

Quality of research articles published in Iranian Dental Journals

Sheibaninia A¹, Valaiee N², Bitavakoli³, Azizi F⁴,
Mohamadsadeghi Sh⁵, Nourbakhsh M⁶

ABSTRACT

Objective: To evaluate the quality pertaining to the various structural components and aspects of research articles published in Iranian journals of dentistry in the first six months of the year 2006.

Methodology: This descriptive study assessed the quality of 100 original articles published in Iranian Journals of dentistry in terms of their various structural components including abstracts, introductions, methodology, results, discussions and references. Based on 52 variables the articles were classified into three categories of "adequate", "relatively adequate" and "inadequate". Data analysis was done using Chi-square statistical test.

Results: The mean number of authors for each article was 2.9+0.84. Failure rate to report the "reliability" of the instrument of measurement was 96%, followed by failure to justify the sample size (93%). Justification for publication was not reported in 73% of the articles and 87% didn't cite the limitations and valuable findings of the study. No statistically significant association was found between the quality of published articles and study designs, number of authors and references (P<0.3).

Conclusion: Significant quality related issues of concern were observed in articles published in Iranian dental journals. Attention to and rectification of these, by authors, reviewers and editors will improve the quality of future publications.

KEY WORDS: Research methodology, Dentistry journals, Quality of research publications.

Note: The findings of this study were earlier published in Persian in intra Campus Journal.

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INTRODUCTION

In the past several decades, there has been an unexpected increase in the number of medical journals and articles.¹ Little research has been done to assess the quality of published articles in terms of

their adequacy or otherwise with reference to their structural components and aspects of writing style. Reports have indicated the disturbing fact related to inadequate citation of references in some 76% articles published in Iran² as compared to the figure of 75% for those published in Pakistani ISI medical journals.³ Critical evaluation of published articles seems to be a research priority due to lack of sufficient information available regarding the overall accuracy of published articles.⁴ Reports regarding the accuracy of articles in terms of research methodology are widely different.^{2,5} One research reported incorrect statistical methods in 80% of articles.⁶ Another research showed that failure to use non-parametric data analysis program was zero percent in 1985, whereas in 2003, it increased to 33% and an incorrect statistical

Correspondence:

Dr. Bitavakoli,
Islamic Azad University,
Dentistry Branch,
Tehran, Iran.
E-mail: bieceet2004@gmail.com

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analysis method was used in 27% of published materials.⁷

This study was designed to evaluate the quality of published articles in terms of research methodology in Iranian journals of dentistry over the first six months of 2006. It should be acknowledged that this study has been published earlier in a local Persian journal in original language.

METHODOLOGY

Original articles from accredited dental journals were selected for this cross-sectional study. The quality issues related to articles in terms of research methodology were evaluated and recorded along with the associated factors in a pre-structured data collection sheets. Each article was divided into six sections (Table-I) and each section was evaluated according to several variables within that particular section.

1. The "Abstract" section included 7 variables: Objective, statement of purpose, methods and materials, results, conclusion, accuracy of translation, and extent of the abstract.
2. In the "introduction" section, 5 variables were evaluated: Content, objective, justification of purpose, avoiding reviews, and extent of the introduction.
3. The "Methodology" section included 17 variables which are shown in Table-II.
4. The "Results" section included 10 variables which are shown in Fig.1.
5. In the "Discussion" section, 8 variables were evaluated: Stating findings, citing similar/different results with references, data analysis, stating limitations and strong points, conclusion, data application, and suggestions.
6. In the "Reference" section, five variables were evaluated: reference citations, total number of references, percentage of journal references, use of all references in the text, and the number of Persian references.

The overall accuracy of the articles in terms of methodology was investigated based on 52 variables from the criteria used for evaluating articles.⁸⁻¹² Three associated factors including number of references, number of authors, and the study design were also evaluated.

The information from data collection sheet was extracted, categorized and analyzed. Each section was categorized separately according to the following criteria:

1. "Inadequate", if more than 50% of the selected variables in a section were deficient.

2. "Relatively adequate", if 25-50% of the selected variables were deficient.
3. "Adequate", if less than 25% of the selected variables were deficient.

The collected data was analyzed using chi-square statistical test.

RESULTS

A total of 100 original research articles from five standard journals were evaluated. These publications included journals from The Iranian Islamic Association of Dentists and those published by the Shahid Beheshti, Tehran, Shiraz and Mashhad universities in Iran.

One hundred original articles were published by 290 authors with a mean number of authors as 2.9 ± 0.84 (SD) per article. One article had a single author and 33% of articles had two authors. A total of 45% of articles had three authors and 21% had 4-5 authors. The mean (\pm SD) number of references was 16.9 ± 7.7 (SD) with a range of 5-41 references. Some 5% of articles had 10-20 references. There was no citation of Persian references in 50% of articles. Deficiencies in research designs were 38% for Cohort studies and 44-48% for the rest. The deficiency level among different study designs was not statistically significant.

The accuracy rate for methodology in various parts of the articles is shown in Table-I. Most errors were found in the introduction section (66%) and the least was seen in the references section (8%).

In 92% of the articles, appropriate key words were present. Strong points of the "abstract" section included proper length of the abstract and correct translation from original Persian language (Farsi). The "introduction" section was too lengthy in 81% of the articles. The main deficiency in "methodology" section (Table-II) was failure to report the "reliability" of the instrument of measurement (96%). The

Table-I: Data for the quality of the various structural aspects of articles.

| Article Section | Adequate | Relatively adequate | Inadequate |
|--------------------|----------|---------------------|------------|
| Abstract | 57.7 | 18.7 | 23.6 |
| Introduction | 33.6 | 9.4 | 57 |
| Methods& materials | 58.9 | 5.7 | 34.4 |
| Results | 51.1 | 17.9 | 31 |
| Discussion | 44.9 | 9 | 46.1 |
| References | 91.9 | 5.1 | 3 |

DISCUSSION

“sample size” was addressed in 96% of the articles, but was not justified in 93% of the cases.

Addressing the issue of “blindness” of the study in researches where selection bias needed to be avoided was missing in 84% of the articles.

The variables used to assess the rate of adequacy or otherwise of the methodology in the “Results” section are shown in Fig.1. Inadequate statistical tests were present in 61% of the cases. Avoiding interpretation of data (84%) was the strongest point of this section.

The main deficiency in the “Discussion” section was failure to establish the limitations and strong points of the research (87% each). In 78% of the cases, the discussion was not started by reporting the results. The strong point of this section was citation of similar results from other studies using related references (85%). The discussion included a conclusion in 75% of the cases.

In general, according to 52 variables that were evaluated in each article, the most common deficiencies were the following respectively: failure to report the reliability of the instrument of measurement, justify the sample size, and state the limitations of the study. Incorrect columns’ headings, names and lines in tables, improper handling of groups, not stating the objective, not starting the discussion by reporting the results, too long an introduction and finally, incorrect statistical tests.

Table-II: Inadequacy aspects related to the “Methodology” section.

| Aspect | Inadequate |
|---------------------------------|------------|
| Stating Reliability | 96 |
| Justification of sample size | 93 |
| Handling of groups | 84 |
| Handling consent | 69 |
| Report of validity | 60 |
| Sampling method | 52 |
| Stating statistical method | 42 |
| Differences among groups | 40 |
| Similarities in study groups | 33 |
| Study design | 32 |
| Stating the problem (variables) | 26.5 |
| Results in methods & materials | 26.5 |
| Exclusion/inclusion criteria | 23 |
| Sample size | 4 |
| Establish Intervention | 4 |
| Intervention effect variables | 4 |
| Follow up period | 0 |

The results of this study indicated that failure to report the “reliability” of the instrument of measurement (96%) was in fact, the greatest deficiency in 52 variables selected to evaluate the quality of methodology in published articles. “Reliability” is defined as the means and methods of measuring variables in a study which is expected to be repeatable and give similar results in similar circumstances.¹² Validity of every research is based on its use of reliable instruments to measure variables and collect data information.¹³ The instrument for measuring variables must be valid to begin with, and its reliability must be proven through a pilot study.¹⁴

Measuring variables comprises the core part of any research. If the instrument of measurement in a research is not reliable, it may not only have a negative impact on the results but could also compromise the conclusions to a great extent. Obviously, we have yet to answer the question as to how we can trust the results of a study when all too often the “reliability” of the measuring instrument is insufficiently documented in the papers. How can we apply such findings to clinical medicine?

For this issue to be resolved, it is the researcher’s responsibility to conduct a “pilot study” not only to clarify different aspects of the research such as the sample size, cost, etc, but also assess the potential reliability and validity of intra-research instruments and examiners. A well documented report of the reliability in any research paper will provide the

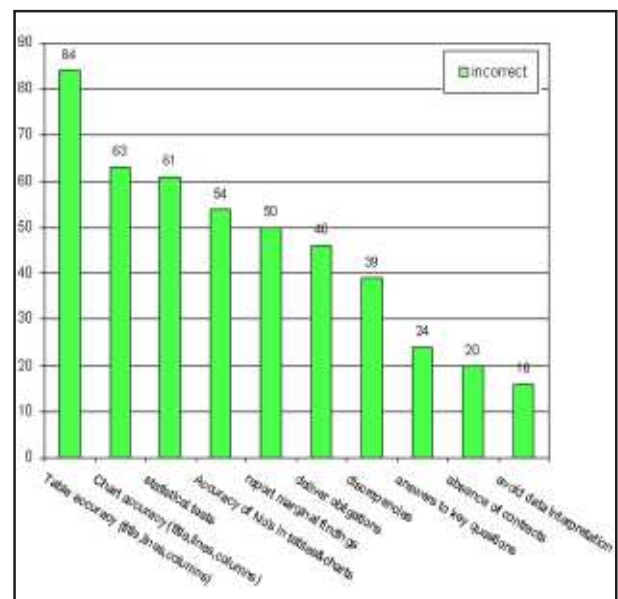


Fig-1: Inadequate aspects related to the results section of articles (N = 100).

readers as well as the editorial boards with greater confidence in terms of the results.

The second highest deficiency in published articles was the rate of failure to justify the "sample size" which was found to be 93%. Results of a research can not be substantiated if the sample size is incorrect. Statistical test results will be non significant if the sample size is too small and vice versa yielding inaccurate overall results in a research.¹⁵ The fact that only 4.4% of dental faculty members participated in sample size learning workshops¹⁶, could offer a possible explanation as to why they did not justify the sample size in their articles.

Usually, previous literature is used to determine the sample size. The question still remains as to why previous literature should be a sufficient source for calculating the sample size? And if so, wouldn't the new research be a simple repetition of the previous one? Having a firm basis for calculating the sample size is critical. Therefore, a pilot study should be conducted to determine the actual sample size and avoid any discrepancies in the results. Until then, the effect of miscalculating the sample size will cloud the results and conclusions of the research studies.

The results of this study showed that the rate of writing inadequately the introduction part of the article was 67% indicating this section as the most inadequate one. The deficiencies included: failure to state the purpose of the study at the end of the introduction (90%), too long an introduction (81%) and finally, not justifying the publication of the article (72%). Valaiee et al evaluated 182 published articles in an Iranian medical journal (Naameh), from 2001-2005, which showed that 63.6% of the articles had an inadequate introduction.¹⁷ Their results, were similar to the current study. Another research by Koohboomi et al indicated that the introductions were inadequate in 71% of medical student theses.¹⁸ The reported results were higher compared to the current study which could be attributed to the poor composition and low quality editing of the theses.

Failure to justify the publication of the article was seen in 72% of the cases. The critical question is raised when no real justification exists for publication of an article: Would articles without any justification for publication be worth reading? To justify publication, the authors should make an effort to find, document and state the research gaps and 'pitfalls' of the previous studies so that the need for publication of their research is not only well demonstrated, but sufficiently documented.

Overall, 68% of the results were reported inadequately in the abstract part of the articles. The

statistical test was found to be inadequate in 61% of the articles preceded by inaccuracies found in the headings of lines and columns of the Tables. One study showed that the rate of the deficiencies in reporting tables and charts in medical journals (ISI) was 7.9%.³ Another research reported that 1.7% of 182 evaluated articles did not need a statistical test.¹⁷

In general, the purpose of any research is to obtain true results and these results will be greatly compromised if inadequate statistical tests are used to analyze the data. Needless to say, lack of true results will eventually lead to an inadequate discussion followed by a conclusion that could be reasonably questionable. In this research, it was never investigated to see if the authors had any expert assistance with methodology or data analysis. One study reported that a statistics expert for data analysis was present only in 20% of the researches, and in 80% of the cases there was no supervision by a data analysis expert.¹⁷ One limitation in this study was that many errors found within the published articles could have been ignored while assessing them for accuracy and higher rankings could have been obtained in terms of quality. However, our basis for evaluation was the contents of published articles and not the actual research material itself. Naturally, this may have had some effect on our results. Another limitation involved the process of ranking the methodology of the articles into three categories of "adequate", "relatively adequate" and "inadequate". To assess our reliability, the "test-retest" method was performed one week later to measure intra-examiner reliability and the result was 96%. In reality, however separating the categories proved to be a difficult task.

In this study, "Problem oriented research" methodology was used as a model for evaluating the adequacy of the articles and each article was to be organized and structured rationally within the defined frameworks.¹⁸ Therefore, standard positive aspects of the articles were not taken into consideration and if any of the selected 52 variables were cited inadequately, they were classified as "inadequate". In fact, some variables could have been considered partially acceptable and this in itself may have compromised our results to some degree. However, our goal was to obtain true results and similar methods were employed in other researches as well.³ The fact still remains that strict measures were employed within the evaluation.

The number of evaluated articles is yet another point to discuss in this study. Better results might have been obtained if more articles were evaluated over a longer period of time. However, published

original researches are very few in number and often too difficult or time consuming to conduct, especially when subject to a refereeing process.

In general, the nature and quality of the deficiencies observed in the published articles are very disturbing. Some of these errors are avoidable and can be resolved by developing learning programs which are designed specifically to target the particular problems in methodology of writing articles.

Reasonable critique in all aspects of science is a necessity for advancement⁴ and research is no exception. Therefore, solid learning packages of research methodology should be developed in all levels of the educational system, especially continuing education programs. A proposal for a thesis or research project, a thesis ready to be presented, and articles are all considered to be research materials. Proper review and critique of such materials will set the preliminary stage for further promotions in the research world and prevent publication of sub standard materials.

Critical review articles should serve as an important factor in the research and academic background of their authors. Conducting such studies is advised to all researchers and should be considered as a means of continuing education for both faculty members and students.¹⁹

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REFERENCES

- Ghaleh FR, Siyadat F, Azizi F. Evaluation of the quality and quantity of Iranian published articles in foreign journals 1992-2003 using the impact factor. *Pajoohesh Dar Pezashki* 2002;27(2):129-143. (Full text in Persian).
- Azizi F, Raieeszadeh F, Zareiee Sh, Saber GT, Garzan R. Evaluation of reference citing in Journals of Science in Islamic Republic of Iran. *Pajoohesh Dar Pezashki* 2001;25(4):2255-2494. (Full text in Persian).
- Jawaid SA, Jawaid M, Jafary MH. Deficiencies in original articles accepted for publication in Pakistan Journal of Medical Sciences: A retrospective analysis. *Pak J Med Sci* 2009;25:1-6.
- Asefzadeh S. Critical analysis of research studies in science. *Pajoohesh Dar Pezashki* 2006;29(3):195-201. (Full text in Persian).
- Asefzadeh S. Evaluation of the skills of research directors in universities of medical sciences. *Gilan University J Med Sci* 2004; p.86-95. (Full text in Persian).
- Kante MH, Taylor JR. Accuracy rate of statistical method in transfusion. *Transfusion* 1996;36:696-701.
- Kurichi JF, Sonnad SS. Statistical methods in surgery journals. *Coll Surg* 2006;202:676-684.
- Janghorbani M. Evaluation of study design, statistics analysis and publication of medical articles. *Pajoohesh Dar Pezashki* 1997;21(3):18-24.
- Valaiee N. Fundamentals of writing articles. Tehran Islamic Azad University. School of Dentistry; 2005.
- International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Ann Intern Med* 1996;126:36-47. (Update in 2008).
- Alidoosti S, Nakhoda M. Guidelines for composing scientific and technologic reports. Tehran: Research center for scientific information and documents, Ministry of science, research and technology; 2006. (Full text in Persian).
- Gachkar L. Fundamentals of preparing research proposals "First level Research methodology". Tehran: Assistant Chairman of research center, Shahid Beheshti University of Medical Sciences, 2006. (Full text in Persian).
- Boswell C, Canon S. Introduction to nursing research. Massachusetts: Tones & Bartlett publisher; 2007.
- Ghafari M, Niknami Sh, Kazemnejad A, Mirzaiee A, Ghofranipoor F. Design, validity and reliability of 10 indexes regarding prevention of AIDS in young adults. *Behbood* 2007;11(1):24-29. (Full text in Persian).
- Azizi F. Clinical trial studies. Tehran: Endocrine and Metabolism center for research, Shahid Beheshti University of Medical Sciences; 2006. (Full text in Persian).
- Ebadifar A, Mohamadi M R, Valaiee N. Research revenue and educational/research needs of the Iranian faculty of dentistry in 2004. *J Dentistry, Tehran University of Medical Sciences* 2005;18(4):95-101. (Full text in Persian)
- Valaiee N, Kosarian M, Nasiri A, Moosavi F. Qualitative and quantitative evaluation of articles in Scientific Journal of Mazandaran University of Medical Sciences. *Sci J Mazandaran University of Med Sci* 2006;52:124-130. (Full text in Persian).
- Koohboomi J, Azizi F, Valaiee N, Rezaiee M, Mehraban B, Kahrizi M. Evaluation of research design in medical theses for doctorate degree in Kermanshah University of Medical Sciences (1998-2005). *Behbood* 2006;10(2):177-185. (Full text in Persian).
- Asefzadeh S. Handbook for evaluation of medical assistants and operators. Ghazvin: Ghazvin University of Medical Sciences; 2000. (Full text in Persian).

Authors:

- Sheibaninia A,
Department of Orthodontics,
 - Valaiee N,
Research Center of Thalassemia,
 - Bitavakoli,
Department of Oral Medicine and Diagnosis.
 - Azizi F,
Research Institute of Endocrine Sciences.
 - Mohamadsadeghi Sh,
Department of Plastic Surgery, 15 Khordeh Hospital.
 - Nourbakhsh M,
Department of Fixed Prosthodontics.
- 1,3,6: Islamic Azad University,
Dentistry Branch,
Tehran, Iran.
- 2: Mazandaran University of Medical Sciences,
Sari, Iran.
- 4,5: Shaheed Beheshti University of Medical Sciences,
Tehran, Iran.