Course Guide 2018/2019

Biostatistics, Epidemiology, and Public Health

Bioestadística, Epidemiología y Salud Pública

Bachelor in Dentistry

Mode: On Campus

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Biostatistics, Epidemiology, and Public Health

Module: **Introduction to Dentistry.**

Subject: **Biostatistics, Epidemiology, and Public Health.**

Level: **Basic.**

No. of Credits: **6 ECTS.**

Academic Session: **1st Course – 1st Semester.**

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Professor coordinating the Module: **Ana I. López Navas.**

Brief Description

Biostatistics is the application of statistical analysis of data to biological and health sciences. All surveys that assess options chosen by voters, products that consumers prefer, pain relief provided by a certain drug, the harm to health caused by a sedentary lifestyle… these are analyzed with the same methods of statistical analysis.

Knowing the rationale and not the mathematical fundamentals of this subject is necessary for scientists and professionals of this century as it allows them to understand important aspects of information inaccessible to those who ignore these basic concepts. These methods are becoming a necessary tool in all research fields.

Epidemiology is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems. Various methods can be used to carry out epidemiological research: surveillance and descriptive studies can be used to study distribution; analytical studies are used to study determinants.

Public Health is the organized efforts of a society aimed at protecting, encouraging, and promoting the welfare of the population when it is healthy, and to restoring its health when needed, and if necessary, rehabilitating and including the sick, integrating them into their social, labor and cultural environment. Dentistry contributes significantly to the development of public health with the prevention and treatment of disease.

Their strategies are: to know the causative agents and risk factors which impact on the health-disease process, to measure and interpret the level of health-disease of the population, to determine the effectiveness of treatments, and to establish levels of disease prevention, health promotion, and protection.

To do this, knowledge of the determinants of health is required, including factors such as genetic, lifestyle, demographic, environmental, social, economic, psychological, cultural, communicable and chronic diseases with an impact on oral health, and knowledge of the epidemiology, the search and interpretation of scientific information, knowledge of national and international health organizations, the organization of health systems, legislation, planning, and health management, as well as having skills like health communication.

Prerequisites

It is recommended to be able to read scientific literature in English and to have basic computer skills.

Objectives

1. To know the basic concepts involved in the design of medical studies, both experimental and clinical.
2. To understand the methods of Descriptive Statistics, uni- and multivariate, being able to summarize the behavior of qualitative and quantitative variables, as well as the relationship between two or more variables.
3. To know the different techniques of statistical inference that allow for the extrapolation of knowledge acquired in the samples studied on the populations they came from.
4. To be able to formulate hypotheses, collect, and critically evaluate information to solve problems by following the scientific method.
5. To have the critical ability to assess established knowledge and new information.
6. That the student is able to interpret and design in a basic way the most common epidemiological studies used in research which are aimed at understanding the burden of community disease and interventions in oral health.
7. That the student is able to understand the causes of health-disease of populations, to measure and interpret the health-disease and the effectiveness of treatments, to know and apply public health strategies such as the prevention of disease, and the protection and promotion of health.
8. That the student is able to perform the search and interpretation of scientific information, to know the national and international health organizations, the organization of health systems, legislation, planning, and health management.
9. That the student acquires the necessary skills for communication in health.
10. That the student is able to develop and execute oral health programs and to be familiar with the inter-institutional and inter-professional coordination necessary for its execution.

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Competencies and Learning Outcomes

Basic competencies

MECES1: Students have demonstrated that they possess and understand the knowledge in an area of study that starts from the basis of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the forefront of their field of study.
MECES2: Students know how to apply their knowledge to their work or vocation in a professional manner and they possess the skills that are usually demonstrated through the elaboration and defense of arguments and through problem-solving within their area of study.
MECES3: Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant issues of a social, scientific, or ethical nature.
MECES4: Students can transmit information, ideas, problems, and solutions to a specialized and non-specialized public.
MECES5: Students have developed the learning skills necessary to undertake later studies with a high degree of autonomy.

General competencies

G17: To understand and recognize the principles of ergonomics and safety at work (including control of cross-infection, radiation protection, and occupational and biological diseases).
G18: To know, critically assess, and know how to use the sources of clinical and biomedical information to obtain, organize, interpret, and communicate scientific and health information.
G19: To know the scientific method and to have the critical ability to assess established knowledge and new information. To be able to formulate hypotheses, collect, and critically evaluate information to solve problems by following the scientific method.
G29: To recognize the determinants of oral health in the population, including factors such as genetic, lifestyle, demographic, environmental, social, economic, psychological, and cultural.
G30: To recognize the role of the dentist in the prevention and protection against oral diseases, as well as in the maintenance and promotion of health, both for the individual and the community.
G31: To understand the National Health System, as well as the basic aspects of health legislation, clinical management and adequate use of health resources, understanding the importance of the role of the dentist in the field of Primary Health Care.

Interdisciplinary competencies

CT7: To consider ethics and intellectual integrity as essential values of professional practice.

Specific competencies

IO01: To know the scientific method and to have the critical ability to assess established knowledge and new information.
IO02: To know the scientific principles of sterilization, disinfection, and antisepsis necessary to prevent cross-infection in dental practice.

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IO05: To know the procedures and clinical and laboratory diagnostic tests, to know their reliability and diagnostic validity, and to be competent in interpreting their results.
IO11: To understand the National Health System, as well as the basic aspects of health legislation, clinical management and adequate use of health resources, understanding the importance of the role of the dentist in the field of Primary Health Care.
IO13: To apply the principles of ergonomics in dental work, both for the individual and the work team when appropriate, as well as the principles of preventing occupational risks associated with dental practice.
IO15: To educate and motivate patients in preventing oral diseases, to control oral pathogenic habits, to instruct them on proper oral hygiene, on dietary and nutritional measures and, in short, on all methods of oral health maintenance.
IO16: To know the effects of tobacco on oral health and to participate in measures that help patients who want to stop smoking. Also, to know the complex interactions between environmental, social, and behavioral factors with oral and general health.
IO17: To know the procedures aimed at making diagnoses in oral health in the community and to know how to interpret the results.
IO18: To know the impacts of demographic and epidemiological trends in the field of dentistry.
IO19: To know the organization and provision of oral health care in the community, both privately and publicly, as well as general healthcare and the role of the dentist in these fields.
IO20: To prepare and execute oral health programs and to be familiar with the inter-institutional and inter-professional coordination necessary for its execution.

Methodology

Methodology	Hours	Hours of Classroom Work	Hours of Non-Classroom Work
Classroom based Classes	30	60 hours (40 %)	
Academic Tutorials	6		
Practicums	15		
Seminars	6		
Classroom Evaluations	3		
Personal Study	63		90 hours (60 %)
On-line Tutorials	9		
Resolution of Exercises and Practical Cases	9		
Project Completion and Oral Presentations	9		
TOTAL	150	60	90

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Syllabus

Theoretical instructional program

1. Natural History of Disease. Prevention levels and strategies. Health Promotion. Environmental determinants of health: physical, socioeconomic, and cultural environments. History of Dentistry. Origins. The beginnings and development of the profession. Technical and technological innovations.
2. The concept and determinants of oral health in the population, including factors such as genetic, lifestyle, demographic, environmental, social, economic, psychological, and cultural.
3. Health demography. Concept and sources of information. Static demography and dynamic demography. Demographic and epidemiological trends.
4. The National Health System. Health legislation. Health management.
5. Sources of clinical and biomedical information. Health information systems and epidemiological surveillance.
6. Epidemiology and the Prevention of Communicable Diseases.
7. Prevention and protection from communicable and chronic diseases with impacts on oral and general health.
8. Infection control. Sterilization and disinfection. Antisepsis. Hand washing.
9. Occupational health in dental practice. Principles in preventing occupational risks.
10. Preventing infectious risk within the dental personnel. Primary prevention: barriers to exposure. Disposition prophylaxis, vaccines.
11. Health education. Principles and methods.
12. The importance of clean water. Diet and Public Health. Preventing oral diseases in relation to nutritional habits.
13. Tobacco and oral health. Smoking cessation. Treatment of nicotine dependence.
14. Research methodology in dentistry. The scientific method. Development of hypotheses, data generation, and data analysis.
15. Types of epidemiological studies and models of causality.
16. Observational studies in epidemiology: Ecological studies, cross-sectional studies, case-control studies, and cohort studies.
17. Experimental studies in epidemiology.
18. Main errors in epidemiological studies. Bias control.
19. Applications of statistics in epidemiology and dentistry. Descriptive statistics and inferential statistics.
20. Comparisons of categorical data.
21. Comparisons of means.
22. Linear regression.
23. Logistic regression. Validity and interpretation of diagnostic tests. Basic concepts of Survival analysis.
24. Sample size in epidemiological studies. Alpha and beta errors.

Practical instructional program

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PRACTICUMS

- Computer practicums with statistical analysis software, R and/or SPSS: Introduction to statistical analysis software. Import/Export. Purpose and basic operations. Types of variables. Graphics. Descriptive statistics. Hypothesis contrast. Linear regression. Logistic regression. ANOVA test (6 hours).
- Validity of diagnostic tests and basic concepts of Survival analysis (3 hours).
- Practicum of study types (2 hours).
- Epidemiology Practicum: Solving problems regarding frequency and association measures in observational and experimental epidemiological studies. (4 hours).

SEMINARS

- Thematic Seminar on Public Health: Presentation and interpretation of scientific article results (2 hours).
- Thematic Seminar: Dentistry Journals Impact Factor on JCR (2 hours).
- Thematic Seminar: An epidemiological study of an epidemic outbreak (2 hours).

Relationship to Other Courses of the Study Plan

This subject is related to Preventative and Community Dentistry, Oral Impacts from Systemic Diseases, Dentistry and Dietetics, and Dentistry and Sports.

Grading System

For the February/September Sessions:

1. **Theoretical exams (60%):** Exams (or evaluative tests) will be carried out with theoretical-practical questions and resolution of assumptions that include the contents of the material studied.

2. **Practical exams (30%):** The practicums and/or seminars will be evaluated through different grading systems (practical exercises, completion and exhibition of projects, clinical cases, etc.…) that include the practical content worked on.

3. **Academic tutorials (10%):** The student's participation will be evaluated though different means such as forums, chats, videoconferences, self-evaluations, activities proposed by the professor, and/or debates.

The student shall pass the subject when the weighted average is equal to or greater than 5 points and all the parts that make up the grading system have been passed, with an overall weight equal to or greater than 20%.

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If the student has less than 5 in any of the parts with a weight equal to or greater than 20%, the subject will be suspended, and the student must retake the part(s) in the next session within the same academic year. The suspended part(s) in official sessions (February/June) will be saved for successive sessions that are held in the same academic year.

In the event that the subject is not passed in the September session, the passed parts will not count for successive academic years.

The grading system (RD 1.125/2003. of September 5) shall be the following:

0-4.9 Suspended (SS)

5.0-6.9 Passed (AP)

7.0-8.9 Excellent (NT)

9.0-10 Outstanding (SB)

Honorable mention may be granted to students who have earned a grade equal to or greater than 9.0. This number may not exceed 5% of the total number of students enrolled in a subject in the corresponding academic year, unless the number of students enrolled is less than 20, in which case only a single honorable mention may be granted.

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Related Websites

- http://www.who.int/mediacentre/factsheets/fs318/es
- http://www.msssi.gob.es/campannas/campanas08/bucoDental
- http://www.odontologiapediatrica.com
- http://www.murciasalud.es/pagina.php?id=28618&idsec=2435
- http://www.consejodentistas.es/comunicacion/actualidad-del-consejo/publicaciones-delconsejo/revistas-del-consejo/revista-dentistas
- http://sespo.es
- http://www.suvison.com/net/sc_aww_fp.asp?id=8503
- http://www.infomed.es/seoepyc/Default.htm
- http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1601-0825
- http://www.joralres.com/index.php/JOR
- https://www.recursoscientificos.fecyt.es

Study Recommendations

Study of the subject is recommended on a daily, continuous, and orderly basis, in order to keep up with the classes and seminars.

Teaching Materials

While no specific material is required, it is advised to have a scientific calculator or tablet with a calculator to solve problems in statistics and epidemiology.

Tutorials

Brief Description

In academic tutorials, the focus will be to work on Decree No. 359/2009, of October 30th, which establishes and regulates the educational response to the diversity of students in the Autonomous Community of the Region of Murcia.
The activities that are carried out in the Academic Tutorials on this subject are:

- Personal orientation on the contents of the subject and the grading systems.
- Consolidation of knowledge, abilities, skills and attitudes of group work, and oral and written communication.
- Planning and promoting student learning through the provision of bibliographic and documentary sources.

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- Advice on how to approach the activities of the practical seminars.

The University also has a Special Body of Tutors that conducts personal tutoring with students enrolled in the degree. The personal tutor accompanies the students throughout the university phase. You can check the following link:

http://www.ucam.edu/servicios/tutorias/preguntas-frecuentes/que-es-tutoria

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