for dental professionals to share their skills, expertise, and experiences about new developments, technological advancements, and clinical practice. This journal also assists professionals in staying abreast of current advancements in dental science in the pursuit of academic knowledge, professional excellence, and evidence-based practice. It also offers other benefits to all end users, such as professional advertising of oral health products.

Published articles in the SADJ benefit from rigorous evaluation processes, including peer reviews by experts in specific fields. To stay current, dental professionals must understand the latest scientific knowledge related to broader oral health [3, 4]. They should also be able to evaluate and weigh the

value of various publications to determine their relevance in clinical practice and knowledge [5, 6]. Consequently, original research, expert opinions, and editorial comments significantly contribute to professional development.

The SADJ publishes 10 issues annually, from February to November, including original scientific articles, case reports, and case series. It aims to publish the highest quality scientific knowledge. Its literature covers specialized dentistry, endodontics, pediatric dentistry, oral pathology, conservative dentistry, maxillofacial fields, periodontology, oral medicine, implantology, dental radiology, and orthodontics. The journal provides a platform that helps clinicians recognize clinical signs and symptoms, treat and manage diseases, and utilize current clinical materials and methods.

Restorative dentistry (RD) is a field published in SADJ that deals with the practice and management of diseases of dental hard tissue. Scientific literature on direct RD assists readers in diagnosing and managing diseases of dental hard tissue and their supporting structures. Other aspects of RD include rehabilitating teeth and the oral cavity to normal functional levels, as well as addressing psychological and aesthetic requirements. Other dental specialties falling under RD include prosthodontics. Specifically, for direct restorative dentistry, endodontics, and pedodontics are fields of interest, focusing on dental emergencies and the subsequent management of patients' oral health conditions [7].

For the purpose of this research, more focus was placed upon endodontics, paedodontics, as well as direct RD and direct restorative materials. The aim of the study was to explore the profile of published scientific research articles on paedodontics, endodontics, dental materials, and direct RD in SADJ and to identify gaps in publication knowledge. The study is based on publication trends, patterns, and frequency of certain fields that are favorable and may not be favorable for certain researchers. This study could assist dental health professionals in identifying gaps in knowledge, arouse research interest, and provide future perspectives and strides in dental literature.

## 2. Methodology

Ethical clearance (SMUREC/D/305/2018) was obtained from the Medical Research Ethics Committee (MREC) at Sefako Makgatho Health Sciences University before the study commenced. A descriptive study design was used, reviewing published articles in the SADJ. Literature searches were conducted on the SADJ database from 2008 to 2018, reviewing a total of 100 journals. All purposive scientific articles in the identified fields within this period were included in the study.

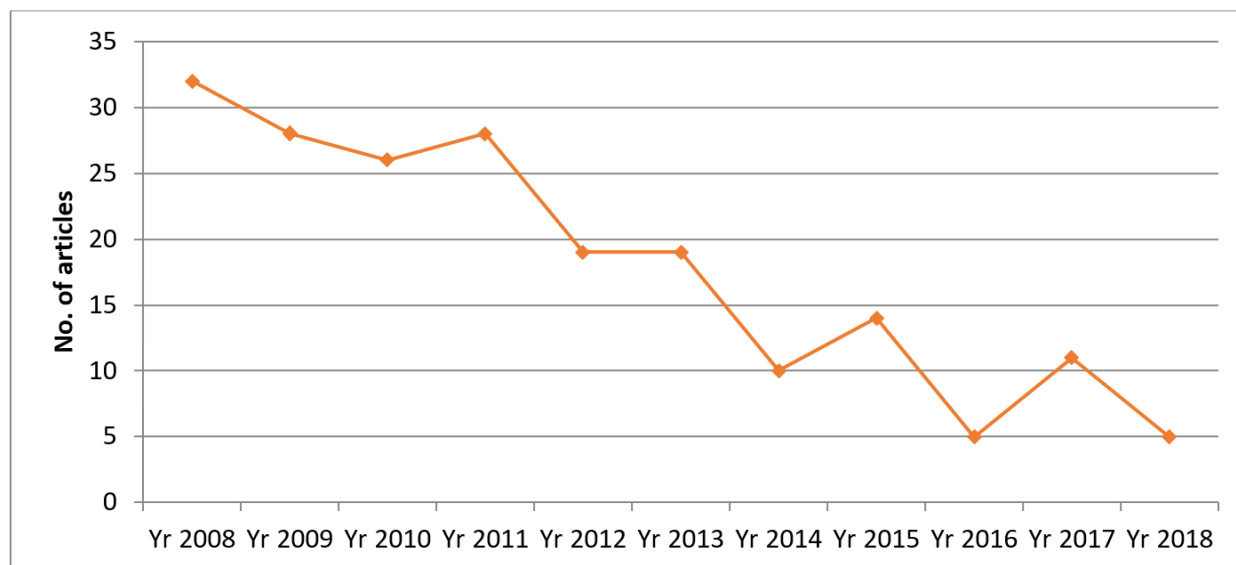
Journals were accessed electronically and downloaded from the SADJ website. The researchers reviewed all articles related to paedodontics, endodontics, dental materials, and direct RD. Studies were categorized according to: year of publication, country where the study was conducted, study design, main field of study, and main conclusions of the study. Only scientific articles on paedodontics, endodontics, dental materials, and direct RD were considered, and all other scientific articles not related to these fields, as well as notes, comments, letters, and adverts, were not included.

A data collection sheet used for the study contained questions previously tested by Khan et al. [8] and Grazziotin-Soares et al. [9]. It was subsequently piloted to help investigators remove or amend unclear variables. Since the study had a retrospective design, published research articles in the field were coded and collated. The data was entered into Excel and converted into SAS, Release 9.2 or higher, running under Microsoft Windows for analysis. Descriptive statistics summarized all variables by frequency counts and percentages, with 95% confidence intervals. Percentage outcomes for the articles were compared using the Fisher-Exact test. All statistical tests were two-sided, and  $p$ -values  $\leq 0.05$  were considered significant.

## 3. Results

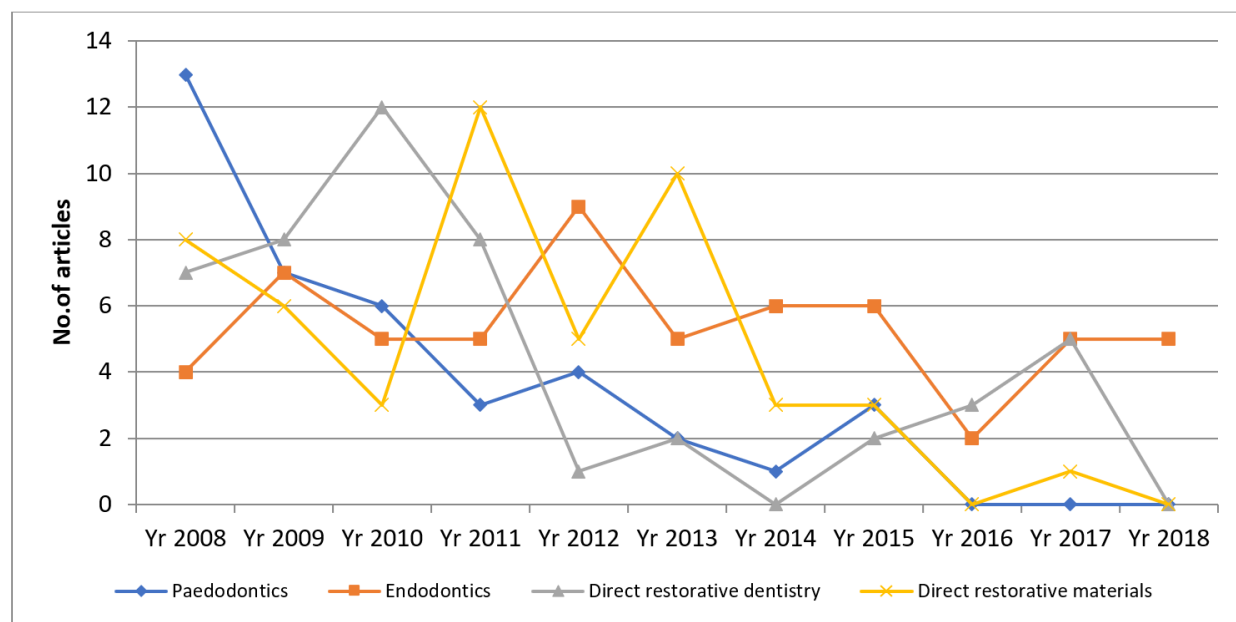
The section interrogates the total number of published SADJ research articles in the fields of Paediatrics, endodontics, dental materials, and direct RD for the period 2008 to 2018.

Total number of SADJ published articles during 2008 – 2018



**Figure 1.**  
Trend for the total number of published scientific research articles in the SADJ.

Figure 1 shows that 197 scientific research articles were published in the SADJ according to the field of expertise for the 11-year period. They reveal a decrease from a peak of 32 recorded in the year 2008 to a low of five (5) publications in the year 2018.



**Figure 1.**  
Trend for total number of published scientific research articles in the SADJ according to the field of expertise.

Figure 2 presents an analysis of the number of published scientific research articles in the SADJ according to the field of expertise. The number of publications in SADJ (according to the field of expertise) showed a decreasing trend between 2008 and 2018. In particular, the number of articles in paediatrics decreased significantly from a peak of 13 recorded in 2008 to zero in 2016. From 2016 to

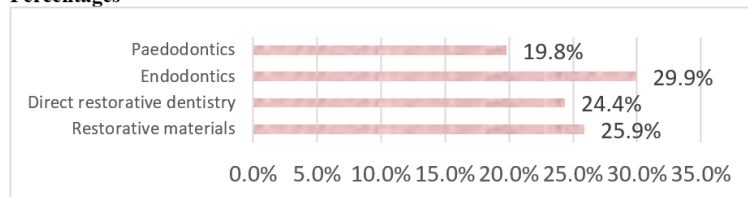
2018, there were no articles in paediatrics published during that period. A similar decreasing trend was observed in publications on direct restorative materials, which peaked with 12 articles in 2011 and dropped sharply to zero in 2016.

Again, direct RD publications dropped from a peak of 12 in 2010 to nil just four years later, up until 2014. However, publications in direct RD show an increasing trend between 2014 and 2017. Publications in endodontics have been slightly inconsistent, averaging between 4 and 8 units, with outliers in 2012 and 2016.

**Frequency table**

Field of expertise	Frequencies
Paedodontics	39
Endodontics	59
Direct restorative dentistry	48
Restorative materials	51

**Percentages**

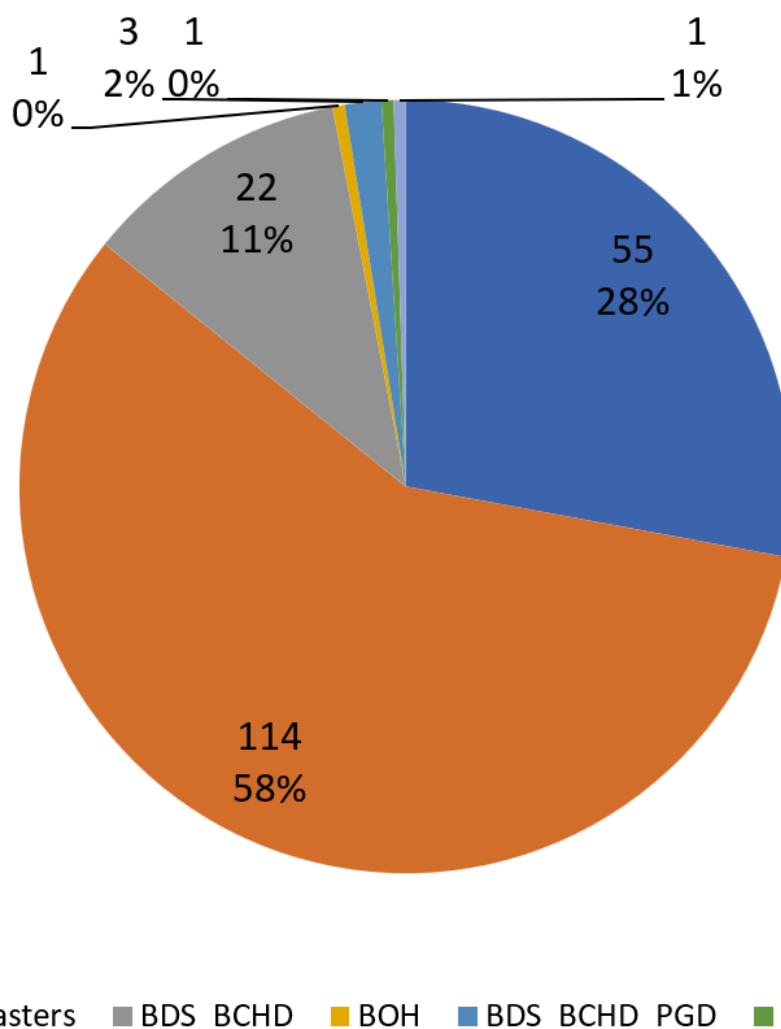


**Figure 3.**

Total number of articles published in SADJ between 2008 and 2018.

Figure 3 shows that for the 11-year period (between years 2008 and 2018), a total of 59 (30%) articles in Endodontics have been published in SADJ. However, 51 (26%) articles in direct RD have been published in SADJ in the 11-year period. On the other hand, 48 (24%) articles in direct RD have been published in SADJ. Paedodontics has the least number of articles published in SADJ and contributed 39 (20%) to the total publications.

Profile of scientific research articles in the SADJ by different authors



**Figure 4.**

Profile of scientific research articles in SADJ by the academic status of 1st author.

Figure 4 shows a profile of scientific research publications in the SADJ by the academic status of the first author. It can be realized that 28% of the first authors of scientific research publications in the SADJ have PhDs, while 58% have master's degrees. However, BDS or BCHD holders make up about 11% of the first authors of scientific research publications in the SADJ. BOH, BDS / BCHD / PGD, BDT holders, as well as students, make up a combined 3% of the first authors of scientific research publications in the SADJ.

First author authorship in SADJ

**Table 1.**  
Scientific research publications in SADJ by 1st author according to the field of expertise.

Field of expertise	PhD	Masters	BDS/ BCHD	BOH	BDS/ BCHD/ PGD	BDT	Student	Total
Paedodontics	16	16	5	0	1	1	0	39
Endodontics	15	36	6	0	2	0	0	59
Direct RD	12	29	7	0	0	0	0	48
Direct restorative materials	12	33	4	1	0	0	1	51
Total	55	114	22	1	3	1	1	197

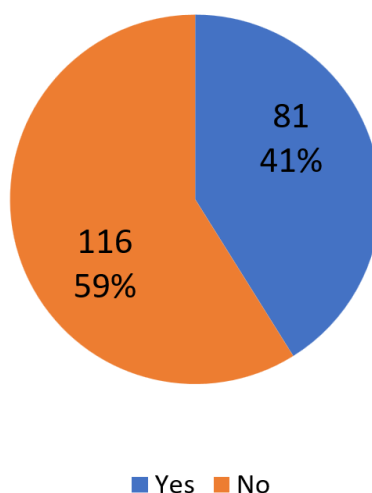
The scientific research publications in SADJ by the first author and field of expertise are demonstrated in Table 1. Out of 197 publications, 59 (29.9%) covered Endodontics, 51 (25.9%) covered Direct restorative materials, and 48 (24.4%) covered direct RD. Additionally, 39 (19.8%) of the publications in SADJ by the first author covered Paedodontics.

Of the 114 scientific research publications in SADJ authored by master's degree holders, 36 (31.6%) were in Endodontics, 33 (28.9%) in Direct restorative materials, and 29 (25.4%) in Direct RD. The remaining 16 (14.0%) covered Paedodontics.

On the other hand, of the 55 scientific research papers published in SADJ by PhD holders, 29.1% dealt with Paedodontics, 27.3% with endodontics, and 21.8% with direct RD. However, direct restorative materials were the subject of the remaining 21.8% of scientific research articles in SADJ conducted by PhD holders.

Of the 22 scientific research publications in SADJ by BDS/BCHD, 31.8% were in direct RD, 27.3% in Endodontics, and 22.7% in Paedodontics. Only 18.2% of these publications covered direct restorative materials.

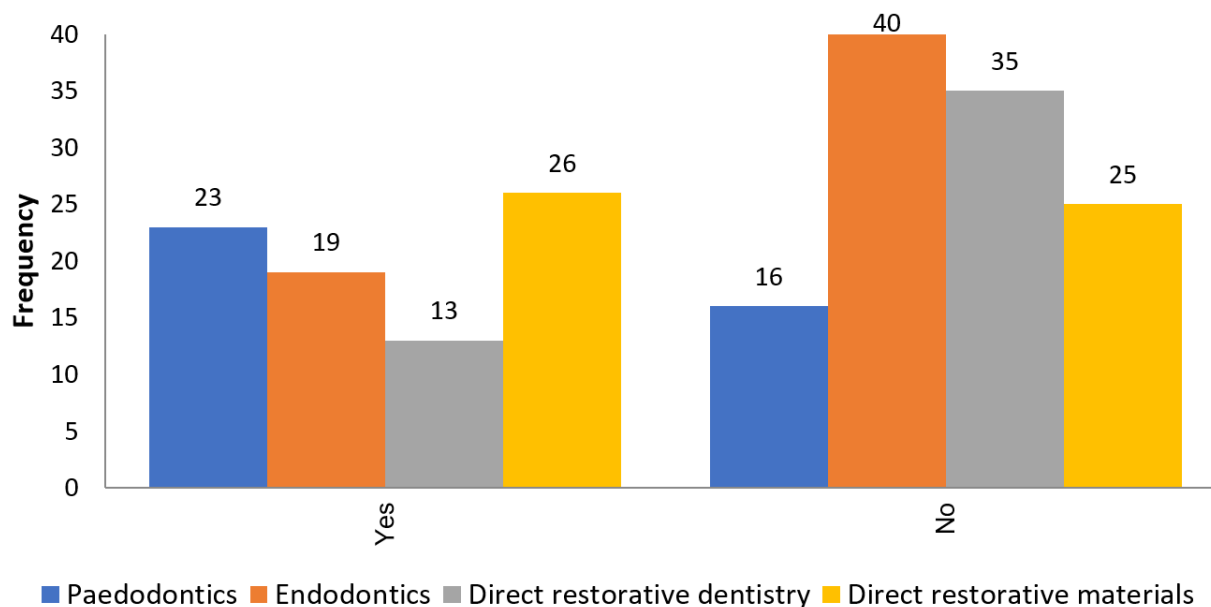
Professors as contributing co-authors in SADJ research publications



**Figure 5.**  
Professors as contributing co-authors in SADJ research publications.

Figure 5 shows that from 197 authored articles in SADJ, 41% involved professors as co-authors and 59% without professors involved.

Professors as contributing co-authors in SADJ research publications according to expertise



**Figure 6.**

Professors as (co-)authors in SADJ research publications across the field of expertise.

Absence or presence of professors as (co-)authors in SADJ research publications according to fields of expertise demonstrates that when professors participate in co-authoring, the number of articles in Paedodontics and direct restorative materials is slightly higher than when professors do not participate. However, SADJ publishes many more articles in endodontics and direct RD when professors are not involved as co-authors.

Field of expertise and professor involvement

**Table 2.**

Field of Expertise and Professor Presence Cross Tabulation.

Field of expertise	Professors Presence		Total
	Yes	No	
Paedodontics	23	16	39
Endodontics	19	40	59
Direct restorative dentistry	13	35	48
Direct restorative materials	26	25	51
<b>Total</b>	<b>81</b>	<b>116</b>	<b>197</b>

Table 2 shows that overall, more articles were published when professors did not participate as co-authors. However, there were only slightly more articles published in Paedodontics and direct restorative materials when professors participated as co-authors.

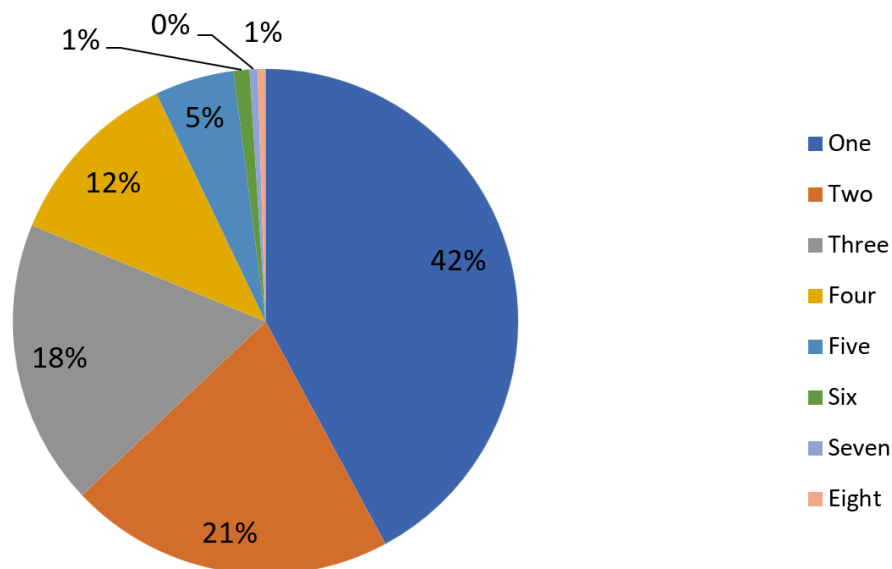
**Table 3.**

Testing the association between Field of Expertise and Professor Presence.

Test type	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.027 <sup>a</sup>	3	0.005
Likelihood Ratio	13.142	3	0.004
Linear-by-Linear Association	0.238	1	0.625
Phi	0.257		0.005

Note: <sup>a</sup> = some entries  $n < 5$ .

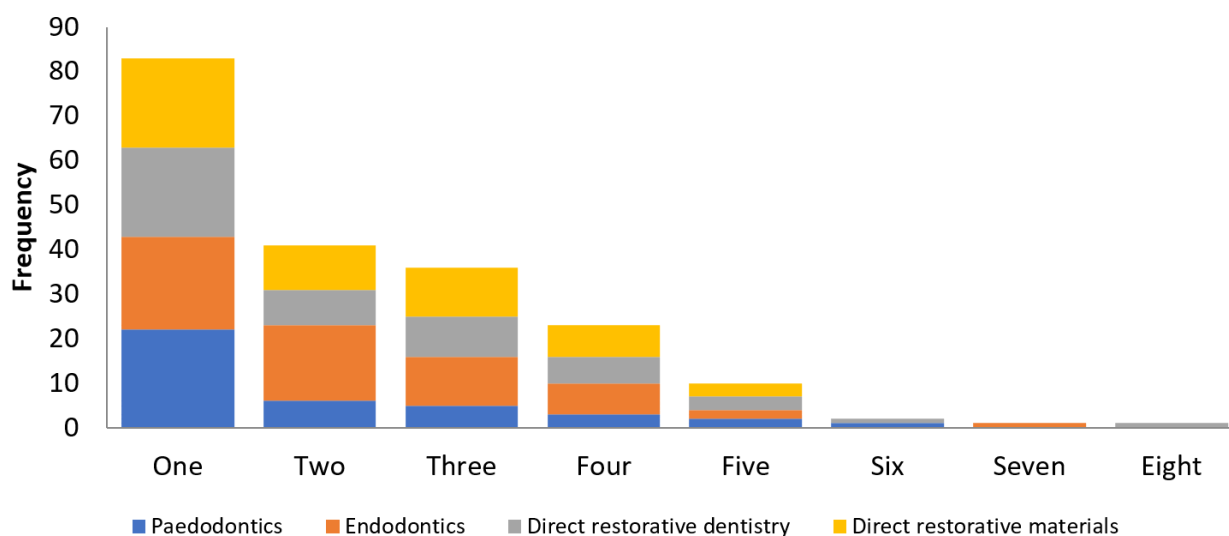
A chi-squared test of independence reveals that there was a significant ( $p < 0.01$ ) association between field of expertise and professor presence with  $\chi^2$  (value = 13.027,  $df = 3$ ,  $p < 0.01$ ). Thus, the articles published in SADJ were significantly dependent on the field of expertise and the professor presence. A phi-coefficient value of 0.257 ( $< 0.5$ ) was attained in this analysis. This demonstrated that there was a small effect size. When the effect size is small in a chi-square test, the observed association between the field of expertise and professor presence is not very strong, even if it is statistically significant. This suggests that, while there might be a significant relationship between these variables, the practical or real-world significance of this relationship might be limited. These results revealed that more articles were published in SADJ when professors were not participating as co-authors. SADJ publications by the number of contributing co-authors



**Figure 7.**  
SADJ publications by number of contributing co-authors.

Figure 7 shows that single authors produced 42% of the SADJ articles, two authors collaborated in 21%, three authors in 18%, and four authors in 12%.

## SADJ publications by number of contributing co-authors and field of expertise



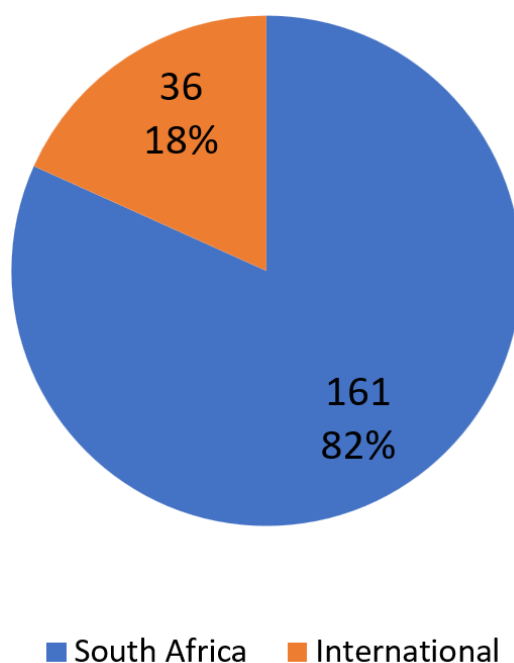
**Figure 8.** Profile of scientific research articles in the SADJ by number of co-authors.

Figure 8 shows that SADJ research articles on all of Paedodontics, endodontics, dental materials, and direct RD decrease. Also, as the number of co-authors increases, the number of articles published decreases severely. A total of 83 scientific research articles were written by single authors. This figure dropped to 41 publications when two authors were involved. It again dropped to 36 when there were three authors, to 23 when there were four, and to 10 when there were five. The number continued to decline until it dropped to one article when eight authors were involved.

Scientific research articles in the SADJ on Paedodontics, endodontics, dental materials, and direct restorative dentistry also decreased exponentially as the number of authors increased. For example, articles in the SADJ on endodontics decreased from 21 publications involving a single author to 3 publications with 5 authors involved. This same trend is demonstrated by the number of scientific publications on Paedodontics, dental materials, and direct restorative dentistry.

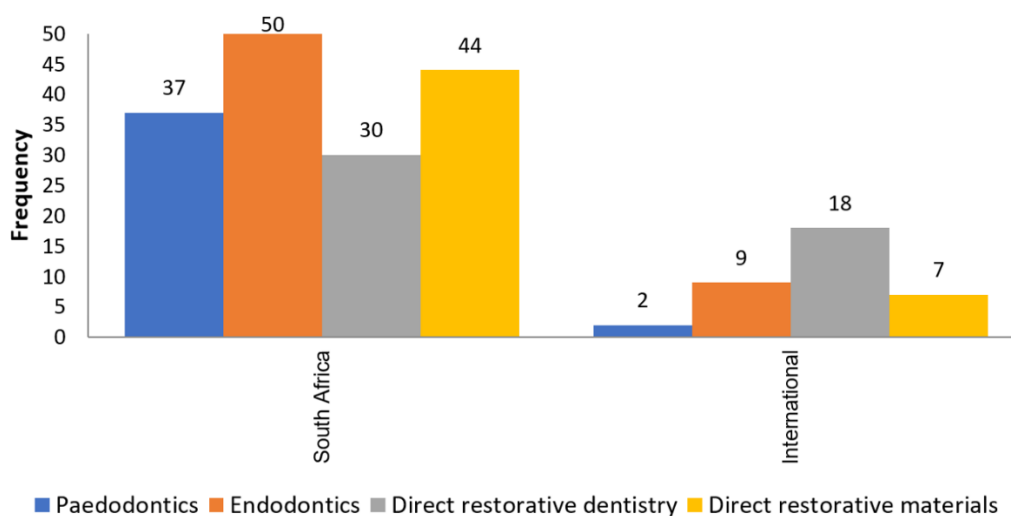
The number of SADJ published research articles on Paediatric dentistry decreased from 22, involving a single author, to 2 publications with 5 authors. On Direct RD and Direct restorative materials, articles decreased from 20 with a single author to 3 publications involving 5 authors.

*Profile of scientific research publications in the SADJ by country of origin*



**Figure 9.**  
Scientific research publications in the SADJ by country of origin.

Figure 9 shows SADJ publications by country of origin. About 82% of the publishers are located in South Africa, and the other 18% come from abroad. It is recognized that having publishers from various countries enriches a journal by bringing in diverse perspectives, enhancing its global relevance, fostering cultural sensitivity, promoting interdisciplinary collaboration, and contributing to the overall quality and credibility of the published content.



**Figure 10.**  
Scientific research articles in the SADJ by country of origin.

Figure 10 shows that out of 161 SADJ research articles from South Africa, 50 (31.0%) covered endodontics, 44 (27.3%) covered direct restorative materials, 37 (23.0%) covered paedodontics, and 30 (18.6%) covered direct RD. At the international level, of 36 articles published, 18 (50.0%) focused on direct RD, nine (25.0%) on endodontics, and seven (19.4%) on direct restorative materials. Publications on paediatrics had the least contribution of two (5.6%) among international publishers.

**Table 4.**

Field of expertise and country cross-tabulation.

Field of expertise	South Africa	International	Total
Paedodontics	37	2	39
Endodontics	50	9	59
Direct restorative dentistry	30	18	48
Direct restorative materials	44	7	51
<b>Total</b>	161	36	197

Table 4 shows that generally, more articles were published in South Africa than by publishers from other countries. The margin of differences in the number of SADJ articles published in South Africa and internationally was large across all fields of expertise.

**Table 5.**

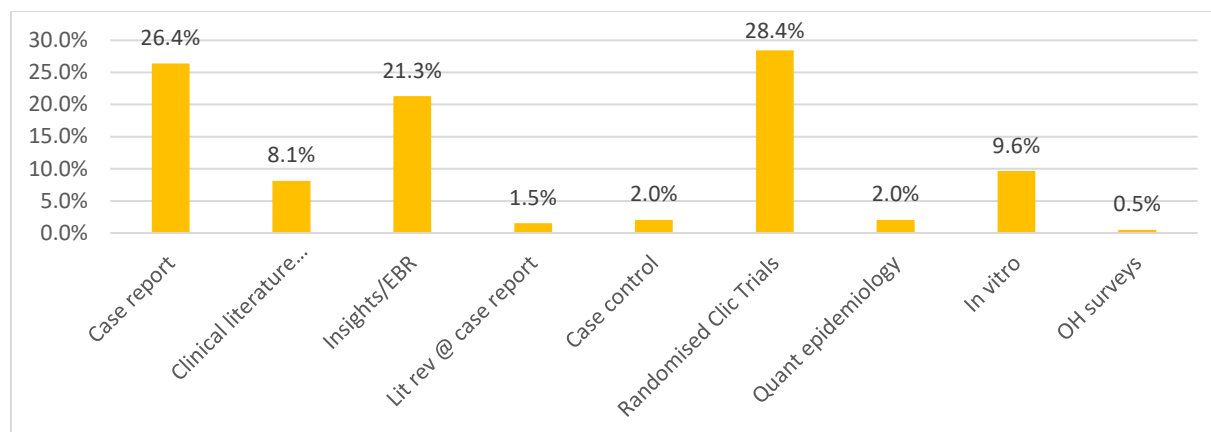
Testing the association between the Field of Expertise and the Country of Origin.

Test type	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.460 <sup>a</sup>	3	0.001
Likelihood Ratio	16.877	3	0.001
Linear-by-Linear Association	2.753	1	0.097
Phi	0.298		0.001

**Note:** 'a' = Some entries  $n < 5$ .

Table 5 uses a chi-squared test of independence to reveal that there was a significant ( $p < 0.01$ ) association between the field of expertise and the country of origin of the publisher, with  $\chi^2 = 17.460$  ( $df = 3$ ,  $p < 0.01$ ). This means that the articles published in SADJ were significantly dependent on the field of expertise and the country of origin of the publisher. A phi-coefficient value of 0.298 ( $< 0.5$ ) was attained in this analysis. This showed that there was a small effect size, indicating that the observed association between the field of expertise and the country of origin of the publisher is not very strong, even though it is statistically significant. This suggests that, while there might be a significant relationship between the variables mentioned above, the real-world significance of this relationship might be limited.

Profile of scientific research publications in the SADJ by study design.



**Figure 11.**  
Profile of study designs employed in scientific research publications in the SADJ.

Figure 11 shows that of 195 published articles in SADJ, 56 (28.4%) were based on randomized clinical trials, while 52 (26.7%) and 42 (21.5%) were based on case reports and insights/evidence-based studies, respectively. Additionally, 19 (9.7%) and 16 (8.2%) articles were based on in vitro and clinical literature study designs. The use of literature reviews, case reports, case-control studies, and oral health surveys contributed a combined total of 10 (5.1%).

**Table 6.**  
Field of Expertise and Study Design Cross-Tabulation.

Study design	Paedodontics	Endodontics	Direct RD	Direct restorative materials	Total
Case report	12	14	16	10	52
Clinical literature review	3	8	3	2	16
Insights/EBR	18	8	13	3	42
Lit rev @ case report	1	2	0	0	3
Case control	0	2	2	0	4
Randomised Clinical Trials	3	18	8	27	56
Quant epidemiology	1	1	1	1	4
In vitro	1	5	5	8	19
OH surveys	0	1	0	0	1
Total	39	59	48	51	197

Table 6 displays fields of expertise and study design cross-tabulation. It generally reveals that there were more articles on Randomized Clinical Trials (RCTs), case reports, and insights/evidence-based research. Most RCTs were used on direct restorative materials and endodontics.

Most case reports (16%) were applied to Direct RD, Endodontics, and Paediatric. Insights and evidence-based research were mainly used in Paedodontics and Direct RD. Clinical literature reviews were applied to Endodontics, while in vitro study designs focused on direct restorative materials, Endodontics, and Direct RD.

Association between Field of Expertise and Study Design

**Table 7.**  
Testing the association between Field of Expertise and study design.

Test type	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	57.259 <sup>a</sup>	24	0.000
Likelihood Ratio	60.683	24	0.000
Linear-by-Linear Association	13.791	1	0.000
Phi	0.539		0.000

**Note:** 'a' = some entries  $n < 5$ .

Table 7 reveals that there was a significant ( $p < 0.01$ ) association between field of expertise and Study design with  $\chi^2 = 57.259a$  ( $df = 24$ ,  $p < 0.01$ ). Thus, the articles published in SADJ were significantly dependent on the field of Expertise and study designs.

A phi-coefficient value of 0. 539 ( $> 0.5$ ) was attained in this analysis. This showed that there was a large effect size. When the effect size is large in a chi-square test, the observed association between the field of expertise and study design is very strong and statistically significant. A large effect size suggests that the relationship between field of expertise and study design is substantial and relevant in a real-world context.

#### 4. Discussion

According to the study findings, paedodontic publications accounted for 20% and had the lowest trends, thereby occupying the fourth position among the other fields of expertise with the greatest participation in the SADJ for the 11-year period (2008-2018). An upward publication trend would be highly appreciated given the quadrupled burden of disease that the country faces, but this is not the case in this study. Other authors previously stated that South Africa continues to be in the midst of a quadruple burden of communicable, non-communicable, perinatal and maternal, and injury-related disorders [10]. This quadruple burden of disease is a cocktail of colliding epidemics of maternal, newborn, and child health, HIV/AIDS and tuberculosis (TB), non-communicable diseases (early childhood caries – ECC), as well as violence and injuries [10]. With that in mind, it further necessitates more paedodontic scientific publications in the SADJ, which can also be the best source for introducing new dental data/(bio)information and clinical applications to the dental profession. That would be more intriguing and advantageous to dental practitioners, as well as help appreciate the interplay and resultant effects between oral health conditions in children and the quadruple burden of disease. High clinical research output in paediatric dentistry would be a plus in terms of research progress, especially since previous analysis of the distribution of paediatric dentistry articles showed a steep decline over the 11-year period.

Out of the 197 research articles published in the SADJ between 2008 and 2018, according to the field of expertise (Paedodontics, endodontics, dental restorative materials, and direct RD), 30% were in endodontics. Endodontics had the greatest representation, followed by 26% of articles on direct restorative materials and 24% on direct RD, occupying the third position. These findings align with literature results discussed in three Brazilian dental journals from 1990-2004, where the most addressed topics were dental restorative materials, followed by endodontics and then Paedodontics [11].

Endodontics had the highest publication rate compared to other fields of expertise in SADJ for the stated 11-year period. Any successful clinical practice in dentistry, including endodontics, depends on a wide spectrum of dental research. Endodontics has remained a cornerstone in the foundation for dental restorative care in the present century [12, 13]. Unfortunately, there is still a substantial shortage of good studies to be used as an evidence base in clinical endodontics, which can be considered a significant problem in endodontics, to such an extent that most treatments are given based on opinions and experiences rather than science [12].

With the upward trend and the highest publication rate in Endodontics in the SADJ for the stated 11-year period, it indicates advancement in dental scientific knowledge. This upward trend relates well

to patient management, the improvement of dentists' clinical expertise, and focuses more on the patient's treatment needs and preferences [13].

Authorship is another fundamental aspect in the publication of scientific literature because it enhances researchers' academic performance, recognition, and credibility. Therefore, this increases opportunities for further research and collaboration in a competitive research environment [14]. The publication rate is at the heart of the reward system of science and serves as the basis for decisions regarding funding, career advancement, salary, and prizes. With that in mind, the more an individual is named as an author on scholarly works, the greater the credibility they gain as a scientist or expert on a specific research topic. This study showed that there was a slightly higher number of articles in Paedodontics and direct restorative materials when professors participated as co-authors [14].

Some studies also suggested that different authorship is a very important or innovative way to come up with radically different ideas, although with the current study, there was a severe decrease in the publication rate for the 11 years [14]. However, it could still be argued that the newest and most creative inventions in science may also come from outside the mainstream of research that encourages a multi-sectoral approach, multicenter, multiple co-authors, and international collaborations [15]. For researchers in the life sciences, common practice is to indicate such collaborations and contributions through position in the authors' list, the number of co-authors, and their order when assessing research performance at the individual level.

Analyzing the publication rate by country, 82% of SADJ articles were authored by South African-based researchers, mainly focusing on Endodontics and direct restorative materials. The remaining 18% was authored abroad, with a primary focus on different topics.

Analysis of the different research study designs aimed to highlight the choices made by various authors. The current study revealed that, generally, there were more articles based on Randomized Clinical Trials (RCTs), case reports, and evidence-based research. Most RCTs focused on direct restorative materials and endodontics.

High-quality research in dental primary care requires collaboration between academics and dental service providers on relevant topics for clinicians and policymakers. Such research outputs are typically achieved through teamwork involving individuals from different organizations, countries, and locations. These collaborators contribute resources, expertise, and skills that may be similar or complementary. Recognizing the importance of diverse partnerships enhances the relevance and impact of research in this field, fostering innovation and informed decision-making.

Scientific publications can significantly influence future planning in dental knowledge, evidence-based clinical practice, and (bio)medical research [12]. Scientific publications are a source of knowledge and modes of communication within the dental fraternity and other disciplines [16].

## 5. Conclusion

Based on the publication rate in the SADJ (according to field of expertise), Paedodontics was the least published field between 2008 and 2018. In particular, the number of articles in paediatrics decreased significantly from a peak of 13 recorded in 2008 to none in 2016. Despite the substantial contribution of other fields such as Endodontics, direct restorative materials, and direct restorative dentistry, there is considerable potential to improve the publication rate of Paedodontics in SADJ. The majority of scientific articles were published by authors from South Africa, with their main focus on aspects of Endodontics and direct restorative materials.

## Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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