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Treatment of diseases as a context of tasks on estimation of the population proportion in Biostatistics manuals

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The different contexts in which data of medical origin are produced have a special interest in the statistical training of future medical graduates. These contexts give meaning to the different concepts and statistical techniques involved in the analysis analysis of medical data (Lwanga y Tye, 1987; Ainley, Pratt & Hansen, 2006).

In the Biostatistics courses offered in graduate programs professionally oriented, the professional approach is usually provided by solving tasks contextualized in work environments (Noss, Pozzi, & Hoyles, 1999). For instance, tasks related to the treatment of diseases, a central issue on medical practice (Gordis, 2005).

In this poster, we identify the contexts associated with the treatment of diseases in tasks related to the estimation of the population proportion included in Biostatistics manuals classically employed in the degree in Medicine in Spain.

According to González-Ruiz, González-López, & González-Astudillo (in press) we identify three clinical contexts that require the use of data and enable the application of techniques related to the estimation of proportion for their analysis:

Trat1 context:

Design and optimal prescription of treatments.

A treatment is designed and applied according to a protocol or prescription that guarantees its success as a measure of cure. For example, estimating the appropiate proportion of a certain substance that should be considered in the design of a new pharmacological treatment.

Example of Trat1 context

In a population of 10,000 children, a vaccination campaign against rubella is desired. How many vaccines should be foreseen in the design of the campaign so that 95% of the vaccines do not lack vaccines if 90 out of 90 randomly surveyed are already vaccinated? (adapted from Martín & Luna, 2004, p. 150)

Trat2 context:

Parameters related to the validity of a treatment.

It is necessary to know the effectiveness of a treatment when it is applied in the cure of a disease. For example, estimating the proportion of obese patients who have lost weight after being on a diet.

Example of Trat2 context

Suppose 100 hypertensive people are given an antihypertensive drug and is effective in 20 of the people By effective, we mean that their diastolic blood pressure is lowered by at least 10 mm Hg as judged from a repeated measurement 1 month after taking he drug. What is the best point estimate of the probability *p* of the drug being effective? (Rosner, 2011, p. 198)

Trat3 context:

Comparison of several treatments used to cure a disease.

The doctor must select the treatment that is most appropriate to the patient's circumstances, by taking into account the variety available. For example, estimating the difference of cure rates in two groups of patients who are given two different treatments against hypertension.

Example of Trat3 context

In a randomized clinical trial two groups of hyperlipidaemia patients were followed, one treated with drug A and the other with drug B. After two months of treatment, in group A there are 300 patients who follow high lipid levels of 900 the group consists; Group B has 880 patients of which 270 continue with high lipid levels. Calculate a confidence interval of 99% for the proportional difference between both drugs. (Álvarez-Cáceres, 2007, p 373)

Method. We followed a exploratory and descriptive method to identify contexts in the tasks that appear in manuals of Biostatistics. The sample is intentional: we have selected fourteen manuals of Biostatistics currently used in the Degree in Medicine in Spain (see the sample here). In each of them, we have taken all the tasks related to the estimation of the proportion; a total of 213 tasks. We have classified every task according to the three types of contexts mentioned before.

Results and discussion. We observe that from the 213 tasks, there are 128 formulated in contexts linked to Medicine and, specifically, to the idea of illness (60.1%). Of these, 41 refer to the treatment of diseases. Therefore, treatment is a relevant medical context in the tasks of estimating the population proportion (32%). Concerning these 41 tasks, only 2 are formulated according to the Trat1 context (4.9%), 35 according to the Trat2 context (85.4%) and 4 tasks correspond to Trat3 context (9.7%). As a conclusion, we observed that the three types of context cover all the tasks presented in the manuals, with important emphasis on the estimation of the proportion in situations related to the effectiveness of medical treatments. These results allow us to assess to what extent the treatment of the estimation of the population proportion in Biostatistics manuals is really related to their professional practice. It should be remembered the relevance of this topic in the fields of Epidemiology and Public Health.

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