Scientific and Technological Research

Assessing the completeness of reporting of observational studies in Colombian Journal of Anesthesiology. Cross sectional study☆

Mary Bravo-Peña[a], Luis Barona-Fong[a], Julio Campo-López[a], Yeni Arroyave[b], José Andrés Calvache[a,c,]*

[a] *Department of Anesthesiology, Universidad del Cauca, Popayán, Colombia*
[b] *Department of Surgery, Universidad del Cauca, Popayán, Colombia*
[c] *Department of Anesthesiology, Erasmus University Medical Centre Rotterdam, Rotterdam, The Netherlands*

ARTICLE INFO

ABSTRACT

Introduction: The STROBE statement (Strengthening the Reporting of Observational Studies in Epidemiology), consisting of 22 points, was published in 2007 with the aim of improving the reporting of observational research.

Objective: To determine the completeness of reporting of observational studies published in the Colombian Journal of Anaesthesiology between 2000 and 2013 using STROBE.

Methods: Cross-sectional study. The units of analysis were observational studies published in Colombian Journal of Anesthesiology between 2000 (volume 28) and 2013 (volume 41). Of the randomly selected studies, 40% were included. The primary outcome was the completeness of the report of each study. Using two groups, the researchers applied the STROBE statement independently, supported by an arbitrator. Descriptive analyses, time series analyses and multiple linear regression analyses were used.

Results: Overall, 55 studies were identified and 22 (40%) were randomly chosen. The median overall completeness according to STROBE was 57%, 95% CI (48–66%). Items with higher completeness in the reports were the Title and Introduction (89% each), followed by Methods 53%, Results 50%, and Discussion 58%. There were no significant differences between before and after the publication of STROBE.

Conclusion: The completeness of reporting of observational studies in the Colombian Journal of Anaesthesiology is close to 60%, according to results worldwide. No change was found as a result of the publication of the STROBE Statement in 2007.

© 2016 Sociedad Colombiana de Anestesiología y Reanimación. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (http:// creativecommons.org/licenses/by-nc-nd/4.0/).

¿Es completo el reporte de los estudios observacionales publicados en la Revista Colombiana de Anestesiología? estudio de corte transversal

RESUMEN

Introducción: La declaración STROBE (*Strenghtening the Reporting of Observational Studies in Epidemiology*) se publicó en el 2007 con el objetivo de mejorar el reporte de la investigación de tipo observacional, consta de 22 puntos.

Objetivo: Determinar la completitud del reporte de estudios observacionales publicados en la Revista Colombiana de Anestesiología entre el año 2000 al 2013 mediante STROBE.

Métodos: Estudio observacional de corte transversal. La unidad de análisis fueron los estudios observacionales publicados en la Revista Colombiana de Anestesiología desde el año 2000 (volumen 28) hasta el año 2013 (volumen 41). Se incluyó un 40% del total de estudios seleccionados aleatoriamente. El desenlace primario fue la completitud del reporte de cada estudio. Mediante dos grupos, los investigadores aplicaron la declaración STROBE de forma independiente con el apoyo de un árbitro. Se utilizó análisis descriptivo, análisis de series temporales y regresión lineal múltiple.

Resultados: Se identificaron 55 estudios y se escogieron al azar 22 (40%). La mediana de completitud global de STROBE fue de 57% IC95% (48%-66%). Los ítems con mayor completitud de los reportes fueron en el título y la introducción (89% cada uno), métodos: 53%, Resultados 50%, discusión 58%. No se encontró diferencias significativas entre el periodo pre y post publicación de STROBE.

Conclusión: La completitud del reporte de los estudio observacionales de la Revista Colombiana de Anestesiología es cercana al 60%, acorde con resultados a nivel mundial. No presentó cambios con la publicación de la declaración STROBE en el 2007.

© 2016 Sociedad Colombiana de Anestesiología y Reanimación. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (http:// creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Observational scientific research describes and analyses reality without intervening,[1] and does not establish definitive causal relationships, but it provides scientific bases regarding the health/disease process and guides future research.

Bearing in mind that in various settings there are implications that preclude intervention (such as studies on the safety of pharmacological or non-pharmacological interventions), observational studies account for the majority of publications in the area of health.[2] These are lower-cost studies, easier to design and perform, and useful for healthcare planning and administration.[3]

The STROBE statement (*Strengthening the Reporting of Observational Studies in Epidemiology*) was designed in 2004 in Bristol, United Kingdom, and published in 2007[4] with the aim of improving observational research reporting. A framework comprising 22 items was developed with the goal of making observational results truly useful by means of an appropriate reporting of cohort, case–control and cross-sectional studies.[4] The three research designs share 18 of the 22 items in the Statement, whereas the other 4 are specific for each. The items include the Title, Abstract, Introduction, Methodology, Results and Discussion sections.[4] The STROBE statement is not a model for conducting an observational study and it does not assess the quality of a study directly. Rather, it is more a completeness guideline for authors or readers, and has been used to assess this characteristic in various medical disciplines.[5–12]

The Colombian Journal of Anaesthesiology (RCA) was published for the first time in September 1973; the first few articles were narrative reviews related to the practice of anaesthesiology but the journal later became a medium for disseminating original research results. At present, it is the official communication medium of the Colombian Society of Anaesthesiology and the main medium for the dissemination of research in

anaesthesiology and related areas in Colombia. In 1999, the Cochrane Collaboration found that RCA is the Colombian journal that publishes the largest number of reports on intervention studies, systematic reviews and meta-analyses.[13]

Recently, RCA adopted the guidelines of the EQUATOR network (*Enhancing the QUAlity and Transparency Of health Research*), which includes the *STROBE* statement for its editorial process as well as a firm suggestion about its use for its authors.[14]

The main objective of this study was to determine the completeness of reporting of observational studies published in RCA between 2000 and 2013, using the *STROBE* statement. Additionally, to analyse the completeness of observational study reporting before and after the publication of the *STROBE* statement, quantify the trend, and establish recommendations regarding complete reporting of observational research in anaesthesiology in Colombia.

Methodology

Cross-sectional observational study. The subjects for the analysis were all the observational studies published in RCA between 2000 (volume 28) and 2013 (volume 41). The RCA archive hosted in the website and the database of the tables of content and abstracts in *Science Direct* were initially explored.

Studies classified as "observational" were those defined as such by their authors: cohort studies, case–control studies and cross-sectional (or prevalence) studies, and they were initially classified based on the evaluation of each abstract. Studies that were excluded were those without a clear, well-defined methodological design, editorials, letters to the editor, reflection articles, narrative or systematic reviews of the literature, case reports and case series.

A total of 55 observational studies were identified. Because of the exploratory nature of the study, a random selection of 40% (22 studies) was made, and annual representation in the sample to analyse was ensured by means of proportional fixation by year. Based on reports on prior publications, the sample size was estimated using a completeness proportion of 60%, 15% accuracy and 95% CI, for $n = 24$.

An assessment tool developed on the basis of the *STROBE* statement and aimed at evaluating the reporting completeness for each study was applied. This tool and minor modifications thereof have ween widely used in the literature for similar purposes.[4–12]

The selected studies were divided into 2 groups and two researchers already familiar with the research methodology, the health research designs and the STROBE initiative were assigned to each group (Group 1: JC-YA, Group 2: MB-LB). Each researcher, working separately, applied the list of items to each study in order to determine whether they were "met", "unmet" or did "not apply", in accordance with the specific type of design. Regular follow-up meetings were held, during which the researchers shared their results, reviewed and discussed the cases for which the assessment was inconclusive. In cases of difficulty, the rating was discussed individually with a research advisor (JAC).

The dependent variable (primary outcome) was completeness of the report of each study assessed. Additionally, other variables were explored, such as sample size, number of authors, number of professors, presence or not of individuals with Masters or PhD degrees in the research team, and the year of publication.

Statistical analysis

All statistical analyses were made using the SPSS 21.0 and R software package.[15] Completeness rating for each study was the sum of all the items in the assessment. Considering that the total number of variables assessed was different for each research design (cohort, case–controls, and cross-sectional) the individual final result was weighted, and the median rating between the two reviewers and the range as a measure of scatter were estimated. The degree of agreement regarding completeness rating was analysed using the intra-class correlation coefficient (ICC). This agreement was assessed for study segments and also globally.

The general description of the results was made using descriptive techniques in accordance with the nature of each variable. Non-parametric tests were used for univariate contrasting (Mann–Whitney *U* Test) using report completeness as the dependent variable.

A time series analysis was made using an autoregressive integrated moving average (ARIMA) model that allows to assess trends before and after an intervention. This methodology considers multiple evaluation points before and after an intervention and the existing autocorrelation between those points.[16,17] Pre-intervention (2007: year of the *STROBE* initiative publication) and post-intervention periods were used. Their results are presented as the difference in the slope of the regression line before and after the intervention. Additionally, the effect of the intervention for 2009, 2012 and 2013 is also presented. Statistical significance was predefined as a *p* value of 0.05.

Finally, a multiple linear regression model was developed in which the degree of completeness was considered as the outcome, and the year of publication, sample size, the number of authors, the number of professors and the presence or absence of individuals with masters degrees or PhDs in the research team were considered as independent variables. The results are presented as the regression coefficient and their corresponding *p* values. The adjustment of this model was valued using the graphic residual analysis.

Results

Overall, 22 observational studies published in RCA between 2000 and 2013 were analysed.[18–39] One of them was reported as a two-phase study, so it was divided separately for a total of 23 (Fig. 1). Table 1 shows the general characteristics of the studies included. The median overall completeness of the items in the STROBE statement was 57%, 95%CI (48–66%). The sections for which greater completeness was documented were the Title and the Introduction (89% each).
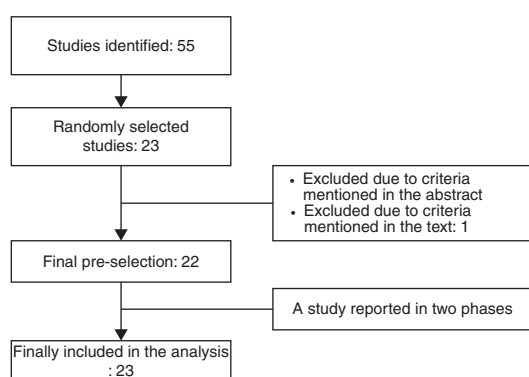
Fig. 1 – Selection of the studies included (*n* = 23).
Source: Authors.
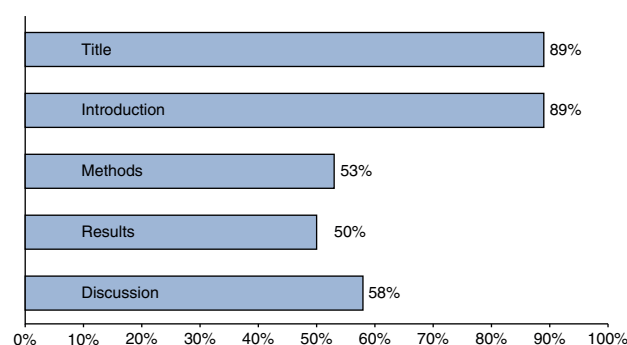
Fig. 2 – Completeness for research article sections (*n* = 23).
Source: Authors.

Table 1 – General characteristics of the studies included (*n* = 23).	
	Frequency (%) Mean $\mu \pm 1$ SD Median [IQR]
Year of publication	
2000–2003	7 (30)
2004–2007	5 (22)
2008–2011	5 (22)
2012–2013	6 (26)
Total number of authors	$\mu = 3.7 \pm 2$ Median = 3 [3–5]
Number of faculty	$\mu = 1.7 \pm 1$ Median = 1 [1–3]
Study sample size	Median = 212 [65–260]
Presence of author with masters degree or PhD	18 (78)
Source: Authors.	

Completeness for each section of the research articles is shown in Fig. 2.

Table 2 shows completeness results by reviewer and article sections, and the degree of agreement between reviewer pairs by group.

The overall completeness trend is shown in graph form (Fig. 3) for before and after the publication of the STROBE strategy. The linear equation for completeness is shown for each of the sections as a function of the year of publication. Greater rating variability was found for the post-STROBE period. The slope of the straight line for the time period before the intervention was 0.85. The difference in the slope of the line between the before and after time periods was −0.47 ($p = 0.709$). Change coefficients in the slope of the line for 2009, 2021 and 2013 were, respectively, −3.2 ($p = 0.698$), −5.1 ($p = 0.628$) and −7.5 ($p = 0.626$).

The completeness of the reports that included the presence of an author with a Master's or PhD degree was higher ($p = 0.03$). The adjusted effect of the study variables on completeness is shown in Table 3.

Discussion

The main findings of this study are, first, that completeness of observational studies published in RCA is 57%, and the Title and Introduction are the sections with the greatest completeness, while Methodology and Results are the ones with the greatest deficiencies. Second, during

Table 2 – Completeness rated by each reviewer by article sections and degree of agreement between reviewer pairs by group (*n* = 23).						
	Group 1 (*n* = 12)			Group 2 (*n* = 11)		
	Reviewer 1	Reviewer 2	Agreement*	Reviewer 1	Reviewer 2	Agreement*
Title	95.8	95.8	1.00	77.3	81.8	0.86
Introduction	87.5	95.8	0.64	86.4	90.9	0.77
Methods	64.5	52.0	0.53	54.7	46.4	0.56
Results	70.6	33.6	0.28	54	45.2	0.56
Discussion	73.3	56.6	0.53	42.3	59.6	0.45
Total	70.8	52.8	**0.49**	55.9	52.2	**0.59**

* Intraclass correlation coefficient.
  Source: Authors.

f(y) = 54+0.8 (year)   f(y) = 54+0.4 (year)
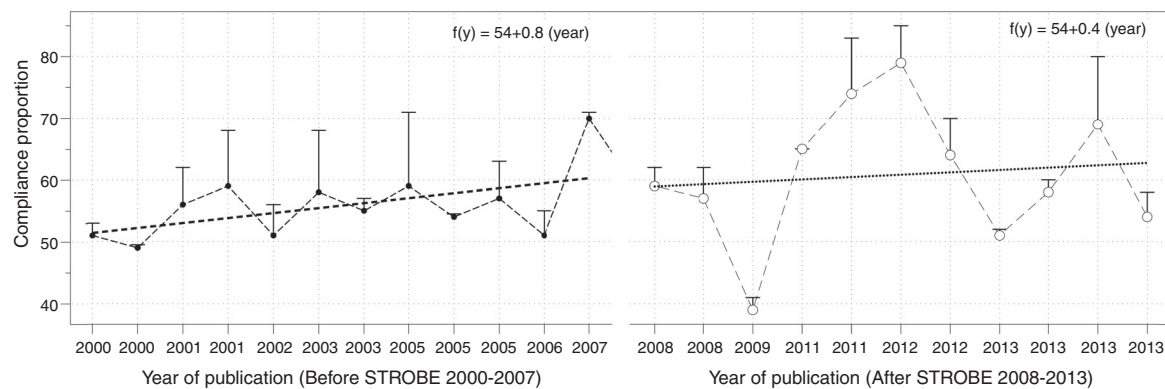
Fig. 3 – Overall annual completeness trend of the observational studies published in RCA between 2000 and 2013 (n = 23).
Note: The straight line equations in the upper part represent the proportion of increased completeness by year during the two periods. During the first period, the increase (B coefficient) was 0.8%, and during the second period, the increase was 0.4%.
Source: Authors.

Table 3 – Adjusted effect of the variables on report completeness for observational studies published in RCA between 2000 and 2013 (n = 23).

Variable	B coefficient	Standard error	p value
Year of publication	0.345	0.420	0.43
Number of authors	1.169	1.073	0.29
Number of faculty	−3.988	1.995	0.06
Sample size	0.003	0.009	0.73
Presence of author with Masters or PhD degree	10.310	4.452	0.03

Source: Authors.

the 13-year study period there is a very slow increase in completeness, and there is no evidence that the publication of the STROBE statement in 2007 had any effect on completeness for RCA.

The completeness of observational studies is similar to that reported by other authors. Several research studies have documented completeness ranges of 30–85%.[5,6,9,10,12,40] In 2011, Poorolajal et al., analysed observational studies in the *New England Journal of Medicine, Journal of the American Medical Association, Lancet, British Medical Journal, Archives of Internal Medicine, and the Canadian Medical Association Journal*, and found an overall compliance of 69% (95% CI 59–79%).[10] In 2013, Bastuji-Garin et al., published a similar study in which they analysed observational studies of four European dermatology journals. The mean rating using the *STROBE* tool was 57% (range 18–98%).[9] Percentages vary in specific areas of knowledge, from satisfactory quality of reporting, like in the study by Papathanasiou et al. in oncology which included publications between 2008 and 2009, where completeness reported ranged between 70 and 90%,[7] all the way to low proportions, such as those reported by Sorensen et al., where compliance in observational studies on hand surgery published between 2005 and 2011 was 38%, with a range between 10 and 54%.[6] This might be influenced by the range of time during which the studies were developed in relation to the time of publication of the

statement, and the awareness of scientists and authors regarding the importance of completeness when it comes to disseminating information. Despite having analysed 40% of the studies, the accuracy of our completeness estimation had a 95% CI of 48–66%, leaving an impression of the need for future improvement.

Authors like Fung and Langan et al., found that the items with the highest percentage of compliance were the Title, the Introduction and the Abstract. Of the publications analysed by Fung, 100% met the criteria established by *STROBE* for the Introduction, 86% and 93% for the Title and the Abstract, respectively. Compliance found by Langan et al. was 97% for the Introduction, 87% for the Title and 93% for the Abstract.[8,41] Consistent with the literature mentioned above, for RCA publications we found an 89% compliance with the *STROBE* guidelines for the Title and the Abstract.

The sections with the lowest completeness ratings were Methodology and Results, and this is consistent with results from similar studies. Galera et al., found that none of the articles reviewed were in compliance with the items recommended for Methods and Results.[12] In the work by Fung, reporting completeness for the section on Materials and Methods varied, with item ratings ranging between 7% and 97%.[8] Low completeness for these sections may be related

with their degree of complexity. For example, the methodology section requires detailed knowledge of epidemiology and biostatistics, which is not always widely available or accessible. It is worth noting that the section on Methods and Results had the lowest scores for domain agreement between reviewers (ICC of less than a 0.5). This fact reinforces the hypothesis that these are sections of a manuscript that require prior training and sound knowledge of research methodology both for writing as well as for analytical purposes.

During the 13 years selected for this assessment, there was evidence of a slight trend towards improved report completeness. This trend is quite slow (0.4 a 0.8% per year). In their study, Bastuji-Garin et al. show an increase during the study period (2004–2010) of close to 2% per year.[9] The results of this analysis must be taken cautiously because of the great variability found during the post-STROBE period in the overall rating for certain studies. Additional studies regarding RCA have found that, over time, the risk of bias of the reported studies has diminished.[42]

No evidence was found in this study in the sense that the publication of STROBE had any significant impact on the completeness of the observational research published in RCA. This fact has been replicated by other authors.[8] Despite the publication of the strategy in 2007 and of its wide dissemination in the scientific media, many publications and journals were late in adopting it. RCA adopted the guidelines of the EQUATOR network, including STROBE, in 2013.[14] With the use of other statements like CONSORT there has been a consistent increase in the completeness of published reports.[43] Fortunately, the scientific community in general is increasingly attaching greater importance to research completeness as a strategy to improve reproducibility and increase its validity.[44–46]

The effect of some variables on the completeness of study reports was almost negligible. Only the presence of researchers with Masters and/or PhD degrees increased report completeness significantly (by approximately 10%). Although this is not a statistically significant increase and requires a critical analysis, it is plausible. Moreover, the size of the study sample may have lowered the power of the study for detecting actual differences (type II error).

As far as we know, this is the first study to analyse the completeness of observational research reports in anaesthesiology and other areas in Colombia. Noteworthy among the strengths of the study are the thorough search of observational studies in RCA, the analysis of completeness performed by 4 independent reviewers, and the participation of an arbitrator to solve discrepancies. This resulted in a lower possibility of selection and information bias. The main limitation was failure to study the entire population of observational studies, which undermined the confidence of our overall completeness estimate. However, our objective was to document its existence in order to promote improvement. Below are the main recommendations of this study.

REFERENCES

1. Sanderson S, Tatt ID, Higgins JP. Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography. Int J Epidemiol. 2007;36:666–76.
2. Hernandez M, Garrido F, López S. Epidemiologic study design. Salud Publica Mex. 2000;42:144–54.
3. Manterola C, Otzen T. Estudios observacionales. Los diseños utilizados con mayor frecuencia en investigación clínica. Int J Morphol. 2014;32:634–45.
4. Von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology [STROBE] statement: guidelines for reporting observational studies. Gac Sanit. 2008;22:144–50.
5. Da Costa BR, Cevallos M, Altman DG, Rutjes AW, Egger M. Uses and misuses of the STROBE statement: bibliographic study. BMJ Open. 2011;1:e000048.
6. Sorensen AA, Wojahn RD, Manske MC, Calfee RP. Using the strengthening the reporting of observational studies in epidemiology (STROBE) statement to assess reporting of observational trials in hand surgery. J Hand Surg Am. 2013;38, 1584–9 e2.
7. Papathanasiou AA, Zintzaras E. Assessing the quality of reporting of observational studies in cancer. Ann Epidemiol. 2009;20:67–73.
8. Fung AE, Palanki R, Bakri SJ, Depperschmidt E, Gibson A. Applying the CONSORT and STROBE statements to evaluate the reporting quality of neovascular age-related macular degeneration studies. Ophthalmology. 2009;116:286–96.
9. Bastuji-Garin S, Sbidian E, Gaudy-Marqueste C, Ferrat E, Roujeau JC, Richard MA, et al. Impact of STROBE statement publication on quality of observational study reporting: interrupted time series versus before–after analysis. PLOS ONE. 2013;8:e64733.
10. Poorolajal J, Cheraghi Z, Irani AD, Rezaeian S. Quality of cohort studies reporting post the strengthening the reporting of observational studies in epidemiology (STROBE) statement. Epidemiol Health. 2011;33:e2011005.

11. Knobloch K, Yoon U, Rennekampff HO, Vogt PM. Quality of reporting according to the CONSORT, STROBE and Timmer instrument at the American Burn Association (ABA) annual meetings 2000 and 2008. BMC Med Res Methodol. 2011;11:1611.

12. Galera Llorca J, Lahoz Grillo R, Roig Loscertales F. The reporting of observational studies: analysis using the STROBE statement. Rev Esp Salud Publica. 2011;85:583–91.

13. Ardila E. El Cochrane Colombiano. Rev Colomb Anestesiol. 2000;28:193–6.

14. Eslava-Schmalbach J, Gómez-Duarte O. The Colombian Journal of Anesthesiology (RCA) welcomes the Declaration of Transparency and Guidelines for the publication or articles, including CARE, for case reports. Rev Colomb Anestesiol. 2014;42:4–8.

15. R Development Core Team. R: a language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2008. ISBN 3-900051-07-0, Available in: http://www.R-project.org. Date of consultation 09.12.15.

16. Eccles M, Grimshaw J, Campbell M, Ramsay C. Research designs for studies evaluating the effectiveness of change and improvement strategies. Qual Saf Health Care. 2003;12: 47–52.

17. Ramsay CR, Matowe L, Grilli R, Grimshaw JM, Thomas RE. Interrupted time series designs in health technology assessment: lessons from two systematic reviews of behavior change strategies. Int J Technol Assess Health Care. 2003;19:613–23.

18. Del Rio Gómez JA, Buriticá AO, Angulo D. Riesgo anestésico y tipo de herida asociados a infección intrahospitalaria en pacientes quirúrgicos. Modelo logístico. Rev Colomb Anestesiol. 2002;30:17–21.

19. Delgado MB, Muvdi Khalilieh J, Mora Russi J. Predicción del CO2 arterial a partir del CO2 espirado en pacientes con probable alteración de la relación ventilación perfusión. Rev Colomb Anestesiol. 2001;29:143–7.

20. Salazar L, Montes FR, Charris H, Serrano OL, Sepúlveda Y, Carrizo R, et al. Comparación de las estrategias tradicionales y la teoría de Stewart en la interpretación de las alteraciones ácido-básicas en pacientes pediátricos con disfunción multiorgánica en el postoperatorio de cirugía cardiaca. Rev Colomb Anestesiol. 2003;31:119–24.

21. Cabas L, Ramón Montes F, Kling JC, Domingo J, Rincón I, Giraldo JC, et al. Disfunción renal en postoperatorio de cirugía cardíaca pediátrica con circulación extracorpórea. Rev Colomb Anestesiol. 2005;33:85–91.

22. Delgado MB, Moreno LS, González LE. Conocimientos, actitudes y barreras hacia la investigación, las revisiones sistemáticas de la literatura y la colaboración Cochrane. Estudio de corte transversal. Rev Colomb Anestesiol. 2006;34:227–31.

23. Morales C. Factores de predicción del uso de soporte inotrópico en cirugía cardiaca. Hospital Rafael Ángel Calderón Guardia, San José, Costa Rica, septiembre de 2005 a enero de 2007. Rev Colomb Anestesiol. 2008;36: 77–84.

24. Jiménez JC, Chica J, Vargas D. Anestesia espinal para colecistectomía laparoscópica. Rev Colomb Anestesiol. 2009;37:111–8.

25. Riveros E. Validación de la utilidad clínica del catéter articulado orotraqueal en salas de cirugía y cuidado intensivo. Rev Colomb Anestesiol. 2011;39:330–9.

26. Arcila MA, Rivera R, Campuzano D, Mejía MA, Martínez SM. Eficacia y seguridad del bloqueo de nervio supraescapular guiado por ultrasonido en pacientes con dolor crónico de hombro. Rev Colomb Anestesiol. 2013;41:104–8.

27. Gómez LM, Ocampo F, Orozco JA, Caicedo J. Eficacia de la premedicación anestésica en el paciente pediátrico con midazolam oral y acetaminofén. Estudio observacional. Rev Colomb Anestesiol. 2013;41:4–9.

28. Islam MS, Ahmedh SM, Bano S, Nadeem A, Shafi M. Correlación y concordancia entre los valores de pH, PO2, PCO2 y HCO3 – en sangre arterial y venosa de pacientes con ventilación mecánica en la unidad de cuidados intensivos: a prospective observational study. Rev Colomb Anestesiol. 2013;41:190–5.

29. Collazos C, Bermudez L, Quintero A, Quintero LE, Díaz MM. Verificación de la lista de chequeo para seguridad en cirugía desde la perspectiva del paciente. Rev Colomb Anestesiol. 2013;41:109–13.

30. Castillo CG, Candia CA, Marroquín HA, Aguilar F, Benavides JJ, Alvarez JA. Manejo de la temperatura en el perioperatorio y frecuencia de hipotermia inadvertida en un hospital general. Rev Colomb Anestesiol. 2013;41:97–103.

31. Amaya AC, Bruce A, Herrán D, Martín A, Munoz K, Abella P. Variables asociadas a riesgo de suicidio en pacientes con dolor crónico atendidos por consulta externa en un hospital de Bogotá. Rev Colomb Anestesiol. 2013;41:267–73.

32. Lema E, Tafur LA, Giraldo AL. Aproximación al conocimiento de los hábitos que tienen los anestesiólogos en el uso de relajantes neuromusculares no despolarizantes y sus reversores, Valle del Cauca, Colombia. Rev Colomb Anestesiol. 2012;40:113–8.

33. Calero D, Rendón F, Cañas Ó. Mortalidad prematura en salas de recuperación del Hospital Universitario del Valle, ESE, "Evaristo García". Rev Colomb Anestesiol. 2008;36:259–63.

34. Gómez H, Reyes D, Sánchez P. Precisión diagnóstica de diferentes técnicas para hallar la vena yugular interna en niños de 6 meses a 16 años. Rev Colomb Anestesiol. 2007;35:37–43.

35. Degiovanni BJC, Chaves VA, Moyano AJ, Raffán SF. Incidencia de complicaciones en anestesia regional, análisis en un hospital universitario: Estudio de Corte Transversal. Rev Colomb Anestesiol. 2006;34:155–62.

36. Oliveros H, Martínez F, Lobelo R, Santrich D. Factores de riesgo determinantes de mortalidad postoperatoria en UCI, en los pacientes quirúrgicos de alto riesgo. Rev Colomb Anestesiol. 2005;33:17–23.

37. García MJ, Meléndez HJ. Náusea y dolor en cesárea. Incidencia de náusea y dolor transoperatorio bajo diferentes técnicas de anestesia regional en cesárea. Rev Colomb Anestesiol. 2003;31:9–19.

38. Echeverri CM, Posada OE, Sierra CL, Cardona F. Uso de máscara laríngea en el trasplante renal. Rev Colomb Anestesiol. 2001;29:281–3.

39. Delgado MB. Predicción clínica de intubación orotraqueal, diseño difícil de una escala y evaluación de su reproducibilidad. Rev Colomb Anestesiol. 2000;28:69–75.

40. Bravo M, Barona L, Campo J, Calvache JA. El reporte de la investigación observacional y la declaración STROBE. Rev Fac Cienc Salud Univ Cauca. 2014;16:39–45.

41. Langan S, Schmitt J, Coenraads PJ, Svensson A, von Elm E, Williams H. The reporting of observational research studies in dermatology journals: a literature-based study. Arch Dermatol. 2010;146:534–41.

42. Calvache JA, Barajas-Nava L, Sánchez C, Giraldo A, Alarcón JD, Delgado-Noguera M. Evaluación del "riesgo de sesgo" de los ensayos clínicos publicados en la Revista Colombiana de Anestesiología. Rev Colomb Anestesiol. 2012;40:183–91.

43. Turner L, Shamseer L, Altman DG, Schulz K, Moher D. Does use of the CONSORT statement impact the completeness of reporting of randomised controlled trials published in medical journals? A Cochrane review. Syst Rev. 2012;1:60.

44. Ioannidis JPA. Why most published research findings are false. PLoS Med. 2005;2:e124.
45. EQUATOR Network. It's a kind of magic: how to improve adherence to reporting guidelines; 2016 [Cited 20 Apr 2016]. Available in: http://www.equator-network.org/2016/02/17/its-a-kind-of-magic-how-to-improve-adherence-to-reporting-guidelines/
46. Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. Lancet. 2009;374:86–9.

SCIENTIFIC AND TECHNOLOGICAL RESEARCH