A COMPARATIVE ANALYSIS OF RETRACTED ARTICLES IN NIGERIA AND SOUTH AFRICA BETWEEN 2016-2020

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ABSTRACT

Retraction of public domain articles to self-correct research is expedient to remedy misleading and false findings in the scientific community. This paper, therefore, examined the trends and prevalence of article retraction in Nigeria and South Africa. The comparative cross-sectional survey used www.retractiondatabase.org to sample 51 retracted articles from Nigeria (20) and South Africa (31) between 2016 and 2020. Data was analysed at univariate and bivariate levels. Findings revealed that while Elsevier retracted more articles from South Africa, Taylor and Francis had the most retracted publications from Nigeria. Medical scientists were more likely than authors from other fields to have their publications withdrawn. While errors and concerns about methods and analysis were the primary reasons for the retraction of articles from South Africa, plagiarism was the primary reason for retractions from Nigeria. It is, therefore,

imperative that manuscripts be allowed to pass integrity tests before being published.

Keywords: Article retraction, Retraction watch, Errors, Plagiarism, Integrity

JEL classification: Y80

1. Introduction

The hallmark of science is facts obtained through a rigorous and systematic method. Conversely, any violation of scientific principles and techniques is a breach of the scientific method, resulting in erroneous study results. Consequently, to maintain academic integrity and prevent damaging effects on scientific outcomes, scientists and researchers have begun to retract their articles when faults are identified. As Brainard and You (2018) pointed out, the annual rate of retractions is increasing, which appears to represent a community-wide effort at self-policing rather than an epidemic of fraud.

In fact, more than 20,000 retracted articles have been catalogued in the database since the inception of the Retraction Watch blog in August 2010 (although the database only opened in October 2018). The overall number of papers withdrawn is also expected to have climbed more than 10-fold in the last fourteen years [2000-2014] (Brainard & You, 2018; Vuong, 2019). New studies have bolstered this notion by revealing that the absolute number of retracted papers has increased dramatically in recent years across disciplines (Fanelli, Costas & Larivière, 2015; Fang, Steen & Casdevall, 2012). Thus, according to Fanelli (2013), current institutional scrutiny, aided by the rise in ICT and its use in scholarly communication, has been a key facilitator in the uncovering of fraudulent research and fake science. As a result, the large number of journal publication retractions is a positive sign for science's self-correcting and oversight mechanisms put in place by journal editors (Marusic, 2010).

Although Marusic, Katavic, and Marusic (2007) indicated that journal editors are not traditionally the gatekeepers of the scientific community, they are responsible for withdrawing and accepting manuscripts. As the Council of Editors on Publication Ethics' white paper added, journal editors are responsible for correcting inaccuracies in the public record by publishing corrections (errata or corrigenda) or retracting erroneous science. As a result,

the Council can "identify a correction to a small, isolated piece of an otherwise reputable paper" or retract "an entire article that is the result of a pervasive error, non-reproducible research, scientific misconduct, or duplicate publication" (Scott-Lichter, 2012, p. 71). The guidelines were released in Version 2 of the Committee on Publication Ethics (COPE) in 2019 for eight reasons:

> "(i) They have clear evidence that the findings are unreliable, either as a result of major error (e.g., miscalculation or experimental error), or as a result of fabrication (e.g., of data) or falsification (e.g., image manipulation)
>
> (ii) It constitutes plagiarism
>
> (iii) The findings have previously been published else-where without proper attribution to previous sources or disclosure to the editor, permission to republish, or justification (i.e., cases of redundant publication)
>
> (iv) It contains material or data without authorisation for use
>
> (v) Copyright has been infringed or there is some other serious legal issue (eg, libel, privacy)
>
> (vi) It reports unethical research
>
> (vii) It has been published solely on the basis of a compromised or manipulated peer review process
>
> (viii) The author(s) failed to disclose a major competing interest (a.k.a. conflict of interest) that, in the view of the editor, would have unduly affected interpretations of the work or recommendations by editors and peer reviewers" (COPE Council, 2019, p. 3).

In light of this, investigations have revealed persisting differences in article retractions by countries and individuals (Qu & Wiwanitkit, 2015; National Science Board, 2017; Ribeiro & Vasconcelos, 2018). According to a

study by Brainard and You (2018), articles from high- and middle-income countries (e.g., Japan, the United States of America, China, the United Kingdom, Germany, and so on) are more likely to be retracted, with China, the United States of America, and India having the most duplicated publications (Grieneisen, & Zhang, 2012). Between 2001 and 2010, the Science Citation Index Expanded (SCIE) found that China, India, and South Korea had greater retraction rates than the global average (He, 2013; Lei, & Zhang, 2018; Park, Lee, & Kwon, 2018). According to Oransky (2018), between 2003 and 2016, the United States of America and China had the highest absolute number of publications retracted, with South Africa ranking ninth among the top ten countries.

The literature has documented retractions in numerous fields of study. Scholars have noted that biomedical and life science retractions account for the majority of retractions (Resnik, Wager, & Kissling, 2015; Coudert, 2019), while Cox, Craign & Tourish (2018) stated that economics has one of the highest rates of retraction. Individual researchers are also known to withdraw multiple times. Ribeiro and Vasconcelos (2018) discovered that Japan had three of the top ten recurrent offenders with retracted papers.

While various studies have found an increase in article retractions, other investigations have found a variety of explanations for article retractions. Some scholars identified that retractions of articles were due to unethical publishing practices (Bozzo, Bali, Evaniew & Ghert, 2017; Coudert, 2019; Moylan & Kowalczuk, 2016). Others noted that retractions were due to scientific misconduct such as duplication of articles, plagiarism, fake peer review, data and results problems, and falsification, among others (Fanelli et al., 2015; Lei & Zhang, 2018; Park, Lee, & Kwon, 2018; Qu & Wiwanitkit, 2015). According to Fanelli et al. (2015), retractions are more likely to occur in nations that emphasize publication as a necessity for academic advancement than in countries that place less emphasis on publication as a requirement for academic growth. This suggests that many researchers are more likely to focus more on the number of papers produced than on the quality of their outputs.

Even though studies on journal retraction are gaining attention in developed nations, there is little research on retraction in less-developed countries like Africa. Using a secondary dataset, the goal of this study is to

examine the trends, prevalence, and reasons for article retraction in Nigeria and South Africa. It also includes a comparison of retracted publications from the two African countries, which were primarily published in prominent international journals in Africa.

2. Materials and Methods

2.1 Design and study settings

This research employed a comparative cross-sectional survey design to analyse 51 retracted articles from Nigeria and South Africa for the last five years. The two African countries were chosen because reports positioned them among the countries in Africa with the highest number of retractable articles from January 1, 2016, to August 3, 2020. The selection of these two countries was also based on their leadership positions in African research and publication.

2.2 Sample size and data collection procedures

A total of 51 retracted articles were selected from the Retraction Watch database, which included 31 retracted papers from South Africa and 20 from Nigeria during the period covered by the study. Only papers that were retracted in the two countries – Nigeria and South Africa – between January 1, 2016, and August 3, 2020, were extracted from the Retraction Watch database via www.retractiondatabase.org, which remains one of the most globally dedicated and reliable databases that report article retractions.

2.3 Data management and analysis

The data for this study is purely quantitative, and all information about retracted papers from the two countries was promptly cleaned and edited when it was taken from the database (www.retractiondatabase.org). Following that, the data was exported to the Statistical Package for Social

Sciences (SPSS v. 21.1 version) and Microsoft Excel 2019. The data was then recoded and saved for further analysis.

The data collected from the database was analysed at two levels – univariate and bivariate analysis – using SPSS (v.21.1). While descriptive statistics such as frequency, percentages, line, and bar graphs were used in the univariate analysis, cross-tabulation and the student's t-test were used to show the relationship between variables of interest in the two countries and to determine if there were statistically significant differences between the two countries at the 0.05 level of significance.

2.4 Ethical considerations

Although official ethical approval for this study was not necessary because it did not involve the use of human subjects or animal trials, the use of secondary data was conducted following internationally accepted ethical norms. For example, the writers ensured that the names of authors of retracted works were kept confidential and anonymous.

3. Results

3.1 Trends and prevalence in article retraction from Nigeria and South Africa

Figure 1 shows that articles from South Africa had more retractions (31 articles) throughout the study period, compared to Nigeria which had a total of 20 retractions during the same period. Furthermore, while the observed trend in Nigeria revealed that retractions consistently fell about 10% each year from 2016 to 2019 but rose about 20% in 2020, the rate of retractions in South Africa fluctuated, dropping between 2016 and 2017, rising astronomically about 50% between 2017 and 2018, and again dropping about 50% between 2018 and 2019. Between 2019 and 2020, however, retraction in South Africa decreased by roughly 10%. Figure 1 also shows that Nigerian papers had the greatest retraction rate (6 articles) in 2016, while South Africa had the highest rate in 2018 (10 articles). Also, South African papers had the fewest retractions in 2020 (4 articles) and Nigerian papers had the fewest retractions in 2019 (2 articles).
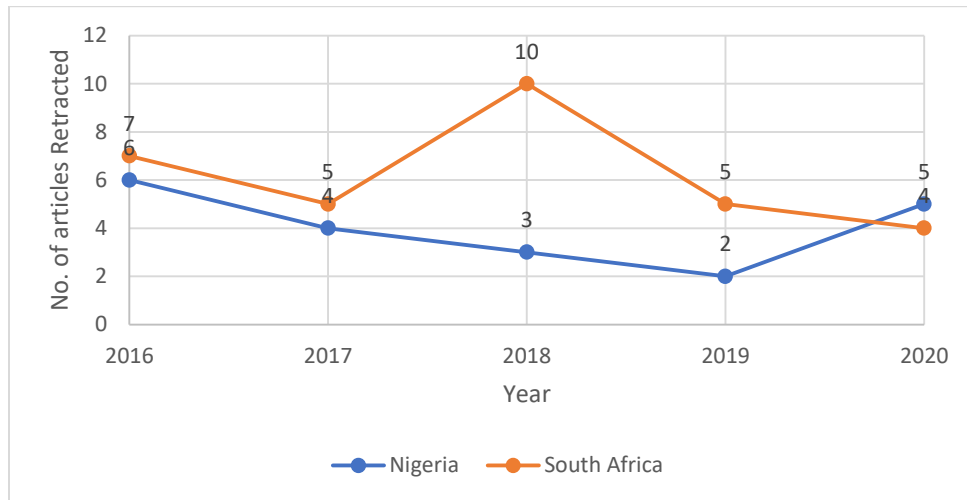
Figure 1. Trends in Article Retraction Originating from Nigeria and South Africa 2016-2020

Source: Authors' computation.

3.2 Reasons for retractions

A comparison of the reasons for retraction of articles from the two countries (Figure 2) reveals that plagiarism (60%) was the most common reason for article retraction in Nigeria, while errors and concerns regarding methods (techniques) and analysis were the most common reasons in South Africa (100%). Concerns and misconduct concerning authors were the least common reasons for publication retraction in both countries (at 10% and 16% respectively).

Other reasons identified for paper retractions originating from both countries include; investigation by journal/publisher; objection by third party; copyright claims; lack of approval from third party; fake peer review; unresponsiveness from authors; limited or no information; withdrawal; issues with referencing; breach of policies; etc.
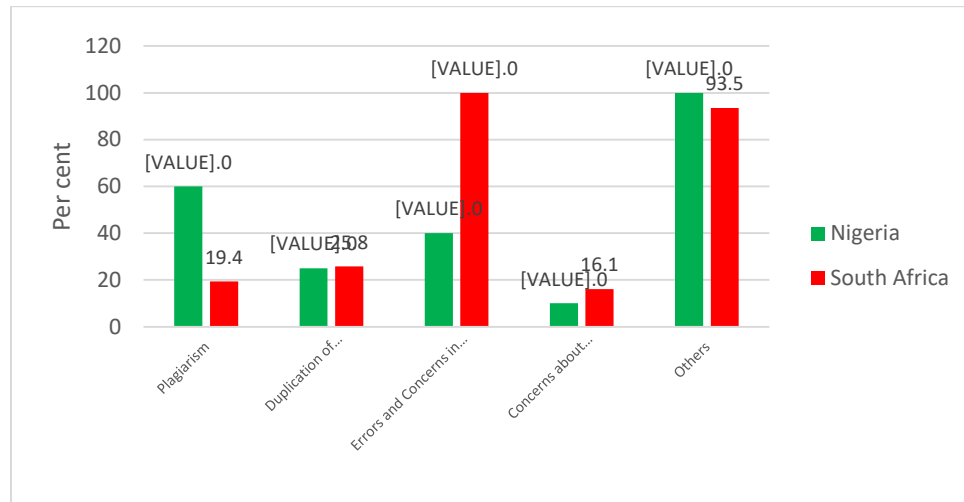
**Figure 2.** Reasons for Article Retraction in Nigeria and South Africa

Source: Authors' computation.

Note: It is important to note here that in the retraction database, an article might have more than one reason for being retracted. In fact, in one case, there were eleven reasons why a particular article was retracted.

3.3 Retractions by publishers

The results in Figure 3 demonstrate a difference in the trend of publishers' retraction of papers from the two countries. For papers originating from South Africa, Elsevier had the highest percentage of papers retracted (25.8%) within the period of study, while in Nigeria, it was Taylor and Francis (35.0%). However, both South Africa and Nigeria had Wiley as the publisher with the least proportion of retracted papers (2 and 1 respectively).
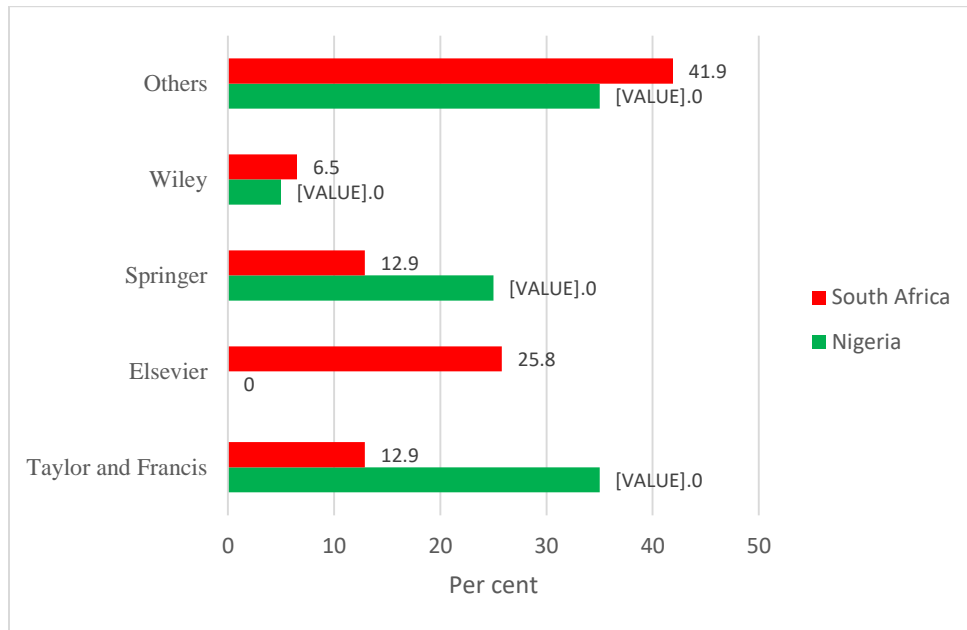
Figure 3. Distribution of Retracted Articles by Publishers
Source: Authors' computation.

3.4 Retraction of articles by authors' countries of affiliation (Nigeria and South Africa)

The details of the retraction of articles between the two countries with regard to the year of retraction, name of the publisher, number of authors, and field of study are presented in Table 1. Findings from the study indicate that while papers from South Africa had the highest level of retractions in 2018 (19.6%), articles from Nigeria had the highest level of retractions in 2016 (11.8%).

Furthermore, while the highest number of retracted articles from South Africa was from Elsevier (15.7%); that of Nigeria was from Taylor and Francis. Additionally, while the number of retracted articles generally dropped as the number of authors increased, papers with between 3-4 authors were more likely to be retracted in South Africa (21.6%), while in Nigeria, it was articles with between 1-2 authors that were more likely to be retracted

(15.7%). Finally, the findings in Table 1 reveal that, generally in both countries, articles from the medical and health sciences were more likely to be retracted (31.4%) compared to other disciplines.

Table 1. Cross-tabulation of Retraction by Country (Nigeria and South Africa)

Variables	Country of Authors		Total
	Nigeria *(n=20)*	South Africa *(n=31)*	*(n=51)*
Year of Retraction			
2016	6(11.8%)	7(13.7%)	13(25.5%)
2017	4(7.8%)	5(9.8%)	9(17.6%)
2018	3(5.9%)	10(19.6%)	13(25.5%)
2019	2(3.9%)	5(9.8%)	7(13.7%)
2020	5(9.8%)	4(7.8%)	9(17.6%)
Name of Publisher			
Taylor and Francis	7(13.7%)	4(7.4%)	11(21.6%)
Elsevier	-	8(15.7%)	8(15.7%)
Springer	5(9.8%)	4(7.8%)	9(17.6%)
Wiley	1(2.0%)	2(3.9%)	3(5.9%)
Others	7(13.7%)	13(25.5%)	20(39.2%)
Numbers of Authors			
1-2	8(15.7%)	10(19.6%)	18(35.3%)
3-4	4(7.8%)	11(21.6%)	15(29.4%)
5-6	6(11.8%)	6(11.8%)	12(23.6%)
7 and Above	2(4.0%)	4(7.9%)	6(11.9%)
Field of Study			
Medical/Health Sciences	6(11.8%)	10(19.6%)	16(31.4%)
Arts/Humanities	2(3.9%)	4(7.8%)	6(11.8%)
Sciences	3(5.9%)	4(15.7%)	11(21.6%)
Engineering	3(5.9%)	2(3.9%)	5(9.8%)
Agriculture	1(2.0%)	2(3.9%)	3(5.9%)
Management	-	2(3.9%)	2(3.9%)
Education	-	2(3.9%)	2(3.9%)
Social Sciences	5(9.8%)	1(2.0%)	6(11.8%)

In a country-specific scenario, while articles from the Social Sciences originating from South Africa were the least likely to be retracted (2.0%), in Nigeria it was those from Agriculture (2.0%).

3.5 Test of difference between Nigeria and South Africa

In Table 2, an independent sample t-test was conducted to compare the mean scores for the years of submission, years of retraction, numbers of authors, names of publishers, and field of study of retracted articles from both countries. The results indicate that there was no significant difference between the two countries with regard to the year of submission (t(49) = .969, p>.05) with a mean score of M=3.05, SD= 1.572 for Nigeria, higher than that of South Africa (M=2.65, SD=1.380). The magnitude of the difference in means (Mean difference = .405, 95% CI: -.435 to 1.245) was, however, not significant.

With respect to the year of retraction, the study indicates that no significant difference exists between the two countries (t(49)=-.016, p>.05) with a mean score of M=2.80, SD=1.609 for Nigeria, slightly less than that of South Africa (M=2.81, SD=1.327). Nonetheless, the magnitude of the difference in means (Mean difference =-.006, 95% CI: -.838 to .825) was not significant.

Again, the results from the numbers of authors also indicated no significant difference between the two countries (t(49)=.518, p>.05) with a mean score of (M=4.45, SD= 4.673) for Nigeria, higher than that of South Africa (M=3.94, SD =2.394). The magnitude of difference (Mean difference = .525, 95% CI: -.1.480 to 2.509) indicates that no significant difference exists between the two countries. Furthermore, no significant difference was observed between the two countries with respect to the publishers (t(49)=-.721, p>.05) with the mean score for Nigeria (M=3.05, SD=1.731) being lower than that of South Africa (M=3.39, SD=1.564). From the magnitude of difference (Mean difference = -.337, 95% CI: -.1.277 to .603), the study indicated that no significant difference exists between the two countries.

Table 2. Independent t-test of Nigeria and South Africa on Article Retraction

Variable	Country	Mean	SD	Levene's Test for Equality of Variance		t-test for Equality of Means						
											95% Confidence interval of the Diff.	
				F	Sig	t	df	Sig (2-tailed)	Mean Diff.	Std Error Diff.	Lower	Upper
Year of Submission	Nigeria	3.05	1.572	1.074	.305	.969	49	.337	.405	.418	-.435	1.245
	South Africa	2.65	1.380									
Year of Retraction	Nigeria	2.80	1.609	2.321	.134	-.016	49	.988	-.006	.414	-.838	.825
	South Africa	2.81	1.327									
Numbers of Authors	Nigeria	4.45	4.673	2.454	.124	.518	49	.607	.515	.993	-1.480	2.509
	South Africa	3.94	2.394									
Names of Publisher	Nigeria	3.05	1.731	.020	.889	-.721	49	.474	-.337	.468	-1.277	.603
	South Africa	3.39	1.564									
Field of Study	Nigeria	3.80	2.764	3.065	.086	1.132	49	.263	.768	.678	-.596	2.131
	South Africa	3.03	2.073									

Finally, with regard to the field of study, no significant difference was observed between the two countries (t(49)=1.132, p>,05) with a mean score for Nigeria (M= 3.80, SD=2.764), higher than that of South Africa (M=3.03, SD=2.073). Nevertheless, the magnitude of the difference as observed from the mean (Mean difference = .768, 95% CI: -.596 to 2.131) revealed that no significant difference exists between the two countries.

4. Discussion of Findings

This study explored a comparative analysis of retracted articles originating from Nigeria and South Africa. From the findings in this study, generally, articles originating from South Africa are more likely to be retracted than those from Nigeria. These findings negate previous studies which have indicated that articles from Nigeria have more cases of misconduct in publishing, therefore are likely to fall short of acceptable standards. For instance, in a study by Rohwer, Wagewer and Young (2018) on academic misconduct in Africa, it was discovered that about 70% of the total articles from Nigeria had one form of plagiarism or the other, while in South Africa, it was only 39%.

Previous studies have generally used the umbrella term of misconduct as the major reason for article retraction (Grieneisen, & Zhang, 2012; Marcus, & Oransky, 2014; Steen, Casadevall & Fang, 2013; Tang et al., 2020). This study found that the major reasons for article retraction in the two countries were plagiarism for Nigeria and errors/concerns about methods and data analysis for South Africa. Despite these findings, there seem to be similarities between the reasons for retraction of articles in the two countries and that of Steen's (2011) study, which earlier observed that there were three major reasons for article retraction; these are falsification and fabrication, scientific errors, and plagiarism. These findings however contrast with those of Moylan and Kowalczuk (2016) whose findings suggest that a compromised peer review process was the top reason for article retraction followed by plagiarism.

Additionally, this study revealed that in South Africa, the publisher that had the most retracted papers was Elsevier, while in Nigeria it was Taylor and Francis. This finding supports Palla, Sngson & Tiyagarajan's (2020) study which found that most of the papers that were retracted by authors from India and China were published by Springer and Elsevier. Vuong (2019) had also noted earlier that Wiley-Blackwell and Elsevier had the highest numbers of papers retracted by a publishing company. On the other hand, while this study indicated that South Africa recorded the highest number of retracted articles in 2018, it was reported that Nigeria had the highest retracted articles in 2016. This finding aligns with Vuong's (2019) argument that there were reports of a high rate of articles retracted by authors, an act described by Alberts et al. (2015) as 'heroic acts' in the recent past. This suggests that authors of articles are now more conscious of the integrity of their articles than in the previous years of publication. This could also translate to more integrity among authors and publishers in the contemporary academic community.

Concerning the field of study, findings from this study have shown that articles from the medical and health sciences were more likely to be retracted than articles from other disciplines. This result corroborates Fanelli's (2013) and Tang et al's (2020) earlier works that showed article retractions were most common in the field of biomedical and life sciences, with over 60% of retracted articles compared to only 0.1% in the arts and humanities, and 5.1% in the social sciences during the same period. Nevertheless, it has been argued that the uneven distribution of retractions across disciplinary lines might be attributed to the low detection of false science and problematic research in the arts, humanities, and social sciences, where replicability is much more difficult to attain (Tang et al., 2020). As a matter of fact, global research output carried out in different subject areas between 2014 and 2019 by SciVal revealed that articles from the medical sciences have the highest number of output (14.4%) out of sixteen subject areas. Thus, having the highest numbers of retracted and output means that they also have the highest number of submitted articles.

Extant literature has suggested that most of the articles that have been retracted were authored by fewer numbers of authors (Tang et al., 2020). Findings from this study also indicate that as the number of authors increases, the number of papers retracted decreases. This finding suggests that the

higher the number of authors in a given paper, the higher the quality of the output of the paper. This follows the logic that when the number of authors in a paper is high, the likelihood of contributors exerting more effort to enhance the quality of the paper increases. Nevertheless, it should be noted that this might not always be the case, as sometimes contributors shift their responsibilities or roles to other contributors in the hope that the performance of their assigned roles in the paper will be accomplished.

Conclusively, this study is not without limitations. Firstly, this study only considered the number of papers retracted in each country without considering the total number of papers submitted during the period covered in the analysis, which may undermine the outcome of the result. Be that as it may, the focus of the study could still be achieved. Secondly, the Retraction Watch database only takes into cognizance articles retracted from world-recognized publishers such as Elsevier, Taylor & Francis, Wiley, Springer, etc. Most articles published, especially in Nigeria, are locally-based, hence, they may not be adequately captured by the Retraction Watch Database, while most South African journals, on the other hand, can be found in these recognized publishing outlets. Thus, articles in South Africa are more likely to be retracted if they breach ethical standards.

Finally, this study excluded the number of times authors' papers were retracted or appeared in the database, which may also undermine the outcome of this study. This is because one or more authors may have repeatedly breached the ethical process of publishing, which might have led to the retraction of their papers in the two countries. Thus, a holistic view of the subject matter would have been enhanced if such omissions were addressed in the study.

5. Conclusion

This paper attempted a comparative analysis of articles retracted from Nigeria and South Africa within five years (2016-2020) using the Retraction Watch Database. Based on the findings from this study, it is evident that most

journals in Africa are yet to key into the Retraction Watch Database. As a result, few or no African journals are listed in the Retraction Watch. This means that a lot of unethical practices may just have been slipping through African journals without retractions. On this note, it is recommended that all hands be on deck by all stakeholders in academics to promote scholarly integrity through their research outputs while university administrators are allowed to put all measures in place to ensure quality research outputs are scrutinized and published in reputable journals.

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