



ORIGINAL ARTICLE

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Reporting quality of papers published in Chilean dental journals. Evaluation period: 2002-2012.

Abstract: Aim: To assess the reporting quality of papers published between 2002-2012 in Chilean dental journals. Methods: Bibliometric analysis of research papers published in indexed Chilean dental journals between 2002-2012. Three calibrated examiners (interoperator- $\kappa=0.83$) assessed 205 papers: 150 case-reports, 37 observational studies and 18 clinical trials. Reporting quality was evaluated using CARE for case reports, STROBE for observational studies and CONSORT for clinical trials. Descriptive statistics were conducted. Results: Case-reports reported 35% of the required methodological items; epidemiological research reported 16% of required items for Materials and Methods and 10% for Results. Clinical research reported 29% of required Materials and Methods items and 20% of Results items. Conclusion: Case-report, epidemiological and clinician research papers in Chilean dental journals published during the 2002-2012 period are lacking explicit key methodological items, preventing a proper research replication or clinical application of the results.

Keywords: *Bibliometrics, Quality of Reporting, Journal Article.*

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INTRODUCTION.

The practice of evidence-based dentistry involves the integration of patient's preferences and expectations, ability and clinical judgment of the dentist and the use of the best evidence available¹. Best evidence is the evidence produced with an appropriate methodological design that allows to achieve the objective of the research. However, conducting a research is not enough, it must be reported in such a way that other researchers and clinicians may evaluate it in detail and replicate it to verify the reported results.

Recent studies have detected the lack of reporting quality of important methodological aspects in many publications in areas such as orthodontics² or implantology³. This lack of reporting quality of key methodological elements may be found even in high-impact journals. Pandis

*et al.*⁴ found that the 6 major clinical dental journals had significant differences in the quality of their papers. This lack of reporting quality of methodological elements prevents that other researchers evaluate the internal validity of the studies and affects the reproducibility of results.

What are the elements that must be included in a research report? This question has begun to be answered with various systematic reviews that assess the content and quality of available papers. Most reviews have detected the omission of relevant methodological aspects in publications. For this reason, there have been agreements about what are the minimum elements that a scientific publication in the clinical and epidemiological fields should contain. The current agreements are collected in an international, multidisciplinary initiative called Equator-Network, which gathers and organizes the

recommendations for the elements and aspects that must be reported in several types of studies^{5,6}, clinical trials⁷, observational studies⁸ and case reports⁹, among others.

As there are numerous studies available in dental journals, we ask what is the reporting quality of papers published in indexed Chilean dental journals over the period 2002-2012. Therefore, the objective of this study is to evaluate by international guidelines the reporting quality of scientific papers published in Chilean dental journals during 2002-2012. This information would allow to estimate the reproducibility and relative applicability of the papers published in that period.

MATERIALS AND METHODS.

A bibliometric study of publications available in Chilean dental journals over the period 2002-2012 was performed. This research uses the database of a previous study¹⁰, which establishes the criteria for the selection of journals and papers.

Study sample.

The analyzed journals belong to dental journals published over the period 2002-2012. They were Revista Dental de Chile, Revista Chilena de Ortodoncia, Revista de la Facultad de Odontología de la Universidad de Valparaíso, Revista de la Sociedad Chilena de Odontopediatría, Revista Canal Abierto, Revista Clínica Periodoncia Implantología y Rehabilitación Oral y Oseointegración and International Journal of Odontoestomatology.

The unit of study was the scientific paper. Only case reports, epidemiological observational studies and clinical trials reported in IMRD format (Introduction, Methods, Results and Discussion) were included. All papers available were used. Papers having a different methodological design to the one declared were excluded; for example, a report that was presented as a clinical research but that was actually an *in-vitro* study was excluded.

Quality assessment

The quality of reporting was evaluated according to guidelines recommended by the editors of biomedical

journals available in Equator-Network⁵. We define the methodological quality of the report as the characteristic of including sufficient information as to replicate the methodology used by the researchers. Operationally, we expect a report to include as many required items declared in the materials and methods section as possible. Thus, a higher quality report must include most of the items, particularly those described in the Materials and Methods section.

The guidelines used were Case Report Guidelines (CARE) for case reports⁹ Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for observational studies⁸ and Consolidated Standards of Reporting Trials (CONSORT) for clinical trials⁷. A researcher with 10 years of experience in the methodological evaluation of papers conducted the calibration for the implementation of the guidelines designed to assess the methodological quality of a report. Calibration was performed until an intra-examiner agreement of linear weighted Kappa of 0.83 was obtained.

Data extraction

Each paper was printed and evaluated by each of the two reviewers (NH, PQ). They extracted from each paper the title, declared design and manually filled the guideline for each methodological design. Discrepancies in the evaluation were resolved by consultation with a third reviewer (SU). The agreement of the final evaluation for each paper was registered.

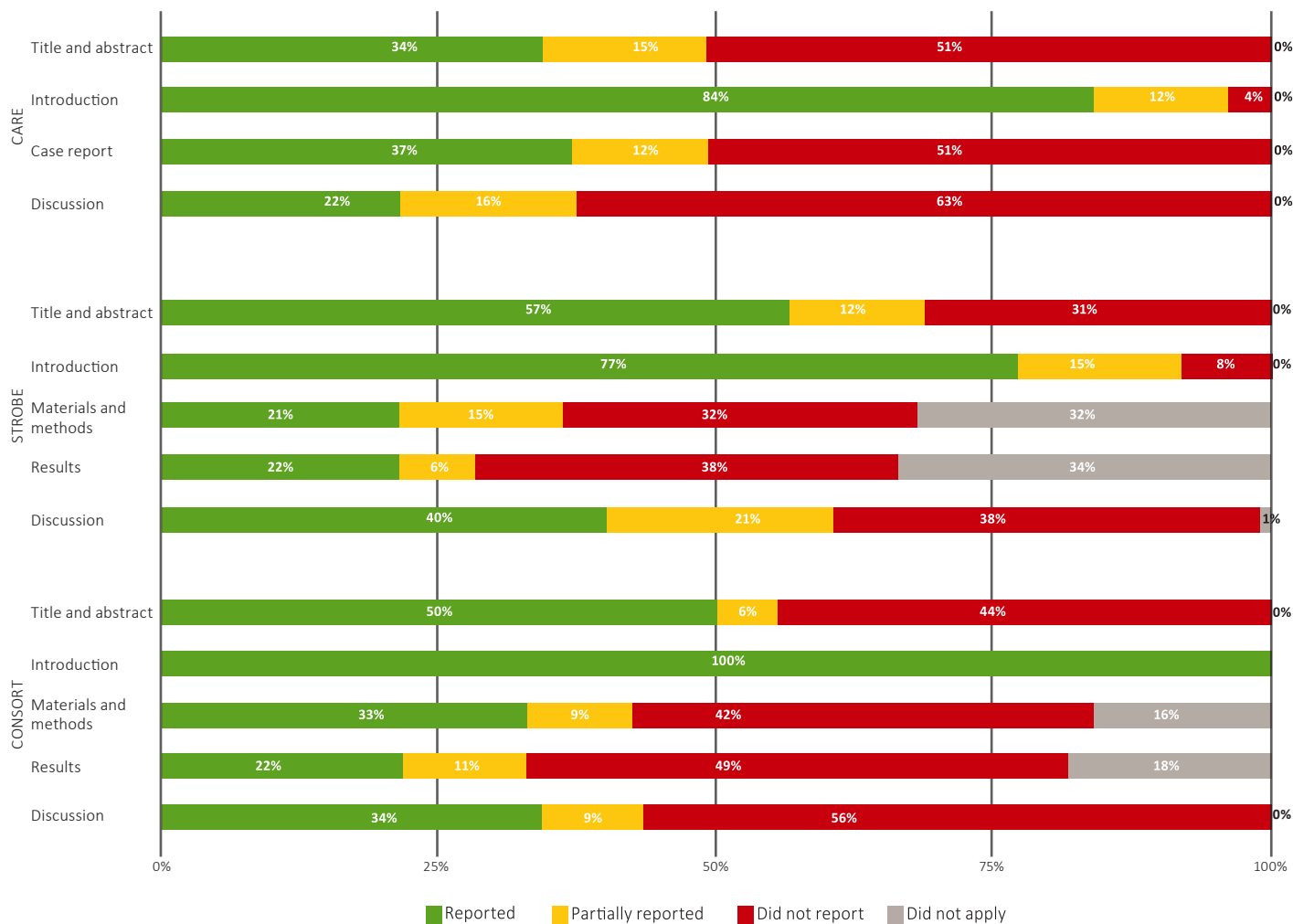
Statistical analysis

Data were tabulated and analyzed using descriptive statistics. The results for each study were described and compliance percentages were obtained for each item in each of the guidelines to identify areas where the report meets the required aspects.

RESULTS.

Of the 827 items available, we found and analyzed 150 case reports by CARE guidelines, 37 observational studies by STROBE and 18 clinical trials by CONSORT guidelines.

Figure 1. Percentage of compliance of reporting quality by IMRD section and study design.



The percentage of compliance of reports by section and type of paper are shown in Figure 1. It shows that sections with greater compliance were Introduction for all designs, while sections with lower compliance were Discussion and Material and Methods for case reports; and Results for observational studies and clinical trials.

Case reports

The analysis of case reports showed that the item with the highest percentage of compliance was presenting the facts of the case (84%). Moreover, the majority of case reports did not report about the perspective of the patient (1%) or if there were problems for diagnosis (3%).

Also, only 4% of case reports reported if the patient

had given consent to publish his/her clinical information. Details are shown in Table 1.

Observational studies

The reporting in observational studies shows the highest level of achievement in the Abstract, which describes adequately the essential aspects of the study (95%). However, it fails at reporting the criteria used to select the cohort, the study diagram, and the way how researchers dealt with missing or incomplete data, and how they dealt with losses in follow-up cohort studies, as seen in Table 2.

Clinical trials

Clinical trials showed a good reporting of scientific background and rationale of the tests. On the other hand,

they do not explicit whether or not there were changes in the study protocol, who was in charge of the sequence of randomization of patients, which were the periods of recruitment and follow-up, if the study was stopped prematurely or not, or if there was a record of the clinical trial protocol. Details are shown in Table 3.

Table 1. Percentage of compliance with reporting quality of 150 case reports.
In bold print items with less than 50% of compliance.

Section of the paper	Item	Reported	Partially reported	Did not report
Title	1 The words "case report" should be in the title along with the area of focus]	57	11	33
and abstract	2 2-5 keywords that identify areas covered in this [case report]	77	1	23
	3a Introduction— ¿What is unique about this case? ¿What does it add to the medical literature?	16	41	43
	3b The main symptoms of the patient and the important clinical findings]	22	11	67
	3c The main diagnoses, therapeutic interventions and outcomes]	21	21	57
	3d Conclusion— What are the main "take-away" lessons from this case?]	13	4	83
Introduction Content of the report	4 One or two paragraphs summarizing why this case is unique with references]	84	12	4
	5a Demographic information (such as age, sex, ethnicity, profession)]	49	46	5
	5b Main concerns and symptoms of the patient]	51	11	38
	5c Medical, family and psychosocial history including diet, lifestyle and relevant genetic information]	22	27	51
	5d Relevant comorbidities, including past interventions and outcomes]	33	20	47
	6 Describe the relevant physical examination findings (PE)]	75	16	9
	7 Describe important information about past diagnoses and interventions (Table and Figure)]	82	7	11
	8a Diagnostic methods (such as PE, laboratory testing, imaging, surveys)]	73	10	17
	8b Diagnostic challenges (access, financial, or cultural)]	3	0	97
	8c Diagnostic reasoning, including other diagnoses considered]	12	17	71
	8d Prognostic characteristics (such as staging in oncology) where applicable]	9	3	88
	9a Types of intervention (such as pharmacologic, surgical, preventive, self-care)]	82	8	10
	9b Administration of the intervention (as dosage, strength, duration)]	61	5	35
	9c Changes in the intervention (with rationale)]	10	1	89
	10a Clinician and patient-assessed outcomes]	10	25	65
10b Important follow-up diagnostic and other test results]	35	8	57	
10c Intervention adherence and tolerability (How was it assessed?)]	10	3	87	
10d Adverse and unanticipated events]	12	2	86	
Discussion	11a Strengths and limitations in the approach to the case]	15	33	51
	11b Discussion of the relevant medical literature]	54	12	34
	11c The rationale for conclusions (including assessment of possible causes)]	29	25	46
	11d The primary "take-away" lessons of this case report]	25	24	51
	12 Did the patient communicate his/her perspective or experience]	1	1	98
13 Did the patient give his/her informed consent?]	4	0	96	

Table 2. Percentage of compliance with reporting quality of 37 observational studies.
In bold print items with less than 50% of compliance.

Section of the paper	Item	Reported	Partially reported	Did not report	Did not apply
Title and abstract	1. (a) Indicate the study's design with a commonly used term in the title or the abstract]	19	19	62	0

	(b) Provide in the abstract an informative and balanced summary of what was done and what was found]	95	5	0	0
Introduction	2. Explain the scientific background and rationale for the investigation being reported]	76	19	5	0
	3. State specific objectives, including any prespecified hypothesis]	11	11	0	
Materials and methods	4. Present key elements of the study design early in the paper]	78	19	3	0
	5. Describes the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up and data collection]	32	59	8	0
	6. (a) Cohort studies: Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up]	3	5	0	92
	Case-control studies: Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls]	3	5	5	86
	Cross-sectional studies: Give the eligibility criteria, the sources and methods of selection of participants]	38	32	11	19
	(b) Cohort studies: For matched studies, give matching criteria and number of exposed and unexposed]	0	0	3	97
	Case-control studies: For matched studies, give matching criteria and number of exposed and unexposed per case]	3	3	8	86
	7. Clearly defines all outcomes: response, exposures, predictors, potential confounders and effect modifiers. Give diagnostic criteria, if applicable]	30	49	22	0
	8. For each variable of interest, give sources of data and details of the methods of assessment (measurement). Describe the comparability of assessment methods, if there is more than one group]	51	22	27	0
	9. Describe any efforts to address potential sources of bias]	14	3	84	0
10. Explain how the study size was arrived at]	43	11	46	0	
11. Explains how quantitative variables were handled in the analysis. If applicable, describe which groupings were chosen and why]	27	27	46	0	
12. (a) Describe all statistical methods, including those used to control for confounding]	54	24	22	0	
(b) Describe any methods used to examine subgroups and interactions]	14	14	51	22	
(c) Explains how missing data were addressed]	0	0	97	3	
(d) Cohort study: If applicable, explain how loss to follow-up was addressed]	0	3	5	92	
(e) Describe any sensitivity analyses]	3	3	95	0	
Case-control studies: If applicable, describe how matching of cases and controls was addressed]	5	0	5	89	
Cross-sectional studies: If applicable, describe analytical methods taking account of sampling strategy]	8	0	68	24	
Results	13. (a) Report number of individuals at each stage of study; e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed]	41	35	24	0
	(b) Give reasons for non-participation at each stage]	14	0	73	14
	(c) Consider use of a flow diagram]	0	0	76	24
	14. (a) Give characteristics of the study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders]	19	27	54	0
	(b) Indicate number of participants with missing data for each variable of interest]	11	3	76	11

	(c) Cohort studies: Summarizes the follow-up time (e.g., average and total amount)]	0	0	5	95
	15. Cohort studies: Report numbers of outcome events or summary measures over time]	0	3	3	95
	Case-control studies: Report numbers in each exposure category, or summary measures of exposure]	8	0	5	86
	Cross-sectional studies: Report numbers of outcome events or summary measures]	78	3	0	19
	16. (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included]	35	5	59	0
	(b) Report category boundaries when continuous variables were categorized]	27	0	38	35
	(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period]	22	3	32	43
	17. Report other analyses done (e.g. of subgroups and interactions, and sensitivity analysis)]	27	5	51	16
Discussion	18. Summarize key results with reference to study objectives]	76	22	3	0
	19. Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias]	22	27	51	0
	20. Give cautious overall interpretation of results considering objectives, limitations, multiplicity of analyzes, results from similar studies and other relevant evidence]	46	41	14	0
	21. Discuss the generalizability (external validity) of the study results]	49	11	41	0
	Other type of information [22. Give the source of funding and the role of the funders for the present study and, if applicable, the original study on which the present paper is based].	8	3	84	5

Table 3. Percentage of compliance with reporting quality of 18 clinical trials.
In bold print items with less than 50% of compliance.

Section of the paper	Item	Reported reported	Partially report	Did not apply	Did not
Title and abstract	Identification as a randomised trial in the title	33	6	61	0
	Structured summary of trial design, methods, results, and conclusions	67	6	28	0
Introduction	Scientific background and explanation of rationale	100	0	0	0
	Specific objectives or hypotheses	100	0	0	0
Materials and methods	Description of trial design (such as parallel, factorial) including allocation ratio	67	28	60	
	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	6	0	50	44
	Eligibility criteria for participants	78	17	6	0
	Settings and locations where the data were collected	78	0	22	0
	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	50	28	22	0
	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	39	28	33	0
	Any changes to trial outcomes after the trial commenced, with reasons	0	0	50	50
	How sample size was determined	22	11	67	0

	When applicable, explanation of any interim analyses and stopping guidelines	6	0	28	67
	Method used to generate the random allocation sequence	39	0	56	6
	Type of randomisation; details of any restriction (such as blocking and block size)	33	11	50	6
	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	22	6	67	6
	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	0	6	89	6
	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	6	6	83	6
	If relevant, description of the similarity of interventions	17	11	28	44
	Statistical methods used to compare groups for primary and secondary outcomes	72	6	22	0
Results	Methods for additional analyses, such as subgroup analyses and adjusted analyses	28	6	28	39
	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	61	11	28	0
	For each group, losses and exclusions after randomisation, together with reasons	11	6	39	44
	Dates defining the periods of recruitment and follow-up	0	0	100	0
	Why the trial ended or was stopped	0	11	28	61
	A table showing baseline demographic and clinical characteristics for each group	6	6	83	6
	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	28	22	50	0
	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	50	28	22	0
	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	17	11	33	39
	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	28	17	28	28
Discussion	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	17	0	78	6
	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	44	11	44	0
	Generalisability (external validity, applicability) of the trial findings	22	22	56	0
	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	78	17	6	0
	Registration number and name of trial registry	0	0	100	0
	Where the full trial protocol can be accessed, if available	39	0	61	0
	Sources of funding and other support (such as supply of drugs), role of funders	22	6	72	0

DISCUSSION.

Significant deficiencies in the quality of reporting of the papers analyzed in Chilean dental journals over the period 2002-2012 were found when they were assessed according to international guidelines. In should be no-

ted that low reporting quality does not necessarily imply a flawed research, as the name implies, it refers only to the verification of the presence of explicit methodological elements in the scientific publication. The lack of key aspects in the papers analyzed allows us to affirm that

only a very small number of Chilean studies published in dental journals over the period 2002-2012 could be considered or included in systematic reviews. Moreover, the absence of these key elements makes replicability of studies difficult and affects negatively its applicability in clinical practice.

We acknowledge that the guidelines used to evaluate the papers were issued after the publication of most of the papers discussed here. While this could be a limitation, these guidelines focus on the essential aspects of the report, those that allow an evaluation of the validation and applicability of the designs used to obtain the results of a particular research. Hence, they provide an objective guide to analyze the reporting quality. Besides, they have been used in other fields of medicine, such as oncology¹¹, psychiatry¹² or oncological surgery for head and neck cancer¹³. Researchers in these fields have confirmed that there are deficiencies in the quality of papers in different areas of medicine.

Case reports, which are studies based on anecdotal evidence, are the most common type of papers in the sample. The best reported sections (items 4, 7 and 9A of Table 1) show a good summary of the facts of the case and the main clinical findings of a clinical report, as well as a description of relevant events in the history of the case and details of the intervention. On the other hand, we found a potential problem because only 2% of case reports reported full or in part if the patient had given consent for the publication of his/her medical record. The present research includes studies until 2012. That year law number 20584, which regulates the rights and duties of patients, was passed in Chile. This law states that patients must give researchers explicit consent for the use of their clinical data for any type of scientific research¹⁴. This is an important aspect to consider for papers published from 2012 in order to avoid any potential legal conflict. Furthermore, only 4% of case reports included some information about the perspective or experience of the patient. These two aspects must be urgently improved to prevent legal, ethical and scientific misconduct.

Because CARE guidelines are available only since 2013⁹, this is the first report of their use in dental publications. The guidelines used in this study were CARE (2014)⁹.

Observational studies are another category of research design. They allow to evaluate epidemiological characteristics of populations. The three most common designs are prevalence studies, cohort studies, and case-control; these accounted for 18% of the analyzed papers. The aspect that from a methodological point of view negatively affects the quality of these reports is the fact that none of the studies indicated how researchers dealt with the missing data. The importance of explaining the handling of missing data is particularly relevant as such studies frequently use clinical records or forms, which may be incomplete, and it is not clear how researchers handle these situations.

We analyzed 18 clinical trials. From the clinical standpoint, these studies show the importance of evidence on the experimental effectiveness of interventions or treatments. As with the previously discussed designs, they are lacking important elements. Most (73%) do not report the sample size or do it only partially. This aspect is critical to evaluate the results, so that while the majority (72%) of the studies report the statistical methods used, the statistical power of the studies is unclear. Moreover, none of the evaluated clinical trials reported dates of recruitment and follow-up of patients, and the registration of clinical intervention protocol. Currently, most indexed journals require clinical trials to have a prior registration of their protocol. This registration is usually done in the database of the US National Institute of Medicine at <https://clinicaltrials.gov/> or in the International Clinical Trials Registry Platform (ICTRP) of the World Health Organization at <http://www.who.int/ictpr/es/>. Respect to the quality of reporting of clinical trials our results are similar to those found in pediatric dentistry¹⁵ implantology¹⁶, community dental health¹⁷, and even in high-impact journals¹⁸. However, Froud *et al.* found that the report of experimental designs with a greater degree of complexity, such as clinical trials grouped by cluster, showed a good reporting quality¹⁹,

with some deficiencies in specific aspects, such as the calculation of sample size.

Our results show that little evidence published in Chilean dental journals over the period studied would have direct clinical applicability or could be used to generate lines of research due to the lack or omission of essential methodological aspects.

Following the guidelines by the editors does not improve by itself the quality of papers²⁰, it requires active implementation. In this regard, Pandis *et al.* report the results of active interaction between the publisher or editor and researchers as a strategy to improve the quality of clinical trials submitted to *the American Journal of Orthodontics* and *Dentofacial Orthopedics*.

They found a significant improvement in quality, with a few items that remained with little report in some specific aspects such as indicating the premature end of the trial, if there were interim analyzes or changes to the protocol²¹.

We also agree with the suggestion of Stevens *et al.* that publishers or editors should have a more active role in order to provide better quality evidence for medical professionals²². Today in Chile, *the Journal of Oral Research* is the only journal that explicitly requires researchers to report their studies according to established guidelines. Our results strongly suggest that only a small number of papers published in Chilean journals would provide what is considered as good quality evidence.

We believe that a long-term solution can be achieved by strengthening the curriculum research in dentistry schools. In this regard, although the majority (60%) of Chilean schools of dentistry require a research thesis, most

of the curricula show that there is lack of organization in students' training, with a poorly organized curriculum. For example, in the case of dental students, statistics is taught at their first years in college and research at the last. There is also a real lack of integration between clinical and research courses²³.

CONCLUSION.

Case reports, observational and clinical studies published in Chilean dental journals over the period 2002-2012 show a lack of basic design elements and results.

This hampers both the replicability of research and its clinical applicability. Authors, reviewers and editors should make efforts to ensure that future papers published in Chilean journals include the necessary methodological elements to assess their internal and external validity. A useful guide with recommendations is available on the Equator-Network website^{5,6}.

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SU proposed the research, performed the calibration and analysis and wrote the manuscript. DU and WS manually searched and sorted the papers, and reviewed the final draft.

NFH and QPA performed tabulation, data entry, data validation and reviewed the final draft. All authors approved the final version.

Calidad del reporte de los artículos de las revistas odontológicas chilenas. Evaluación del periodo 2002-2012

Resumen: Objetivo: Evaluar la calidad del reporte de estudios descriptivos, clínicos y reportes de casos publicados en revistas del área odontológicas chilenas en el periodo 2002-2012. Método: Análisis bibliométrico de las publicaciones en revistas dentales chilenas indizadas del 2002 al 2012. Tres

evaluadores calibrados (Kappa intraoperadores=.83) evaluaron 205 artículos: 150 reportes de casos, 37 estudios observacionales y 18 ensayos clínicos. La calidad del reporte se evaluó utilizando las pautas CARE para reportes de caso, STROBE para estudios observacionales y CONSORT para ensayos clínicos. Resultados: Los porcentajes de cumplimiento para los aspectos metodológicos por diseño fueron de 35% para los elementos requeridos en el reporte de caso,

del 16% y 29% para los materiales y métodos de los estudios observacionales y clínicos; y 10% y 20% para los resultados de los estudios observacionales y clínicos. Conclusión: Los artículos del tipo reportes de caso, estudios observacionales y clínicos publicados en revistas del área odontológica chilenas

en el período 2002-2012 carecen del informe de elementos básicos del diseño y resultados, lo que dificulta su replicabilidad así como su aplicación clínica.

Palabras clave: *Bibliometría, Calidad del Reporte, Artículo.*

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