Types of Epidemiological Studies in Peruvian Biomedical Journals

Many decisions made in the daily practice of medicine are based on advances in scientific knowledge, journals being one of the more important means for its dissemination. For this reason, journals must provide reliable and truthful information concerning advances in science.

Recently there has been special interest in studying the nature, reliability, and reproducibility of information offered in specialized journals. Thus, for example, Feinstein \(^{18}\), Fletcher and Fletcher \(^{19}\), and Bailar \(^{17}\), among others, have designed classification schemes for biomedical research which make it possible to do a critical analysis of studies, to identify the most powerful methods of research, and to systematize it. On the other hand, several authors \(^{16-18}\) have found the frequency with which important data are omitted related to the design and presentation of results is very high, even in serious journals of worldwide circulation.

In the present study an evaluation has been made of information contained in the regularly published Peruvian medical journals of widest circulation, focusing on the type of study published, with emphasis on those of epidemiological content, and reviewing the statistical analyses used and the bibliography cited. The study was initiated and developed almost totally as an undergraduate curriculum experiment in the Comprehensive Health Course at the Alberto Hurtado School of Medicine, Universidad Peruana Cayetano Heredia, Peru.

Reviews were undertaken of all the articles printed in the journals Tribuna Médica, Diagnóstico, Galeno, and Revista de Neuropsiquiatría published between 1979 and 1983, plus issues (6) 1-3, (7) 1 and 2, (9) 1 and 2, and (11) 2 of the journal Acta Médica Peruana. Each article was classified according to the type of study, its motivation and the style of presentation, according to the following hierarchy:

1. Epidemiological: original study of manifestations, therapeutic tests, causality, diseases or attributes in groups or populations.
2. Technological: study whose principal objective is to demonstrate the validity or merits of a technique or procedure (sonography, tomography, etc.).
3. Review: article that selects, synthesizes, or evaluates information already published, with or without examples of clinical cases.
4. Minor publications: other articles not included under the headings above (editorials, clinical or pathological discussions, interviews, book reviews, translations of foreign articles, etc.).

The number of articles for each journal was the sum of those given in the index. The articles considered to be epidemiological were classified in turn according to the type of epidemiological study \(^{16-20}\), the type of statistical analysis used \(^{19}\), and the nature of the references cited.

The types of epidemiological studies considered were:

1. **Descriptive**

   - Strictly descriptive: details or characteristics of a phenomenon or situation are presented without any intention of establishing associations such as case reporting, surveys, studies on incidence, prevalence, mortality, morbidity (209 studies, 71%).
   
   - Descriptive of effectiveness: observations on the effect of a treatment or procedure in a group of persons without any control group, such as uncontrolled trials (65 studies, 22%).

2. **Analytical**: Studies that attempt to establish an association or causal relation, or to evaluate proposed hypotheses.

   - Retrospective: a study of cases and controls in which the primary observation is the effect, based on which the imputed factor is traced as the cause (one study).
   
   - Cross-sectional: a study that analyzes the association between two apparently independent characteristics or situations observed simultaneously, for which the direction of the cause-effect relation is imprecise (9 studies).
   
   - Prospective: a study based on the longitudinal follow-up of a particular cohort which attempts to examine the effect of exposure to a factor imputed to be causal without any manipulation by the observer (2 studies).
   
   - Experimental: evaluation of a treatment through the comparison of a group exposed to the treatment and a comparable control group selected randomly based on a double-blind design (randomized controlled trials) (3 studies).
Pre-experimental: a study defined in the same terms as the previous type except for the double-blind design and the random selection of the subjects, such as the non-random controlled trials (2 studies).

3. Methodological: Studies of sensitivity and/or specificity (4 studies).

The articles were assigned to one of these categories depending on the study design and on the results obtained, independently of the authors' opinion. According to the statistical methods utilized, the studies were subdivided as:

1. No statistical method or descriptive statistics only: percentages, means, standard deviation, histogram, etc. (257 studies, 83%).
2. One-sample t test, paired t test, two samples test, z transformation test (16 studies, 5%).
3. Contingency tables, Chi squared test, Fisher's ideal index, McNemar's test (7 studies).
4. Other non-parametric tests of the sign, Mann-Whitney, Wilcoxon (one study).
5. Epidemiological statistics: relative risk, sensitivity, specificity, rates (five studies).
6. Simple linear regression, correlation coefficient (5 studies).
7. Life tables: actuarial, Kaplan-Meier estimate of survival (2 studies).
11. Logarithmic transformation to be used in another test.
12. Other: any other analysis not mentioned above (calculus of probability, Kolmogorov-Smirnov goodness-of-fit test, etc.).

In articles that used any other statistical method besides the descriptive one, the latter was not considered. Articles which conclude there are significant differences between some of the parameters studied but which did not specify the statistical method used, were classified as descriptive statistics.

The classification of articles was done by two persons independently; in the case of discrepancies, the two reviewers analyzed the article together and came to a decision. If not achieved, the article was reviewed by all the authors. Given the special structure of the journal Galeno these procedures were carried out jointly from the start.

All the articles indicated to be epidemiological were jointly reviewed by four or more authors, to standardize the definitions, confirm the type of epidemiological study, and discuss any mistakes made in the design of the studies. In general there was no difficulty in reaching agreement.

Results

Table 1 shows the overall breakdown of the articles according to the type of study. It is observed that most of them are review articles (43%), followed by minor publications (38%), epidemiological studies (15%), and finally, technological articles (5%). It was found, in addition, that Acta Médica Peruana and Galeno were the journals with the largest percentages of epidemiological studies, and Diagnóstico and Tribuna Médica, of review articles.

Of the epidemiological studies, 93% are descriptive, 5% analytical, and 1% methodological. This same trend was observed for each of the journals individually, with the exception of Acta Médica Peruana (100% descriptive).

With regard to the type of statistical analysis employed, the great majority of epidemiological articles (257) used only descriptive statistics and the 37 remainder ones used a total of 51 statistical methods. The method most used was the t test, followed by contingency tables.

Table 1. Breakdown of articles by type of study.

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Articles No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiological</td>
<td>294</td>
<td>14.8</td>
</tr>
<tr>
<td>Non-epidemiological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technological</td>
<td>91</td>
<td>4.6</td>
</tr>
<tr>
<td>Informative review</td>
<td>852</td>
<td>42.8</td>
</tr>
<tr>
<td>Minor publication</td>
<td>752</td>
<td>37.8</td>
</tr>
<tr>
<td></td>
<td>1,989</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2 shows that most of the descriptive epidemiological studies do not use statistical analyses and that most of the analytical and all the methodological articles do use some type of analysis.

Table 2. Statistical methods by type of epidemiological study.

<table>
<thead>
<tr>
<th>Type of study</th>
<th>No method No.</th>
<th>%</th>
<th>Some method No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive</td>
<td>252</td>
<td>91.9</td>
<td>22</td>
<td>8.1</td>
</tr>
<tr>
<td>Analytical</td>
<td>5</td>
<td>29.4</td>
<td>12</td>
<td>70.6</td>
</tr>
<tr>
<td>Methodological</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3. Results of statistical methods.
In table 3 it is shown that out of 287 epidemiological articles, 175 (61%) do not cite any reference to national journals, while only 26 articles (9%) lack references to foreign journals. It is also noted that only 4 articles have more than 10 references to national journals.

**Table 3. Characteristics of the references cited in the epidemiological articles.**

<table>
<thead>
<tr>
<th>Type of reference</th>
<th>No. of references</th>
<th>Articles</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>National None</td>
<td>175</td>
<td>61.0</td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>98</td>
<td>34.1</td>
<td></td>
</tr>
<tr>
<td>5-18</td>
<td>10</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Over 10</td>
<td>4</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Foreign None</td>
<td>26</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>136</td>
<td>47.4</td>
<td></td>
</tr>
<tr>
<td>Over 10</td>
<td>125</td>
<td>43.6</td>
<td></td>
</tr>
<tr>
<td>Books None</td>
<td>128</td>
<td>44.6</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>148</td>
<td>51.6</td>
<td></td>
</tr>
<tr>
<td>Over 10</td>
<td>11</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>Other (theses, workshops, congresses) None</td>
<td>137</td>
<td>47.7</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>147</td>
<td>51.2</td>
<td></td>
</tr>
<tr>
<td>Over 10</td>
<td>3</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>

*Note: 7 articles had no references.*

**Discussion**

The aspects reviewed in this study describe the profile of information available in Peruvian publications. It can be seen that nearly half the articles (42.8%) are reviews of existing information, and only a small percentage (14%) have epidemiological content. The possible explanation for this finding could be that the purpose of the publications studied is either medical education or the dissemination of scientific knowledge, or that these are the only works available for publication, reflecting perhaps the lack of means or incentives for research.

Of the epidemiological studies, there is a large percentage of descriptive studies (93%). Fletcher and Fletcher (3), analyzing the *JAMA, Lancet, and N Engl J Med*, find that of 155 original articles 22% are descriptive, 8% retrospective, 34% prospective, 10% descriptive of effectiveness, 6% pre-experimental, and 5% experimental. Moreover, Feinstein (4), analyzing 324 articles from *N Engl J Med and Lancet* found that 40% were descriptive studies. Bailar et al. (5), out of 332 original articles from *N Engl J Med*, found 39% that would correspond to our category of descriptive (what they call “cross-sectional”), and 6%, retrospective. Brown (6) found in *Am J Dis Child* that 34% were prospective studies, 7.2% retrospective, and 58.5% descriptive.

The differences found between the foreign and Peruvian journals in terms of proportions of analytical studies are notable; the preponderance of descriptive studies in Peruvian publications places them at the most elementary level of scientific research.

While in Peruvian journals only 16% of the epidemiological studies utilize statistical methods that are not merely descriptive, in foreign journals this proportion rises to 42%, according to Emerson (7), and to 47%, according to Håyden (8). This gives an idea of the poverty of the statistical content of the Peruvian publications. As was to be expected, the analytical studies use more statistical methods than the descriptive ones; what is notable is that in almost a third of the analytical articles no statistical analysis was used to back up the conclusions.

In the analysis of bibliographic references, the national references are rarely cited, compared with the foreign ones; this perhaps reflects the scarcity of information widely disseminated in the national journals, or else, a lack of confidence in them (9).

There is great variability in the definition of terms, which makes it difficult to compare the results of this study with others, but such comparisons are necessary in order to have a detailed understanding of the problem.

Finally, although the study design did not allow for studying the quality of the articles, the appropriate use of statistical methods and the minimum requirements for the publication of studies, numerous conceptual errors were found in terms of the design of studies and for interpretation of the data in the epidemiological articles reviewed. Information on ways to avoid these errors and present a study of acceptable publication quality is given in the bibliographic references (10,11).

**References**


Epidemiological Activities in the Countries

Analytical Workshop on Functions and Activities of Epidemiological Surveillance in Uruguay

On 14-23 December 1988 an Analytical Workshop on Epidemiological Surveillance Functions and Activities was held in Montevideo under the sponsorship of the Division of Epidemiology of the Ministry of Public Health.

Among the participants in the event were professionals from the Division of Epidemiology (Epidemiological Surveillance, Communicable Diseases, Noncommunicable Diseases, Program for the Control of Smoking), other departments of the Ministry of Health (Laboratory, Nutrition, Vector Control, Zoonosis, AIDS, Tuberculosis), and the working group on data processing.