Reporting quality of Master of Medicine (MMed) mini-dissertations using the STROBE checklist

E S Grossman, PhD

East London and Port Elizabeth Health Resource Centres, Faculty of Health Sciences, Walter Sisulu University, Mthatha, South Africa

Corresponding author: E S Grossman (grossmane@gmail.com)

Background. The 2011 Health Professions Council of South Africa (HPCSA) directive to make a research component compulsory for specialist registration has been decried in some circles as encouraging low-quality research.

Objective. To assess the reporting quality of South African (SA) MMed mini-dissertations using the STROBE checklist.

Methods. A total of 100 monograph-format mini-dissertations reporting retrospective observational research were extracted from a pool of 335 mini-dissertations. Analysis of each was undertaken using a 24-point STROBE Statement checklist. Scoring was as follows: 1 = the item was compliant with STROBE recommendations; 0.5 = partially described; and 0 = not addressed at all. Satisfactory compliance was set at 66%, thus a STROBE score of 17-24 was considered satisfactory. Data were entered into an Excel spread sheet and analysed descriptively.

Results. STROBE item compliance for individual mini-dissertations was at a mean of 83.1%; range 50-97%; median 85% and mode 89%. Sixteen mini-dissertations were non-compliant, scoring below 17 as per the set threshold of 66%. This indicates an 84% satisfactory sample. Only Item 5 (Key settings and locations) was at 100% compliance. The four lowest scores were for STROBE items (9) Bias (29.5%); (10) Study size/power analysis (52%); (1) Title (69%) and (14) Missing data (69%).

Conclusion. The majority of sampled mini-dissertations, evaluated as per STROBE recommendations, are transparently reported to allow the reader to follow what was planned, done, found and which conclusions were drawn. As such the results confer a measure of reporting quality on the SA MMed research endeavour. The use of dissertation templates, commonly using STROBE-type headings and prompts, might have contributed to the good scores obtained. Importantly, areas of weakness in the writing of the SA MMed mini-dissertations have been highlighted and show which items require attention.

The 2011 HPCSA directive to make a research component compulsory for specialist registration came at a critical time in the SA higher education environment. Since 1994, a cascade of policy-driven changes linked to the country's transformation, research and economic strategy, has resulted in pressures on universities to do more with less. Such pressures have had a knock-on effect on postgraduate training in general, which clinical specialist research training has not escaped.

Recent data[1] have shown that between 2010 and 2016, the number of health instructional and research staff declined from 2 901 to 2 485, translating to a loss of 500 full-time equivalent researchers. In terms of research capacity, the health sciences have the lowest proportion of staff with PhDs. Paradoxically, Faculty of Health Sciences (FHS) postgraduate numbers have risen, with a doubling of health sciences PhDs and a 60% increase in MSc graduates in the same time period.[1] The above has contributed towards stretching both FHS research resources and supervisory capacity.

When exploring the registrar research niche within the academic milieu, MMed research and research supervision was at a low base in 2011. For historical reasons, the FHS suffered a two-decade backlog of clinical researchers,[2] which could have contributed to a less than 10% MMed completion rate experienced prior to 2010.[3] By 2016, research active MMed/MDent candidature rose to 50% of the FHS postgraduate cohort at a research intensive university (S Benn, personal comm, March 2016) and MMed graduate numbers escalated from 359 in 2010 to 642 in 2018 (J Mouton, personal comm, June 2020). Graduate numbers are set

to soar even higher with the latest HPCSA requirement now specifying an examined and passed MMed or a published accredited journal article, rather than the previous loosely worded 'research component' as the required research piece.[4]

What impact, then, do the decline in FHS research staff and ever-rising postgraduate numbers have on the MMed candidate embarking on the research component?

When implemented, neither the Colleges of Medicine of South Africa (CMSA) nor the HPCSA made any allowance for universities being unequally resourced to meet the 2011 MMed research requirement.[5] Aldous *et al.*[6] argue that when meeting the requirements of the HPCSA MMed mandate, three of the difficulties training universities encounter are: acquiring research supervisors who fulfil regulatory stipulations; providing sufficient research supervision time; and allocating ringfenced time for specialist trainees to do research and attend methods courses. Elsewhere, the local FHS postgraduate research supervision culture is described as being 'haphazard, impersonal, pressurized and mechanistic'.[7] Lastly, registrars felt that MMed research performance would benefit from improved research training and support.[8] Pertinent to the latter are the special needs unique to the MMed postgraduate which are often overlooked when providing research support: registrars are novice researchers; each candidate requires a clinically-based research project; they are time-poor with erratic windows of research opportunity; they have an overstretched clinical load and must deal with study and examination commitments during their specialist training. Given the challenges that the FHS currently face in terms of

research capacity, it is unsurprising that some clinical academics allege that the introduction of a research requirement for specialist registration is counterproductive: leading to poorly conducted research, the teaching of inferior science,[9] polluting the research pool and low-quality research which undermines research reliability.[10] While these allegations appear emotive, they merit deeper investigation, bearing in mind the dominant policy discourses taking place in many jurisdictions across the globe on the pressures of massification on the quality of higher education.

Research 'quality' is an elusive notion and not easily captured in any quantitative metric, with the gold standard to assess quality in research being peer review.[1] While conversion of an MMed-type dissertation into a publication is widely considered as a sign of research quality in countries as diverse as France,[11] Egypt,[12] Peru,[13] and Turkey[14] there is ample evidence to show that poor quality is not the only reason for accredited journals to reject a research submission. Reasons for manuscript rejection are numerous: the topic is not of interest to the research readership; the journal has recently published on the topic; the submission is unlikely to make a significant contribution to knowledge; a negative result; reviewer and editor bias or subjectivity; conflicts of interests; the significance of the research is not yet apparent; whether the research field is 'hot' or not; and geographical bias, among others.[15-17] Hence, publication as a validation of rigorous research is not a realistic option when assessing the worth of an MMed research project.

Fortunately, another measure of research quality is available based on the way evidence is presented in the research study. The *raison d'être* of this measure is that the merit and potential impact of a scientific study can only be judged if the reader can determine exactly how the study was conducted and what was found. To this end, several reporting guidelines have been developed, depending on the study design used, and consolidated under the umbrella of the EQUATOR network (Enhancing the QUAlity and Transparency Of health Research), to improve transparency and accuracy of communicating medical research.[18] STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) was developed in 2004 and is used as a guideline for reporting observational studies, specifically cohort, case-control and cross-sectional studies.[19] While the guidelines were developed primarily to evaluate journal publications,[20] STROBE has been used to assess the quality of Indian postgraduate medical degrees,[21] Chinese public health dissertations[22] and the methods section of Indian dental postgraduate dissertations.[23]

The aim of this investigation was to assess the reporting quality of SA MMed mini-dissertations using recommended STROBE guidelines to support or refute previous claims of 'shoddy' research.[9,10] This current investigation is based on two previous studies[21,22] which provide a validated method, and a suitable comparison of results. To obtain sample uniformity, all selected mini-dissertations were limited to monograph format and were retrospective in focus. The latter requirement was set to overcome any confounders linked to cost.[12]

Methods

The data source for this current study consisted of 335 MMed mini-dissertations, collected for previous use.[4,24,25] Briefly, all mini-dissertations were downloaded from local and global electronic theses and dissertation databases (www.netd.ac.za; www.ndltd.org) and library repositories of the eight SA specialist training universities. From this pool, monograph-format mini-dissertations reporting observational research of retrospective study design were extracted, resulting in 100 mini-dissertations for analysis (Fig. 1). Dissertations were assessed using the STROBE Statement checklist of 22 items,[26] which, after extensive piloting, underwent minor adjustment for data collection as follows:

- The title and abstract (STROBE 1) were separated to give a score for each of the two recommended items.
- Variables and outcomes were split in STROBE 7 to isolate the two recommendations.
- STROBE 14 was divided to give one score each for describing participants and mentioning missing data.
- STROBE 22 on funding was excluded as being redundant to the MMed university degree.

Hence, no departure from STROBE statements occurred. Rather, three items were separated to independently record important subcomponents within the mini-dissertation. Scoring was as follows: 1 = the item was compliant with STROBE recommendations; 0.5 = described partly and 0 = not addressed at all. Thus, 24 was the highest score a dissertation could obtain and 0 the lowest. Scoring consistency was ensured by closely following a guide which offers a detailed, exampled explanation for each STROBE item during assessment.[27] There was no penalty if an item did not appear in the precise location or order as reflected in the checklist[20,27] and no piloted data used in the final analysis.

Satisfactory compliance was set at 66%, as done elsewhere.[21] Therefore a STROBE score of 17-24 was considered a satisfactory indicator of mini-dissertation reporting quality, below 17 was unsatisfactory.

Data analysis

The data were entered into an Excel spread sheet (Microsoft, USA) and analysed descriptively, and 20% of the monographs were reassessed at the end of the study for intra-rater reliability. The Kappa value obtained was at 0.74, indicating scoring consistency.

Ethical approval

All mini-dissertations are in the public domain. Ethics approval for the study was obtained from the Walter Sisulu University, Faculty of Health Sciences, Postgraduate Education, Training, Research and Ethics Unit: Human Research Committee Clearance Certificate (ref. no. 32/2019).

Results

Breakdown of the analysed 100 mini-dissertations as per university and college are in Table 1. Unsurprisingly, mini-dissertations from the four largest Health Sciences Faculties predominate, as does the College of Obstetrics and Gynaecology, which required a research component for specialisation prior to the HPCSA decree. Fig. 2 shows the spread of the sampled mini-dissertations according to year of acceptance.

Sixteen mini-dissertations were non-compliant with a total score below 17 as per the set threshold of 66%, which translates to an 84% satisfactory sample. When analysing total item scores (Table 2), compliance was at a mean of 83.1%; range 50-97%; median 85% and mode 89%. Table 3 shows comments and scoring for the nine STROBE items which fell below the compliance mean of 83.1%. In addition, two further findings regarding STROBE items 5, 7 and 15 are noteworthy. All mini-dissertations provided detailed information of settings, locations and time periods of data collection (Item 5) and was the only item to score 100% for the sample.

Table 1. Breakdown of 100 MMed mini-dissertations analysed by university and college

University/College	MMed mini-dissertations, *n*
University and abbreviation	
University of the Witwatersrand (Wits)	25
University of Cape Town (UCT)	23
University of Stellenbosch (US)	21
University of KwaZulu-Natal (UKZN)	17
Sefako Makgatho Health Science University (SMU)*	6
Walter Sisulu University (WSU)	4
University of Pretoria (UP)	2
University of the Free State (UFS)	2
College† and abbreviation	
Obstetricians and Gynaecologists (COG)	31
Paediatricians (CPAED)	15
Surgeons (CS)	10
Radiation Oncologists (CRO)	9
Physicians (CP)	7
Orthopaedic Surgeons (CORTH)	5
Neurosurgeons (CNEUROSURG)	4
Family Physicians (CFP)	3
Pathologists (CPATH)	3
Ophthalmologists (COPTHTH)	3
Psychiatrists (CPSYCH)	3
Public Health Medicine (CPHM)	2
Forensic Pathologists (CFORPATH)	2
Emergency Medicine (CEM)	1
Paediatric Surgeons (CPS)	1
Radiologists (CR)	1

*Due to mergers, the numbers reported here are the totals obtained from adding MMed dissertations appearing in MEDUNSA, University of Limpopo and SMU repositories.
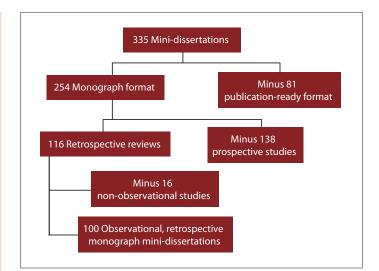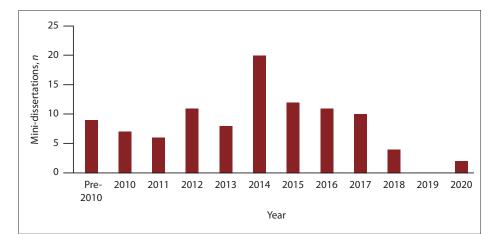†www.cmsa.co.za

Fig. 1. Flow chart of the selection of 100 observational, retrospective-study type, monograph mini-dissertations from the 335 accumulated MMed mini-dissertations.

Item 7 (Outcomes) scored just below the mean at 82% in the Methods section. This rose to 90% when Outcomes was further enlarged upon in the Results (Item 15), indicating a deeper understanding of this research concept as the study progressed.

Discussion

The mean compliance to individual STROBE items in the sampled SA MMed monographs was 83.1%. This is in contrast to 27.37%[21] and 74.79% [22] for Indian postgraduate medical students and Chinese Master of Public Health dissertations, respectively (Table 2). Although reporting outcomes between the current study and the other three publications are not entirely equivalent, comparisons can be made. While SA registrars are uniquely non-compliant with Items 1 (Title) and 3 (Objectives) and exceptionally compliant with Item 5 (Settings and locations), poor compliance in Items 10, 14, 17 and 19 of the current study can be found in one or more of the other three studies. The results suggest that SA registrars report observational studies that clearly present what was planned, done and found in the study. However, it must be borne in mind that while clarity of reporting is a prerequisite to research evaluation, the STROBE checklist is not an instrument to evaluate the quality of observational research as such,[20] nor was it designed to assess unpublished work such as the mini-dissertation.[21,22]

That said, the aim of the current study was to ascertain whether the allegations of 'shoddy science' and similar claims[9,10] are justified by using the STROBE checklist to assess the reporting quality of SA MMed mini-dissertations. With the sampled observational mini-dissertations being 84% compliant in important aspects of research reporting, our MMed registrars have clearly met the STROBE requirements of research transparency and reporting quality which could serve as a rejoinder to MMed research naysayers. However, in the interest of prudence, it is necessary to delve a little deeper into the registrar research learning environment to probe alternative causes for the high STROBE scores achieved.

Thesis and dissertation templates are extensively used, globally and across all academic disciplines, to apply structure, assist development and explore the research process through directed writing.[28] Templates follow Faculty regulations, guidelines and formats for the presentation of higher research degrees. They usually include mandatory administrative sections for the front matter; the body of the text with appropriate headings with the back matter covering references and appendices. By using prompts and sub-headings throughout, many of which meet EQUATOR principles, the FHS postgraduate is able, via the template, to apply structure to the research project, further develop the topic, explore research strategies and become acquainted with previously unknown research concepts and terms. Novice researchers, such as registrars, are often daunted by the prospect of 'doing the MMed' – they literally do not know where or how to start research in a meaningful way and are unfamiliar with research terminology. In this, the templates cater to an educational need by facilitating a streamlined learning process.[6] Thus, the question which requires answering is, 'Are the high STROBE scores obtained in this current study an indication of robust research learning on the part of registrars or of the particular clinical or university template, or indeed, the quality of the template itself?' This study cannot provide an answer to the question and suggests that further exploration on the matter is required.

But there remains a further proviso which must be considered when critically assessing the high STROBE marks obtained in this study against claims of 'poorly conducted research'[9,10] on the one hand and the use of templates on the other. This proviso falls within the ambient of hyper-structured student research projects (HSSRP), an alternative mode of research

supervision. HSSRP have evolved, within a depleted supervisory pool, to manage large numbers of students and specific research agendas,[29] as is currently experienced by SA FHS. HSSRP take a utilitarian approach, placing institutional interests first by delivering on institutional requirements

Fig. 2. Number of mini-dissertations accepted by year, of the sample of 100 observational, restrospective-study type monographs.

of efficient postgraduate throughput to ensure the success of a particular learning programme. Pertinently, defined report writing to produce an acceptable research report via templates is one of the hallmarks of HSSRP. However, HSSRP has raised questions about the graduateness and professional preparedness of the postgraduate as well as critical reflection of whether HSSRP meets the needs of academic and professional requirements. Indeed, some contend that such structured, controlled project management (or 'spoon-feeding') influences both the quality of researchers being trained and the value of the research produced.[30] Thus, the concerns of the MMed research naysayers[9,10] have merit and cannot be completely dismissed when considering their argument.

A previous Zambian study was prescient when suggesting that MMed dissertation quality would benefit from utilising reviewing guidelines under

Table 2. Comparison of current study STROBE item compliance results with three other published studies

| STROBE number | STROBE ITEM | Percentage compliance | | | |
		Current study	Bhawalkar *et al.*, 2014[21]	Dai *et al.*, 2020[22]	Shirahatti *et al.*, 2015[23]
1	Title as per STROBE	69.0	74.5	99.39	-
1	Abstract as per STROBE	81.5		98.79	-
Introduction					
2	Scientific background of the dissertation	93.0	-	95.75	-
3	Specific objectives of dissertation	78.0	95.9	100.00	-
Methods					
4	Key elements of study design	95.0	17.7	100.00	-
5	Mentioned setting, locations	100.0	25.5	78.18	-
6	Mentioned eligibility criteria	93.5	20.0	53.54	75.0
7	Mentioned variables, exposures as per STROBE	85.5	8.2	31.52	93.7
7	Mentioned outcome data	82.0			
8	Mentioned data sources/assessment/measurement	86.5	-	76.97	-
9	Mentioned sources of bias	29.5	5.0	81.82	35.7
10	Mentioned study size (power analysis)	52.0	-	42.42	6.7
11	Mentioned quantitative variables	85.0	-	12.73	-
12	Mentioned statistical/descriptive methods	85.0	35.9	85.45	-
Results					
13	Mentioned participant numbers/subgroups flow	97.5	8.2	29.70	-
14	Descriptive data	99.0	1.4	47.88	33.3
14	Mentioned missing data	69.0		8.48	
15	Mentioned outcome data	90.0		98.79	-
16	Main results – statistical/descriptive analysis	94.5	-	35.16	-
17	Mentioned sensitivity analysis/subgroups other analysis	76.5	-	12.12	-
Discussion					
18	Mentioned key results	93.5	12.3	100.00	-
19	Limitations	75.5	-	52.73	-
20	Interpretation	91.5	-	83.03	-
21	Generalisability – external validity	91.5	-	27.27	-
	Mean overall dissertation compliance with STROBE items	83.1	27.37	74.79	-

Note: Bhawalkar *et al.*[21] reported on only 10 of the 22 STROBE items and Shirahatti *et al.*[23] on just 5 method-based STROBE items. Dai *et al.*[22] reported on all 22 recommendations as absent/partly/fully reported and in some cases numbers were further broken down to study type (cohort/case-control/cross-sectional study). Note that STROBE numbers 1, 7 and 14 are described under a single item in the original checklist.

Table 3. Scoring of nine STROBE items which fell below the study mean of 83.1%

STROBE Item (% compliance)	Score 0	Score 0.5	Score 1
1 – Title (69.0%)	Title had very little bearing on nature of research = 2	Titles which did not reflect study design = 58	Titles fully compliant = 40
1 – Abstract (81.5%)	Abstract missing = 8	Abstract partially compliant = 21	Abstract compliant = 71
Introduction			
3 – Objectives (78.0%)	No aim/objective = 2 Aim/objective lacked specifics = 11	No clarity as to the research question the study aims to address = 18	Met the required STROBE recommendations = 69
Methods			
7– Outcome data (82.0%)	A list of variables presented = 12	Some mention of which variables are of interest = 10	Generally compliant = 78
9 – Bias (29.5%)	The word 'bias' did not appear at all = 57	Bias mentioned, in the context of study limitations towards end of mini-dissertation but without further elaboration = 27	Described sources of bias & conceded that these could have affected results in some way &/or had taken measures to reduce bias &/or speculate on the direction any bias had on the results = 16
10 – Study size (52.0%)	Study size absent or required careful searching to find study size = 14	Stated sample size = 67	Reported formal sample size calculations or discussed theory to explain why ideal size was unmet = 19
Results			
14 – Missing data (69.0%)	No mention of missing data = 29	Data reported missing without further elaboration = 4	Generally mentioned in the Discussion or Limitations section, usually in terms of missing patient folders or incomplete patient records. Often using a flow chart = 67
17 – Other analyses (76.5%)	No elaboration on further analyses, beyond those of the main analysis = 22		Subgroup analysis = 78
Discussion			
19 – Limitations (75.5%)	Study limitations not mentioned = 23	Limitations mentioned = 3	Full engagement with consequences of study limitations = 74

the EQUATOR umbrella at the planning stages of dissertation research studies.[31] The results of the current study have supported this opinion, thereby demonstrating the relevance and role of STROBE and other reporting guidelines to boost research reporting quality on the African continent. In addition, this study has underscored areas of weakness in the writing of the SA MMed mini-dissertation and provided direction for items which require attention. Further, interesting commonalities between the current study and the other three reports[21-23] have been highlighted. Finally, comparison of mean overall compliance scores imply that the reporting quality of the SA MMed mini-dissertation is on a par, if not better than elsewhere[21-23] despite being conducted in a research resource-challenged academic environment and stretched supervisory capacity.

Study limitations
The extraction of data and reporting appraisal was done by a single investigator.

Study strengths
This is the first report to examine the reporting quality of MMed mini-dissertations or equivalent outside of India and China.

Conclusion
This study has shown that SA MMed mini-dissertations reporting retrospective observational research in monograph format are 83.1% compliant when assessed with the STROBE Statement checklist. The results indicate that the sampled studies have been transparently reported to allow the reader to follow what was planned, done, found and which conclusions were drawn. As such the findings confer a measure of reporting quality on the SA MMed research endeavour, refuting the claims of shoddy research made elsewhere. However, just as reporting quality does not imply research quality in SA mini-dissertations so the sentiments of poor science, polluting the research pool and low-quality research cannot be held true of the MMed dissertation in the absence of evidence, examples or proof. The purpose of having reporting guidelines in medical research is to encourage total transparency, accurate reporting and easier assessment in the validity of reported research findings. Perhaps the time has come to make greater use of the EQUATOR armamentarium to ensure reporting quality when embarking on the MMed research study, rather than dismissing the compulsory HPCSA research component for specialist registration out of hand.

1. Mouton J, Basson I, Blanckenberg J, et al. The state of the South African research enterprise. DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy. Stellenbosch University. 2019. http://www0.sun.ac.za/crest/wp-content/uploads/2019/08/state-of-the-South-African-research-enterprise.pdf
2. Grossman ES, Naidoo S. Academic-service partnerships, research and the dental academic. J Dent Educ 2012;76(9):1226-1233. http://repository.uwc.ac.za/xmlui/handle/10566/1205
3. Grossman ES, Cleaton-Jones PE. Pipelines or pipe dreams? PhD production in a South African dental research institute 1954-2006. PiE 2011;29(3):111-125. https://www.ajol.info/index.php/pie/article/view/76980
4. Grossman ES. Publication rate of 309 Master of Medicine dissertations submitted between 1996-2017: Can our registrars fulfil HPCSA Form 57 MED amendments? S Afr Med J 2020;110(4):302-307. https://doi.org/10.7196/SAMJ.2020.v110i4.14339
5. Szabo CP, Ramlall S. Research competency and specialist registration: Quo vadis? S Afr Med J 2016;106(12):1183-1185. https://doi.org/10.7196/samj.2016.v106i12.11217
6. Aldous CM, Adhikari M, Rout CC. The research component of specialist registration – a question of alligators and swamps? A personal view. S Afr Med J 2015;105(1):21-22. https://doi.org.10.7196/SAMJ.8732
7. Heyns T, Bresser P, Buys T, et al. Twelve tips for supervisors to move towards person centered research supervision in health care sciences, Med Teach 2019. https://doi.org/10.1080/0142159X.2018.1533241
8. Kisansa ME, Lubinga MH. Strategic and focused solutions to challenges faced by medical postgraduate students in performing research at a South African university. S Afr J High Educ 2020;34(2):59-73. https://doi.org/10.20853/34-2-3666
9. Biccard BM, Dyer RA, Swanevelder JL, et al. Is the HPCSA requirement for a research mini-dissertation for specialist registration the best option? South African J Anaesth Analg 2017;23(4):4-6.
10. Rodseth RN, Wise R, Bishop D. Polluting the well. South African J Anaesth Analg 2017;23(6):5.
11. Chassagnon G, Dangouloff-Ros V, Vilgrain V, et al. Academic productivity of French radiology residents: Where do we stand? Diagn Interv Imaging 2016;97(2):211-218. https://doi.org/10.1016/j.diii.2015.08.001
12. Nour-Eldien H, Mansour NM, Abdulmajeed AA. Master's and doctoral theses in family medicine and their publication output, Suez Canal University, Egypt. J Family Med Prim Care 2015;4(2):162-167. https://doi.org/10.4103/2249-4863.154622
13. Arriola-Quiroz I, Curioso WH, Cruz-Encarnacion M, et al. Characteristics and publication patterns of theses from a Peruvian medical school. Health Info Libr J 2010;27(2):148-154. https://doi.org/10.1111/j.1471-1842.2010.00878.x
14. Koca K, Ekinci S, Akpancar S, et al. An analysis of orthopaedic theses in Turkey: Evidence levels and publication rates. Acta Orthop Traumatol Turc 2016;50(5):562-566. https://doi.org/10.1016/j.aott.2016.03.001
15. Young SN. Bias in the research literature and conflict of interest: An issue for publishers, editors, reviewers and authors, and it is not just about the money. J Psychiatry Neurosci 2009;34(6):412-417.
16. Fathelrahman AI. Rejection of Good Manuscripts: Possible Reasons, Consequences and Solutions. J Clinic Res Bioeth 2015;6(1):204. https://doi.org/10.4172/2155-9627.1000204
17. International Science Council. Advisory Note on Bias in Science Publishing. https://council.science/publications/advisory-note-on-bias-in-science-publishing/ (accessed 17 October 2022).
18. EQUATOR Network. UK Equator Centre, Centre for Statistics in Medicine, University of Oxford. http://equator-network.org (accessed 17 October 2022).
19. STROBE Statement. http://www.strobe-statement.org/ (accessed 17 October 2022).
20. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. PLoS Med 2007;4(10):1623-1627. https://doi.org/10.1371/journal.pmed.0040296
21. Bhawalkar JS, Jadhav SL, Banerjee A, et al. Research trends in post-graduate medical students, Pune. Ann Med Health Sci Res 2014;4(3):355-360. https://doi.org/10.4103/2141-9248.133459.
22. Dai Shuangyang, Xiaobin Zhou, Hong Xu, et al. Evaluation of the reporting quality of observational studies in master of public health dissertations in China. BMC Med Res Methodol 2020;20:230. https://doi.org/10.1186/s12874-020-01116-6
23. Shirahatti RV, Hegde-Shetiya S. Review of research designs and statistical methods employed in dental postgraduate dissertations. Indian J Dent Res 2015;26(4):427-434.
24. Grossman ES. How long does it take a registrar to complete the compulsory research project enabling specialist registration? S Afr Med J 2019;109(4):254-258. https://doi.org/10.7196/SAMJ.2019.v109i4.13377
25. Grossman ES. Content analysis of the South African MMed mini-dissertation. Afr J Health Prof Educ 2020b;12(2);56-61. https://doi.org/10.7196/AJHPE.2020.v12i2.1227
26. von Elm E, Altman DG, Egger M, et al. STROBE Statement Checklist. https://www.strobe-statement.org/fileadmin/Strobe/uploads/checklists/STROBE_checklist_v4_combined.pdf (accessed 17 October 2022).
27. Vandenbroucke JP, von Elm E, Altman DG, et al. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration. PLoS Med 2007;4(10):1628-1654. https://doi.org/10.1371/journal.pmed.0040297
28. Singh S. An intervention to assist students with writing their dissertations and theses. S Afr J High Educ 2011;25(5):1020-1030. https://www.ajol.info/index.php/sajhe/article/view/80701
29. Steyn R. Ethical dilemmas associated with hyper-structured student research projects. S Afr J High Educ 2020;34(1):231-248. https://doi.org/10.20853/34-1-3095
30. Boehe DM. Supervisory styles: a contingency framework. Stud High Educ 2016;41(3):399-414. https://doi.org/10.1080/03075079.2014.927853
31. Ahmed Y, Kanyengo CW, Akakandelwa A. Mapping postgraduate research at the University of Zambia: a review of dissertations for the Master of Medicine programme. Med J Zambia 2010;37(2):52-57. https://www.ajol.info/index.php/mjz/article/view/75655