DEGREE CURRICULUM
BIOESTADÍSTICA

Coordination: Montserrat Rué

Academic year 2015-16

Subject's general information

Subject name	BIOESTADÍSTICA
Code	100605
Semester	2nd semester, Continuous Assessment
Typology	Obligatory
ECTS credits	6
Groups	1 1/2
Theoretical credits	0
Practical credits	0
Coordination	Montserrat Rué
Office and hour of attention	By appointment via e-mail
Department	Ciències Mèdiques Bàsiques
Teaching load distribution between lectures and independent student work	Classroom 60 Lectures 30 Practices and tutorials 10 Seminars 20
Modality	Presencial
Important information on data processing	Consult this link for more information.
Language	Catalan
Degree	Degree in Human nutrition and dietetics
Office and hour of attention	By appointment via e-mail
E-mail addresses	montse.rue@cmb.udl.cat

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Iván Benítez Iglesia

Subject's extra information

It is a subject of the Human Nutrition and Dietetics degree taught during the second semester of the first academic year. This course aims to introduce students into statistical methods that allow to study the phenomena where variability is an important component. Without this method, it is very difficult to generalize the results observed and determine their significance. This is the case of observational and experimental studies in the field of health sciences, where individual variability and the many factors that influence each situation makes it difficult to analyze the problem intuitively.

Learning the basics of statistical tools and their use in practical situations of interest is a key point in a nutritionist career. As a methodological tool, statistics plays a main role in health sciences, being fundamental to professional performance based on the best scientific evidence.

In this subject we will also work general competences like use of information technology, group work, English, and oral presentations.

Learning objectives

To pass the course, students should know how to use the basic concepts of statistical method in relation to spcific problems of professional activity in human nutrition and dietetics, with particular attention to the critical appraisal of the results of observational and experimental studies.

As for skills, students who pass the course should be able to:

- Identify and know the main features of the designs used in health studies.
- Perform descriptive data analyses.
- Estimate and interpret probabilities of events.
- Estimate confidence intervals in the case of a group or in the comparison of groups.

In addition, students who pass the course must achieve the following skills:

- Interpret and describe the results of a specific study using descriptive statistics tools.
- Gather information, relate it to their knowledge, synthesize and report it.
- Using a statistical software to analyze data.
- Teamwork.
- English to understand scientific literature.

Competences

Specific	Objectives	
To know the statistical methods applied to Health Sciences	1, 2	
Cross-sectional	**Activities**	**Evaluation**

- Teamwork - Information Technologies use - English use	- Assignment work in small groups - Working at the Sakai environment and use statistical software - Read articles in English	- Assignments grading - Homework

Subject contents

First Part

Chapter 1. The statistics in Human Nutrition and Dietetics. Design of studies in health sciences. Introduction of research in health sciences and presentation of the fundamental role of statistics in the research process. Variability, representation, measurement errors.

Chapter 2. Design of experiments. The clinical trial as the "gold standard" of research in the health sciences. Study design. Validity of measures. Factors that may influence the results. Randomization, blinding, intention to treat. Assessment of the effect: Primary and secondary variables. Ethical issues of experimental studies.

Chapter 3. Observational studies. Observational descriptive studies. Analytical observational studies. The cohort and the case-control studies. Measures of frequency and measures of association between risk factors and diseases. The relative risk and the odds ratio. Advantages and limitations of observational studies.

Part Two

Chapter 4. Description and presentation of data. Descriptive statistics. Type of variables. Measures of central tendency (mean, quantiles, median) and measures of dispersion (variance, standard deviation, interquartile range). Graphical representation of variables.

Chapter 5. Probability. Probability as relative frequency. Rules for calculating probability. Conditional probability. Bayes' theorem. Sensitivity, specificity and predictive values. Interpretation.

Chapter 6. Probability distributions. Theoretical probability distribution. Discrete and continuous distributions. Binomial and Poisson distributions. Normal, Student's t and exponential distributions. Normality or reference intervals. Z-scores.

Part Three

Chapter 7. Estimation and Hypothesis. Population and sample. Sampling distribution of a parameter. Central limit theorem. Confidence intervals for means and proportions. Confidence intervals for means and proportion differences. Confidence intervals for probability ratios. Hypothesis. The null and alternative hypotheses. Statistical significance: p values.

Chapter 8. Correlation and regression. Relationship between two quantitative variables. The Pearson correlation coefficient. The Spearman correlation coefficient. The regression line. The regression model. Interpretation of the parameters of the regression model.

Methodology

To achieve the objectives and acquire the competences the following activities will be scheduled :

Lectures (CM for classes magistrals)

These will be conducted with all students and are not mandatory. The purpose is to present the contents and

highlight the most important aspects of the use of statistics in NHD.

Seminars (Sem)

These will be done with 1/2 of the students. The assistance is mandatory and students must attend the corresponding group. Each group is subdivided into working groups of five students. The purpose is that students deepen the course contents and apply the statistical methods.

Virtual Activities (Av)

These activities will be carried out through the Virtual Campus (Sakai) and other tools such R demonstrations. Students will perform activities related to the assignments, exercises, coursework, and communication with teachers and each other.

Computer Activities (Inf)

These will be done with 1/2 of the students. The assistance is mandatory. Exercises of analysis and presentation of data. Deepen statistical concepts presented in lectures and seminars.

Tutorials (Tut)

These will be done in small groups students. Are not mandatory. Used to share a part of the learning matter, to answer questions and highlight those aspects of Biostatistics more used in NHD.

Evaluation

The evaluation will take into account the score obtained in an mid-term exam (30%), an assignment that will include exercises and computer practice (30%) and a final exam (40%), which can be repeated if failed.

To pass the course, it is necessary to pass the final exam (minimum grade of 5 out of 10) and have an average overall grade greater than or equal to 5.

Bibliography

Basic references:

Sorribas A, Abella F, Gómez X, March J. (1997) Metodologia estadística en ciències de la salut: Del disseny de l'estudi a l'anàlisi de resultats. Lleida: Edicions de la Universitat de Lleida.

The Sorribas et al. book can be downloaded from www.bioestadistica.org.

Daniel WW. (1995) Bioestadística: base para el análisis de las ciencias de la salud. México: UTEMA.

Complementary references:

Bland M (2000). An introduction to medical statistics, 3rd ed. Oxford: Oxford University Press.

Altman DG. (1990) Practical statistics for medical research. Chapman & Hall/CRC; 1st ed.

Gonick L, Smith W. The cartoon guide to statistics. HarperCollins Publishers, Inc. New York, 1993.

Addictional materials

Notes and materials that will be used during the course will be placed in the folder Continguts of Sakai.