Strobe checklist for reporting observational studies

http://www.who.int/bulletin/volumes/85/11/07-045120.pdf

Item	Item number	Recommendation	Page number in ms
Title & Abstract	1	a) Retrospective cross-sectional b) available retraction notices were assessed to record the reasons for retraction and whether they adhered to COPE guidelines (as stated in the abstract)	1&2
Introduction Background/rationale	2	To assess all retraction notices from BioMed Central to determine causes of retraction and whether notices were transparent and adhered to COPE guidelines	3
Objectives	3	• To find out reasons why BioMed Central retracted articles • Whether COPE guidelines were followed • Whether retractions were increasing	1
Methods Study design	4	Retrospective cross-sectional study of all retractions published by BioMed Central between 2000-2015. This time period is from when BioMed Central first started publishing retractions (in 2000) up to 2015 (to have 15 complete years of data).	4
Setting	5	All retractions published by BioMed Central, between January 2000 (when the first retractions began to be published) until December 2015 (which represented 15 years of	4

		data).	
Participants	6	The participants in this study were 134 articles (published across various BioMed Central journals by different authors, in different disciplines) that had been retracted by BioMed Central in the above timeframe. The articles were identified using the publisher's publically available advanced search function using the search term 'retraction' within the article title. Retractions were excluded if they were published by other publishers before the journal was transferred to BioMed Central as we were interested in analysing BioMed Central-written retraction notices. Elizabeth Moylan conducted the search for retracted articles.	4
Variables	7	When retractions are published at BioMed Central they must all state 'Retraction' in the title (it is a specific article type determined by the production department). We are confident no retraction articles have been missed as the search term used 'retraction'. Any false positives, i.e. articles which included the word retraction but were not themselves retractions were excluded by Elizabeth Moylan.	4
Data sources/measurements	8	Who issued the retraction notice and the reason for retraction were recorded. The time elapsed between publication of the original article and publication of the	4

		retraction notice was also recorded. Retractions were broadly classified according to the apparent underlying reason for the retraction into the following categories: honest error, misconduct (see manuscript for further discussion). Where it was not possible to distinguish 'honest error' from 'misconduct', the retraction notice was scored as 'unclear'. Where a retraction notice mentioned irregularities in the data and an institutional investigation the notice was scored as misconduct unless honest error was explicitly mentioned. Where multiple reasons for the retraction were given the main reason was scored and the secondary reasons were noted. The scoring of the retraction notices is given in Supplementary File 1. Citations for all retracted articles were counted before and after the date of retraction by searching for the article or authors in Scopus accessed on 26/2/2016. Citations to the retraction notice were also counted. Citation data are also provided in Supplementary File 1.	
Bias	9	All notices were classified by one author (EM) and checked for agreement by the other author (MK) using the information given in the retraction notice alone (i.e. no additional information was used). Where there was a difference in opinion, a discussion took place between the authors to reach a consensus.	4

Study size	10	The study is limited by the number of retractions that occurred (and are available to analyse) between January 2000 and December 2015.	3
Quantitative variables	11	Individual reasons for retraction were described as given in Table 2 of the manuscript	8
Statistical methods	12	Retraction notices were classified and analysed in excel and total numbers (and percentages) reported. Descriptive statistics (means and percentages) was used to analyse the results.	6
Results			
Participants	13	134 retraction notices were published between January 2000 and December 2015 and eligible for analysis.	6
Descriptive data	14	All retractions were analysed. The classification is given in Supplementary File 1.	(see supplementary file 1)
Outcome data	15	Table 1 in the manuscript shows who retracted the various notices. Table 2 in the manuscript shows the reasons for the retractions.	6 8
Main results	16	The most common reason for retraction is compromised peer review (44, 33%), followed by plagiarism (22, 16%) followed by problems with the data - i.e. the data was found to be 'unreliable' (13, 10%). Other reasons include lack of appropriate ethical approvals or permission to use data (5 or 4% in each case), duplicate publication (11, 8%), publication in error (8, 6%), image manipulation	7

Other analyses	17	(6, 4%), or because of a lack of awareness by some authors of the manuscript's submission and publication (5, 4%). 10 (7%) of retractions were due to data falsification/fabrication. 3 (2%) of retractions were due to undeclared conflicts of interest. Citations for all retracted articles were counted before and after the date of retraction by searching for the article or authors in Scopus accessed on 26/2/2016. Citations to the retraction notice were also counted. Citation data are provided in Supplementary File 1. Median number of days from publication to retraction was 337.5. Articles involving apparent misconduct took longer to retract (median of 386 days) than honest error (median of 184 days) as previously reported. It took between 11 and 4147 days to retract an article.	(see supplementary file 1) 6
Discussion Key results	18	The majority of retractions were a result of misconduct, as found in other larger studies. However, within this category, compromised peer review was the predominant reason (Table 2). Plagiarism was found to be the second main reason for retraction (Table 2) and has also been a predominant reason for retraction highlighted in other studies. The third main	8

		reason for retraction was that the published data has subsequently been found to be unreliable in some way. 13 (10%) of retractions were due to problems with the data. For all retraction notices a descriptive reason for each retraction was always given. However, in 15 (11%) of notices it was not possible to distinguish the underlying issue, honest error or misconduct, which ultimately led to retraction. This may have been due to legal constraints or limited information available from institutions for editors to make the distinction between honest error and misconduct. In other cases retraction notices were ambiguous. COPE guidelines were adhered to in so far as a clear reason for each retraction was given. However, 8 (6%) of notices did not state clearly who was retracting the article. These cases all occurred after the publication of the COPE guidelines on retraction which were not adhered to in this respect.	10 10
Limitations	19	The study is limited by the number of retractions available to analyse and because of this any correlations of retractions with a particular journal, article type, discipline or peer review model have not been explored.	3

Interpretation	20	To reduce bias in how retraction notices were classified they were first described by one author (EM) and checked for agreement by the other author (MK) using the information given in the retraction notice alone. Where there was a difference in opinion, a discussion took place between the authors to reach a consensus.	4
Generalizability	21	The majority of retractions were a result of misconduct, as found in other larger studies. We found that COPE guidelines on retraction were adhered to in that an explicit reason for retraction was given in all cases of retraction evaluated from 2000-2015. However, in some cases notices did not document who issued the notice and there were ambiguities as to the underlying cause (honest error or misconduct). The findings reported here have also been documented in large scale studies. We do not know the extent to which the findings of one publisher may generalize to another publisher but we would suspect that a majority of retractions would be due to misconduct, namely plagiarism. We recommend that Publishers adopt a checklist (linking to COPE guidelines) and a standard template for various classes of retraction notices to facilitate increased transparency and consistency.	10-12

Other information Funding	22	This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.	13