

# Plagiarism in dentistry – a systematic review

Taseef Hasan Farook,<sup>1</sup> John Radford,<sup>2</sup> Mohammad Khursheed Alam<sup>\*3</sup> and Nafij Bin Jamayet<sup>\*1</sup>

## Key points

This paper explores different types of plagiarism in dental scholarship.

This paper attempts to identify those who carry out plagiarism and the possible reasons for this academic fraud.

This paper proposes structural and specific approaches to manage plagiarism.

## Abstract

**Objective** Following a survey of the literature, a systematic review was carried out with the aim of answering the following questions: 1) What is 'acceptable plagiarism'?; 2) Who carries out plagiarism?; 3) What factors could encourage plagiarism?; 4) How can plagiarism be managed?

**Data source and selection** Following PRISMA guidelines, data were gathered by searching Scopus, PubMed and Web of Science. After removal of duplicates, 345 titles were identified. Then, having satisfied *a priori* eligibility criteria, 29 papers were interrogated. The quality of relevant papers (n = 23) was assessed using the Joanna Briggs Critical Appraisal Tool.

**Data extraction** There was no clear threshold as to what is 'acceptable plagiarism'. Despite this lack of clarity, it is argued consistently that males, and those who wrote in a language that is not their mother tongue, were more likely to plagiarise.

**Conclusion** Plagiarism is all but inescapable due to various reasons: 1) there is no agreed threshold as to what is 'acceptable plagiarism'; 2) the internet; 3) institutional; and 4) societal expectations. Plagiarism could be mitigated in the student domain by grammar support and, for example, non-written submissions such as presenting work by video. Academic fraud is fundamentally undermined by valuing original and creative scholarship and sound ethical principles.

## Introduction

### Understanding plagiarism

Paradoxically, this study exploring plagiarism in dental scholarship examines and develops ideas from previously published papers on this subject. However, as Wilson Mizner stated, 'if you steal from one author, it's plagiarism. If you steal from many, it's research'.<sup>1</sup>

Plagiarism is the fraud of someone intentionally or unintentionally taking and using another person's thoughts, writings, data and expressions as their own without permission or acknowledgement.<sup>2,3,4,5</sup> Plagiarism not only

refers to copying of texts but also reproduction of images and data representations without recognising the originator. There have been countless instances of plagiarism and, although more common in lower-impact journals,<sup>6</sup> have blighted even high-impact journals, resulting in withdrawal of the paper.<sup>7</sup>

Plagiarism from the student perspective hinders the development of skills such as synthesis and evaluation, originality, creativity, and ability to deal with uncertainty and ambiguity. Such characteristics are expected of a graduate with Bachelor of Dental Surgery and are required by a graduate in Masters in Science by the *UK quality code for higher education – part A: setting and maintaining academic standards*.<sup>8</sup> From a research perspective, plagiarism adds no scientific value, contributes to the ever-burgeoning number of publications and could be a faux-authoritative vehicle disseminating fake information.<sup>9</sup>

Plagiarism is just one aspect of academic fraud, which includes: 1) blatantly falsifying

or fabricating results;<sup>10</sup> 2) false commentary;<sup>9</sup> 3) omission of data outliers;<sup>11</sup> 4) bias when interpreting findings;<sup>12</sup> 5) 'ghost writing' or 'ghost authorship' when not acknowledging the contribution of others;<sup>13</sup> and 6) the 'salami'/segmented publication of repeated or redundant data.<sup>7,14</sup>

### Objectives

This paper focuses on plagiarism, particularly in the dental sphere, with the aim of answering the following questions:

1. What is 'acceptable plagiarism' and is there a threshold?
2. Who carries out plagiarism?
3. What factors could encourage plagiarism?
4. How can plagiarism be managed?

## Materials and methods

### Data source

Following a survey of the literature, a search was carried out using Scopus, PubMed and Web of Science databases to screen for relevant articles

<sup>1</sup>School of Dental Sciences, Universiti Sains Malaysia, Kelantan, 16150, Malaysia; <sup>2</sup>School of Dentistry, University of Dundee, Park Place, Dundee, DD1 4HN, Scotland; <sup>3</sup>College of Dentistry, Jouf University, Sakaka, 72721, Saudi Arabia.

\*Correspondence to: Nafij Jamayet and Mohammad Khursheed Alam  
Email address: dr.nafij@gmail.com and dralam@gmail.com

Refereed Paper.

Accepted 5 May 2020

<https://doi.org/10.1038/s41415-020-2026-4>

(see Table 1 for keywords). Additionally, MeSH words such as (“Dentistry”[Mesh]) OR “Dental Health Services”[Mesh]) OR “Education, Dental”[Mesh]) AND “Plagiarism”[Mesh]) NOT “Education, Medical”[Mesh])) were used to search further PubMed databases. MeSH is a subset of NCBI and the terms were used to search results already indexed in the PubMed

database. These terms had to be modified before interrogating the other two databases. Therefore, MeSH words were not the primary method of search, but instead alternative keyword strings were developed which could be reproduced in all three search databases.

## Data selection

The databases were systematically searched by two reviewers. The search was restricted to papers published between 1979 and 2019. The primary search yielded 6,520 results. The reviewers screened the results using different computers. EndNote X8.2 was used to remove duplicate articles. EndNote was used as it can extract data from all three sources. After duplicate removal from 2,014 articles, 345 titles were narrowed down to 84 abstracts, based on *a priori* eligibility criteria (see eligibility criteria section below). Nine articles were shortlisted from areas outside dentistry but considered relevant to the research aims. This systematic review was based on the interrogation of 29 articles. Twenty-three particularly relevant papers were assessed for quality using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist tool.<sup>15</sup> The final database search was carried out on 7 April 2020. The 2009 PRISMA checklist was followed.

## Criteria of eligibility for data selection

### Inclusion criteria

1. Original and review articles that explore plagiarism, academic ignorance and fraud, idea theft, dishonest and academic misconduct in dentistry
2. Articles from other sources that explore plagiarism relevant to dentistry
3. Articles in English, or with accompanying English translations.

### Exclusion criteria

1. Editorial-based policies outlining academic misconduct
2. Editorials, letters, opinions and viewpoints commenting on plagiarism
3. Case studies on clinical or criminal misconduct by dental practitioners.

## Results

### Data extraction

See Figure 1 for the PRISMA flowchart for data extraction.

This systematic review was based on 29 papers (Table 2), nine of which were included from subject areas outside dentistry. Inter-rater reliability ( $\kappa = 0.557$ ) and agreeability was resolved by applying kappa concordance.

Keywords	Scopus	PubMed	Web of Science (all databases)
[Dent* + Plagiar*]	75	47	70
[Dent* + fraud]	314	310	379
[Dent* + fraud + misconduct*]	17	349	24
[Health* + academ* + misconduct]	338	388	333
[Dent* + Nurs* + theft]	0	3	2
[Oral* + plagiar*]	46	38	39
[Dent* + Ghost*]	305	384	517
[health* + Plagiar*]	365	334	354
[dent* + ethic* + misconduct]	144	257	10
[Dent* + writ* + fraud]	8	5	8
[Health* + dent* + cheat]	6	26	21
[dent* + cheat* + plagiar*]	5	6	7
[dent* + dishonest*]	27	27	40
[Dent* + academ* + Integrity]	199	384	216
[threshold + plagiar*]	61	4	28
<b>Total</b>	<b>1,910</b>	<b>2,562</b>	<b>2,048</b>

Fig. 1 PRISMA flowchart showing search results

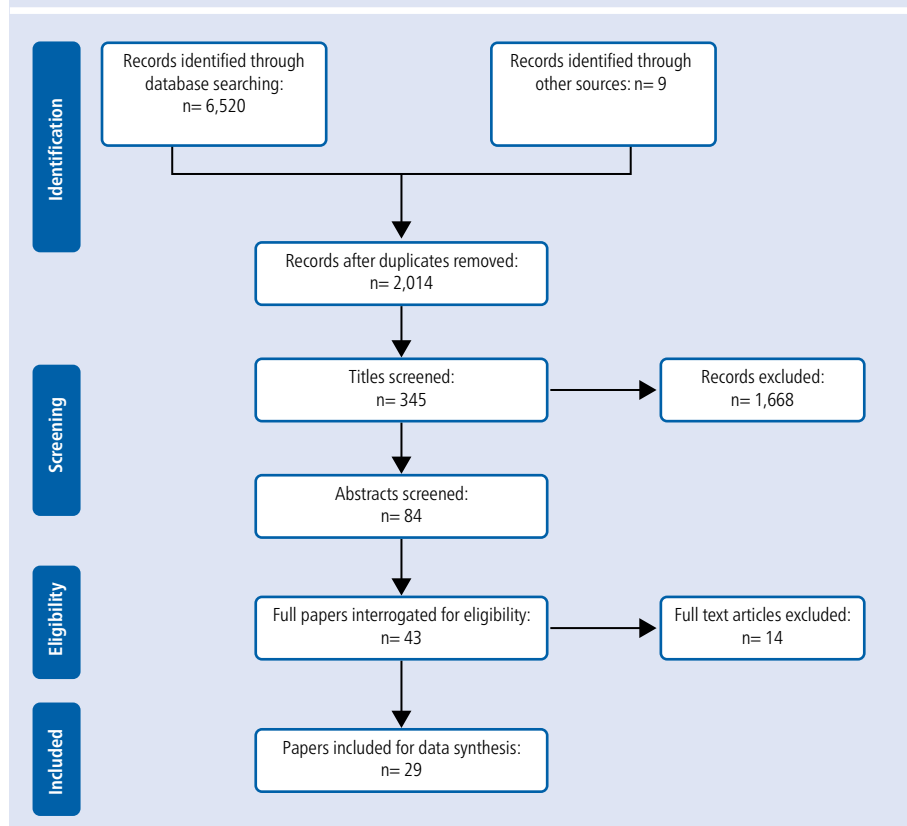


Table 2 Data extraction from the 29 papers identified (cont. on page 4)

Author and year	Article title	Results
Keener <i>et al.</i> (2019) <sup>33</sup>	Student and faculty perceptions: appropriate consequences of lapses in academic integrity in health sciences education	Faculties only address academic dishonesty, after it has been exposed Students did not show changes in behaviour, even after they had witnessed dishonesty
Pratt <i>et al.</i> (2019) <sup>28</sup>	Scholars' preferred solutions for research misconduct: results from a survey of faculty members at America's top 100 research universities	Scholars would support more robust sanctions to minimise academic fraud The imperative to publish encourages plagiarism and academic fraud Lack of clarity as to what constitutes academic fraud Females accept punitive sanctions more than their male colleagues
Decullier <i>et al.</i> (2019) <sup>18</sup>	Have ignorance and abuse of authorship criteria decreased over the past 15 years?	Healthcare professionals were unfamiliar with International Committee of Medical Journal Editors 'Guest authorships' are as prevalent now as they were 15 years ago 'Ghost' and 'guest authorships' can be mitigated by inculcating ethical tenets
Raj <i>et al.</i> (2019) <sup>11</sup>	Plagiarism, P-hacking, and Predatory journals: toxic triple Ps of scientific publications	Business-oriented open access journals without academic scrutiny encourage plagiarism
Khairnar <i>et al.</i> (2019) <sup>21</sup>	Survey on attitude of dental professionals about plagiarism in Maharashtra, India	77.8% of the faculty members and 62.7% of students admitted to repeated plagiarism because there was no penalty Half of the students and faculty members considered there was an 'occasional need' for plagiarism 57.9% of the respondents were influenced by peer pressure
Faggion <i>et al.</i> (2018) <sup>6</sup>	An analysis of retractions of dental publications	Of 138 academic fraudulent events, 38.4% articles were retracted because of plagiarism Despite retraction, over half these papers continue to be cited Almost three-quarters of the retracted articles were written by Asian authors There was increased plagiarism in low-impact journals
Punyani <i>et al.</i> (2018) <sup>13</sup>	Authors' awareness of concepts in the authorship of scientific publications: viewpoints of the dental faculty in India	14% of the respondents had no concept of plagiarism Half were not aware of 'ghost writing' 'Gifting authorships' were a way of pleasing senior colleagues
Rodríguez <i>et al.</i> (2018) <sup>32</sup>	Perception of academic plagiarism by dentistry students (Original title: Percepción del plagio académico en estudiantes de Odontología)	Over half of the 184 students had no understanding of plagiarism, nor that it was academic fraud
Mahuli <i>et al.</i> (2018) <sup>16</sup>	Plagiarism-related dilemmas in scientific writing	Lack of steer by institutions and publishing bodies as to what constitutes 'acceptable plagiarism'
Nogueira <i>et al.</i> (2017) <sup>7</sup>	A survey of retracted articles in dentistry	18.1% of the articles retracted from dental journals were due to plagiarism 13.8% of the articles retracted were due to falsifying or misrepresenting results Of those retracted papers, one-third were in journals from the US and one-third from the UK
Guedes <i>et al.</i> (2015) <sup>31</sup>	Perception of academic plagiarism among dentistry students	Only half of the dental students were aware of plagiarism 78% of the students did not respect copyrights laws relating to the electronic images used for their projects
Jain <i>et al.</i> (2015) <sup>24</sup>	Comparison of opinion referendum of medical and dental postgraduates towards plagiarism in Bhopal-Central India	40.2% of 164 subjects considered that there were occasions when plagiarising was unavoidable One-fifth of students did not consider copying from texts in another language as plagiarism Dental students plagiarised more than their other healthcare colleagues
Mohammed <i>et al.</i> (2015) <sup>3</sup>	Plagiarism in medical scientific research	Self-plagiarism and accidental plagiarism is common in established healthcare researchers Most established researchers do not consider self-plagiarism as academic misconduct Institutions and publishing bodies do not specify the threshold for 'acceptable plagiarism'
Verma <i>et al.</i> (2015) <sup>35</sup>	Attitude of Indian dental professionals toward scientific publications: a questionnaire-based study	Most senior academics stated that the increased number of publications enhanced career progression, which in turn could encourage plagiarism
Singh <i>et al.</i> (2014) <sup>5</sup>	Knowledge and attitude of dental professionals of North India toward plagiarism	43% of 5,000 dental professionals only became aware of plagiarism when they wrote their thesis One-third plagiarise because of language challenges
DeGeeter <i>et al.</i> (2014) <sup>17</sup>	Pharmacy students' ability to identify plagiarism after an educational intervention	Only one-quarter of 252 pharmacy students knew what plagiarism was Two-thirds of the students failed to recognise direct plagiarism, even after they were made aware of this academic fraud
Patel-Bhakta <i>et al.</i> (2014) <sup>4</sup>	Attitudes towards students who plagiarize: a dental hygiene faculty perspective	78% of students copied directly from an online source without making an acknowledgement
Gomez <i>et al.</i> (2014) <sup>25</sup>	Assessment of the attitude towards plagiarism among dental postgraduate students and faculty members in Bapuji Dental College and Hospital	Almost one-third of postgraduate students and residents plagiarise to reduce workload

Table 2 Data extraction from the 29 papers identified (cont. from page 3)

Author and year	Article title	Results
Teh <i>et al.</i> (2013) <sup>12</sup>	Reducing the prevalence of plagiarism: a model for staff, students and universities	Students plagiarise if it saves time as long as there are no financial nor penal consequences Ignoring different cultures and past education are reasons for plagiarism Asians are stereotyped as perpetrators of plagiarism
Adeleye <i>et al.</i> (2012) <sup>10</sup>	Factors associated with research wrongdoing in Nigeria	14.4% admitted to data fabrication and 9.8% to data falsification Plagiarism was considered distinct from data fabrication and data falsification
Faggion (2011) <sup>19</sup>	Policies of dental journals for reporting and monitoring authorship and contributorship	Dental journals should be unequivocal in stating that 'guest/gift authorships' are unacceptable
Das <i>et al.</i> (2011) <sup>14</sup>	Plagiarism: why is it such a big issue for medical writers?	Among other categories, plagiarism can take the form of: 1) 'self-plagiarism'; 2) 'mosaic plagiarism'; and 3) 'direct plagiarism'
Segal <i>et al.</i> (2010) <sup>20</sup>	Plagiarism in residency application essays	One in every 20 applicants had been found to plagiarise residency applications For this study, the threshold for 'acceptable plagiarism' was 10% Students do not consider copying from the internet (cyber-plagiarism) to be academic fraud
Becker <i>et al.</i> (2007) <sup>27</sup>	Gender differences in student ethics: Are females really more ethical?	Females are less likely to commit plagiarism, irrespective of academic discipline
Andrews <i>et al.</i> (2007) <sup>36</sup>	Faculty and student perceptions of academic integrity at U.S. and Canadian dental schools	The author categorises cheating during examinations and assignments as a form of plagiarism Over a half of 1,153 students had confessed to cheating in pre-clinical assignments Students considered both academic and peer pressure as causes for cheating
Sisson <i>et al.</i> (2007) <sup>26</sup>	The attitudes of dental students towards socially acceptable and unacceptable group working practices	61% of the 89 dental undergraduate students considered the sharing of essays was acceptable Students were comfortable with the purchase of essays for formative assessments Male students were less concerned than female students about purchasing online essays Of note, male students who carry out academic fraud would report to authorities such practices carried out by others
Yates <i>et al.</i> (2006) <sup>23</sup>	Predicting the "strugglers": a case-control study of students at Nottingham University Medical School	Rigorous application processes for dental and medical schools may minimise academic fraud
Devlin (2006) <sup>2</sup>	Policy, preparation, and prevention: proactive minimization of student plagiarism	Creative assessment methods would discourage plagiarism
Al-Dwairi <i>et al.</i> (2004) <sup>34</sup>	Cheating behaviors of dental students	Of several dishonest practices, the forging of signatures on clinical entries and the copying of assignments were most prevalent High-achieving females were less likely to cheat

### Critical appraisal findings

Twenty-three particularly relevant papers with datasets were selected for assessment using the JBI Critical Appraisal toolkit (online Supplementary Information 1). Sixteen did not take account of all the confounding factors, although five attempted randomisation. Furthermore, the methods and objectives described in ten of the 23 articles were unclear or judged as invalid, based on standardisation. Although most papers showed bias, taken in the round a steer was offered by these papers.

### Plagiarism: themes and findings that emerged from this systematic review

#### What is 'acceptable plagiarism' and is there a threshold?

- There is no clear threshold as to what is considered 'acceptable plagiarism'
- Self-plagiarism is probably acceptable, if it allows the development of ideas and

concepts, and there is no mendacious intent

- Generally, the bar for 'acceptable plagiarism' from an internet source was lower than plagiarism from the written word. Purchasing or selling scholarship is unacceptable
- Some commentators considered that threshold for plagiarism is absolute in that it is unacceptable
- There is no distinction between plagiarism carried out by a student or researcher.

#### Who carries out plagiarism?

- Students, who have to submit work in a language that is not their own, and possibly male students
- Researchers, who place unrealisable expectations on themselves, or institutions that require unrealistic requirements from their staff.

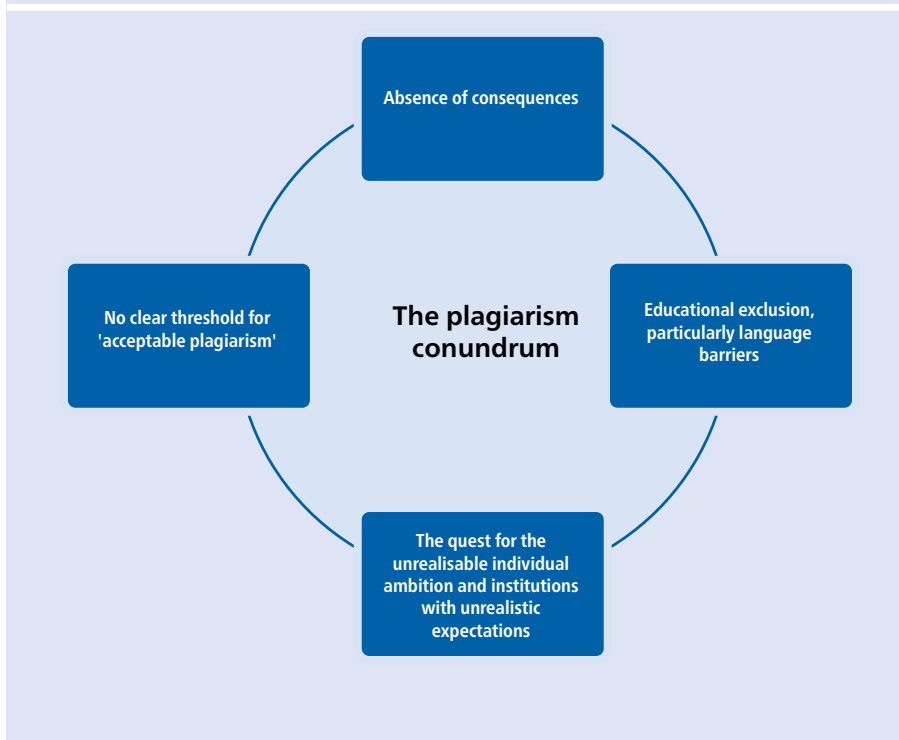
#### What factors could encourage plagiarism?

- Individual, institutional and societal expectations, including workload pressures
- The ease of access to information from the internet
- Failure in having a mature conversation between different stakeholders
- No consistent threshold for what is considered 'acceptable plagiarism'
- Inconsistent consequences if plagiarism is shown.

#### How can plagiarism be managed?

- The application, albeit crude, of plagiarism checkers
- Educational inclusion with grammar support
- In the student domain, using a full range of assessment tools
- Nurturing and rewarding the values of original and creative scholarship
- Embedding ethical tenets.

**Fig. 2** Factors associated with a culture of plagiarism



Reasons for plagiarism are summarised in Figure 2.

## Discussion

This discussion will focus on the following four research aims:

1. What is 'acceptable plagiarism' and is there a threshold?
2. Who carries out plagiarism?
3. What factors could encourage plagiarism?
4. How can plagiarism be managed?

### What is 'acceptable plagiarism' and is there a threshold?

The prosaic question as to what is 'acceptable plagiarism', often raised at examination board meetings, means little as there are different forms of plagiarism with a range of dishonest intentions. The different types of plagiarism that have been described are 'self-plagiarism',<sup>3,14,16</sup> 'mosaic plagiarism',<sup>14,17</sup> 'accidental plagiarism'<sup>3</sup> and 'direct plagiarism'.<sup>14,16</sup> Some have argued that 'ghost writing'<sup>3,18,19</sup> and 'guest/gift authorship'<sup>13,18,19</sup> are also forms of plagiarism, but these may better align with academic fraud.

'Accidental plagiarism', if carried out with no intention of dishonesty, is probably acceptable, whereas 'direct plagiarism' is not. 'Cutting and pasting' digital information from the internet is not considered by some as egregious as the protracted copying from the printed word.<sup>20</sup>

There is a cogent argument that 'self-plagiarism', when the author revisits their data or develops their argument, is acceptable.<sup>3,5,21</sup> However, where is the line drawn between the 'salam' approach and 'self-plagiarism'?

'Mosaic plagiarism' can be illustrated by rewording the statement 'the cleverest form of plagiarism', by substituting and shifting words around such that the meaning is not changed, but so that the sentence now reads: 'an ingenious form of copying another person's work'. 'Mosaic plagiarism' usually cannot be identified by a plagiarism checker.<sup>3,14</sup>

A historic Nursing and Midwifery Council disciplinary hearing set the bar at over 50% for plagiarism.<sup>22</sup> Yet, the moral objectivism position is that plagiarism cannot be tolerated. A liberal pragmatic approach would accept plagiarism from 10% up to 30%,<sup>3,5,12,20</sup> with it being more excusable for those writing in a foreign language.

In summary, as there are different types of plagiarism, it would seem reasonable that there is no universal threshold as to what is 'acceptable plagiarism'.

### Who carries out plagiarism?

Several authors<sup>5,12,20,23,24,25</sup> have suggested that international students, and those who engage in a programme not delivered in their first language, plagiarise more. In addition, it has been shown that males are more likely to take risks and

therefore carry out plagiarism. Of note, it would appear that those who perpetrate plagiarism are only too happy to notify authorities of others carrying out plagiarism.<sup>21,26,27,28</sup> It has been argued that geographical influences may be a stronger indicator for plagiarism than gender.<sup>10</sup> Nevertheless, in some cultures and societies, privilege and perceived norms may encourage males to plagiarise in order to meet the standards of their high-achieving female peers.<sup>29</sup> However, many of these studies are biased. In addition, these findings could just be an example of blaming the victim or indeed testimonial injustice; the aspiring student being categorised as not being able to engage in the intellectual arena of their tutor because of cultural, societal and educational differences. Such diversity in background leads to hermeneutical injustices, in that the student is not part of the conversation regarding how to mitigate plagiarism.

Although the evidence is weak, there is a consensus that international male students are more likely to plagiarise.

### What factors could encourage plagiarism?

Western stereotyping all but nurtures plagiarism in that it points the finger at those who purportedly carry out this academic fraud. Graded absolutism embraces cultural and educational inclusion, with the student being challenged by competing priorities,<sup>12,23</sup> feeding into the contention that there should be different thresholds for 'acceptable plagiarism'.

Dental schools are required to generate unregulated income by recruiting international students; the annual fee for a clinical-based taught postgraduate programme in the UK is in the region of £40,000. In addition, there is a moral imperative to bring 'to the world' relevant programmes in order to narrow the health divide. These programmes must be grounded in sound ethical practice.<sup>30</sup> Not only do some dental and healthcare students fail to appreciate the nuances of academic fraud,<sup>17,31,32</sup> it is almost considered the norm to 'take ideas from the internet'. Indeed, clinical records are changed and other fraudulent practices are carried out in order to pass examinations, as long as the person who carries out the dishonest act is not caught.<sup>4,17,20,21,24,31,33,34</sup>

Unfortunately, there is a culture of plagiarism, starting for some as an undergraduate and then persisting into the postgraduate domain, when the number of publications furthers career progression and esteem.<sup>19,35</sup> Individual, institutional and

societal expectations, including workload pressures and financial struggles, along with invitations to submit papers from predatory journals with little academic rigour, all fuel this academic fraud.<sup>5,11,24,25,36</sup>

Whether or not plagiarism is examined through the lens as to what is 'acceptable plagiarism', or considering individual and structural reasons for plagiarism, the answer could be the same – mature conversations between all, such that it is the norm to practise ethical research.

### How can plagiarism be managed?

Albeit crude, plagiarism can be managed by requiring the student to submit all work through a plagiarism-checker<sup>3,16</sup> and, if shown, mete out punishment. Turnitin is a powerful internet-based plagiarism checker used by millions of students in over 15,000 institutions. It was recently acquired by Advance Publications in partnership with Insight Venture Partners for a reported sum of money of almost US\$1.75 billion.<sup>37</sup> A legal case in the US found that Turnitin did not infringe user data copyright, as the 'click-wrap agreement' was used by the student.<sup>38</sup> However, the principle of presumption of innocence could be infringed upon by the educational institution requiring the students to submit their work on Turnitin. It is also noted that Turnitin had another commercial arm called WriteCheck, advertised as a customised critiques service which, on payment by the student, could ascertain if Turnitin would detect plagiarism under its 'professional tutoring' feature. WriteCheck was withdrawn in November 2019.<sup>39</sup>

When considering 'ghost writing', there is a distinction between this and academic support. Academic support embraces educational inclusion in order to assist a student. Students should not have to pay for grammar services, not least because there could be an imperceptible drift towards 'ghost writing'. A tutor should focus on a student's understanding, their synthesis and evaluation of concepts,<sup>2,21</sup> and should not be a pedant.

Shaping of flexible academic curriculum can neutralise plagiarism<sup>2,36</sup> and can potentially eliminate 'ghost writing'. Examples of assessment methods that achieve this, together with capturing all characteristics required from a dental professional, include the Objective Structured Long Examination Record (OSLER), Objective Structured Practical Examination (OSPE) and Structured Clinical

Reasoning (SCR), but enhancing the SCR by inviting the student to set the question as well as giving the answer. An educationally inclusive way of addressing some of the issues associated with the traditional assignment is to invite the student to make their submission in their own language and then for it to be translated, before summative assessment and feedback. Alternatively, setting challenging assignment tasks can render 'ghost writers' impotent. Interactive delivery and assessment using tools such as Blackboard Collaborate, a virtual classroom, minimises the demanding requirements of an essay,<sup>2</sup> as does inviting the student to submit their work in a non-written form, such as a video.

In the research domain, the Committee on Publication Ethics (COPE) sets a route map on how academic fraud should be addressed.<sup>3,7</sup> Through discussion and debate involving the wider community, their aim is to shape the culture such that ethical practices are the norm. Its application, illustrated by case histories (<https://publicationethics.org/guidance/Flowcharts>), demonstrate how academic fraud including plagiarism can be stopped. The International Committee of Medical Journal Editors, of which the *British Dental Journal* is a member, espouses the same values as COPE.<sup>13,19</sup>

Providing misleading citations,<sup>20</sup> weighting the bibliography with papers published in the intended journal for submission to improve the impact factor of that journal and thereby curry favour with the editor, 'ghost writing',<sup>13</sup> and inappropriate authorships and acknowledgement<sup>19</sup> all come under the umbrella of plagiarism and academic fraud. Only the perpetrators know if they have done wrong, underlining further that application of ethical tenets are the judge. As Decullier's study showed,<sup>18</sup> 'ghost writing' and honorary (gift) authorship was stubbornly persistent within a 15-year period at Hospices Civils de Lyon, France.

There should be a holistic approach to develop both student and researcher awareness of academic fraud, putting aside code-like approaches<sup>2,4,17</sup> and instead creating a moral space to celebrate scholarship.

### Conclusion

In drawing this systematic review to a conclusion, it was considered insightful to put this text through a plagiarism checker (Turnitin). Surprisingly, the value was only

2% (online Supplementary Information 2), particularly as the aim of this paper was to systematically review previous research and ideas of others (online Supplementary Information 3). The overarching conclusion is that plagiarism is unavoidable, but ranges from that carried out with nefarious intent to the mere shaping of previous ideas. Plagiarism should be managed by open discussion between students, researchers and scholars. Such an approach would undermine the roots of this academic fraud as, by its acknowledgement, it would promote the enduring qualities of originality and creativity.

### References

1. Johnston A. *The Legendary Mizners*. New York: Farrar Straus and Giroux, 2003.
2. Devlin M. Policy, preparation, and prevention: Proactive minimization of student plagiarism. *J High Educ Policy Manag* 2006; **28**: 45–58.
3. Mohammed R A A, Shaaban O M, Mahran D G, Attellawy H N, Makhlof A, Albasri A. Plagiarism in medical scientific research. *J Taibah Univ Med Sci* 2015; **10**: 6–11.
4. Patel-Bhakta H G, Muzzin K B, Dewald J P, Campbell P R, Buschang P H. Attitudes towards students who plagiarize: a dental hygiene faculty perspective. *J Dent Educ* 2014; **78**: 131–145.
5. Singh H P, Guram N. Knowledge and attitude of dental professionals of North India toward plagiarism. *N Am J Med Sci* 2014; **6**: 6.
6. Faggion Jr C M, Ware R S, Bakas N, Wasiak J. An analysis of retractions of dental publications. *J Dent* 2018; **79**: 19–23.
7. Nogueira T E, Gonçalves A S, Leles C R, Batista A C, Costa LR. A survey of retracted articles in dentistry. *BMC Res Notes* 2017; **10**: 253.
8. QAA. UK quality code for higher education 2013–18. Available at <https://www.qaa.ac.uk/quality-code/UK-Quality-Code-for-Higher-Education-2013-18> (accessed August 2020).
9. Godlee F, Smith J, Marcovitch H. Wakefield's article linking MMR vaccine and autism was fraudulent. *Br Med J* 2011; DOI: 10.1136/bmj.c7452.
10. Adeleye O A, Adebamowo C A. Factors associated with research wrongdoing in Nigeria. *J Empir Res Hum Res Ethics* 2012; **7**: 15–24.
11. Raj A T, Panta P, Patil S. Plagiarism, Phacking, and Predatory Journals: Toxic Triple Ps of Scientific Publications. *J Contemp Dent Pract* 2019; **20**: 129–130.
12. Teh E C, Paull M. Reducing the prevalence of plagiarism: A model for staff, students and universities. *Issues Educ Res* 2013; **23**: 283–298.
13. Punyani S R, Deshpande A. Authors' awareness of concepts in the authorship of scientific publications: Viewpoints of the dental faculty in India. *J Oral Biol Craniofacial Res* 2018; **8**: 151–153.
14. Das N, Panjabi M. Plagiarism: Why is it such a big issue for medical writers? *Perspect Clin Res* 2011; **2**: 67.
15. Joanna Briggs Institute. Critical Appraisal Tools. Available online at <https://joannabriggs.org/critical-appraisal-tools> (accessed August 2020).
16. Mahuli A V, Mahuli S A, Patil S, Bhandi S. Plagiarism-related Dilemmas in Scientific Writing. *J Contemp Dent Pract* 2018; **19**: 753.
17. DeGeeter M, Harris K, Kehr H et al. Pharmacy students' ability to identify plagiarism after an educational intervention. *Am J Pharm Educ* 2014; **78**: 33.
18. Decullier E, Maisonneuve H. Have ignorance and abuse of authorship criteria decreased over the past 15 years? *J Med Ethics* 2019; **46**: 255–258.
19. Faggion C M. Policies of dental journals for reporting and monitoring authorship and contributorship. *Br Dent J* 2011; **211**: 223.
20. Segal S, Gelfand B J, Hurwitz S et al. Plagiarism in residency application essays. *Ann Intern Med* 2010; **153**: 112–120.

21. Khairnar M R, Wadgave U, Shah S J, Shah S, Jain V M, Kumbhar S. Survey on attitude of dental professionals about plagiarism in Maharashtra, India. *Perspect Clin Res* 2019; **10**: 9.
22. BBC News. Essex University plagiarism nurse struck off by NMC. 2013. Available at <https://www.bbc.com/news/uk-england-23666253> (accessed April 2020).
23. Yates J, James D. Predicting the "strugglers": a case-control study of students at Nottingham University Medical School. *BMJ* 2006; **332**: 1009–1013.
24. Jain S, Saxena V, Hongal S, Jain M, Torwane N, Sharva V. Comparison of opinion referendum of medical and dental postgraduates towards plagiarism in Bhopal-Central India. *J Coll Physicians Surg Pak* 2015; **25**: 514–518.
25. Gomez M S S, Nagesh L, Sujatha B K. Assessment of the attitude towards plagiarism among dental postgraduate students and faculty members in Bapuji Dental College and Hospital, Davangere – a cross sectional survey. *Environment* 2014; **10**: 50.
26. Sisson K, Newton J. The attitudes of dental students towards socially acceptable and unacceptable group working practices. *Eur J Dent Educ* 2007; **11**: 160–167.
27. Becker D A, Ulstad I. Gender differences in student ethics: Are females really more ethical? 2007. Available at <https://quod.lib.umich.edu/cgji/p/pod/dod-idx/gender-differences-in-student-ethics-are-females-really-more.pdf?c=plag;idno=5240451.0002.009;format=pdf> (accessed August 2020).
28. Pratt T C, Reisig M D, Holtfreter K, Golladay K A. Scholars' preferred solutions for research misconduct: results from a survey of faculty members at America's top 100 research universities. *Ethics Behav* 2019; **29**: 510–530.
29. Jackman W M, Morrain-Webb J, Fuller C. Exploring gender differences in achievement through student voice: Critical insights and analyses. *Cogent Educ* 2019; DOI: 10.1080/2331186X.2019.1567895.
30. Clarkson J, Watt R G, Rugg-Gunn A J *et al*. Proceedings: 9th World Congress on Preventive Dentistry (WCPD): "Community Participation and Global Alliances for Lifelong Oral Health for All," Phuket, Thailand, September 7–10, 2009. *Adv Dent Res* 2010; **22**: 2–30.
31. Guedes D O, Gomes Filho D L. Perception of academic plagiarism among dentistry students. *Rev Bioética* 2015; **23**: 139–148.
32. Rodríguez Y C, Yoplac-Lopez B, Carpio-Tello A, Sihuy-Torres K, Cósar-Quiroz J. Percepción del plagio académico en estudiantes de odontología. *Educ Médica* 2018; **19**: 141–145.
33. Keener T A, Peralta M G, Smith M *et al*. Student and faculty perceptions: appropriate consequences of lapses in academic integrity in health sciences education. *BMC Med Educ* 2019; **19**: 209.
34. Al-Dwairi Z N, Al-Waheidi E M. Cheating behaviours of dental students. *J Dent Educ* 2004; **68**: 1192–1195.
35. Verma P, Sachdeva S K, Verma K G, Khosa R, Basavraj S, Dutta S. Attitude of Indian dental professionals toward scientific publications: A questionnaire based study. *J Nat Sci Biol Med* 2015; DOI: 10.4103/0976-9668.166111.
36. Andrews K G, Smith L A, Henzi D, Demps E. Faculty and student perceptions of academic integrity at US and Canadian dental schools. *J Dent Educ* 2007; **71**: 1027–1039.
37. Korn M. Advance Publications to Buy Plagiarism-Scanning Company Turnitin for Nearly \$1.75 Billion. *The Wall Street Journal* (New York) 2019 March 6.
38. Hilton C. 'Memorandum Opinion' United States District Court for the Eastern District of Virginia, Alexandria Division. 2008. Available at [https://web.archive.org/web/20100705110536/http://www.iparadigms.com/iParadigms\\_03-11-08\\_Opinion.pdf](https://web.archive.org/web/20100705110536/http://www.iparadigms.com/iParadigms_03-11-08_Opinion.pdf) (accessed August 2020).
39. Schreiner V. Supporting Originality from the Start: An Update on WriteCheck. 2019. Available at <https://www.turnitin.com/blog/supporting-originality-from-the-start-an-update-on-writecheck> (accessed April 2020).