UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Medical Statistics and Research Methods

2223-2-I0201D139

Aims

Acquisition of basic knowledge for the identification, understanding as well as the conduct of studies in scientific research in the physiotherapy field.

The student will know the main databases for conducting bibliographic research, the main study designs, the collection of data through the evaluation scales, the statistical-methodological tools for evaluating diagnostic tests, descriptive and inferential statistics, with applications in the physiotherapy field. .

Guided by the teachers, the student will analyze, in response to a research question, a scientific article that presents statistical analyzes on data relating to evaluation scales.

At the end of the course the student will have acquired awareness and ability to answer the clinical question in the physiotherapy field through: the use of databases to carry out efficient bibliographic searches, the identification of the appropriate types of study, the choice of appropriate evaluation scales for the collection of data, the interpretation of the results deriving from the application of statistical-methodological tools of descriptive and inferential statistics.

Contents

The objectives will be achieved through:

- Understanding the importance of scientific literature in the physiotherapist profession
- Knowledge of the main databases
- The development of a search string consistent with the clinical question
- Understanding the importance of evaluation in rehabilitation
- Knowledge of the criteria for choosing measurement scales
- Knowledge of the criteria for choosing diagnosis and prognosis tests

- Knowledge of the main types of study in scientific research
- Knowledge of the main descriptive and inferential statistical analyzes

Detailed program

- Introduction to Evidence Based Practice, definition, limits and advantages, steps to practice EvidenceBased.
- Bibliographic search, definition of the research question and its characteristics, formulation of a correct search question according to the PICO model and its variants, primary and secondary databases, Boolean operators, the PubMed database, the PEDro database, how to find a full- text.
- Carry out a bibliographic search: from the research question to the download of the full-text.
- Evaluation in rehabilitation: criteria for choosing measurement scales, criteria for choosing diagnosis and prognosis tests.
- Introduction to Statistics: definitions of population, sample, variable, data, information.
- Sampling methods: random sampling, non-probabilistic sampling, stratified sampling, cluster sampling, multistage sampling, sampling errors.
- Organize and synthesize data: tabular and graphic representations, errors in tabular and graphic representations.
- Numerically synthesize the data: measures of central tendency and dispersion (arithmetic mean, median, mode, standard deviation) for atomic data and grouped into classes, position measures and outliers (z-score, percentiles, quartiles).
- Introduction to probability calculus: approaches to probability determination, probability rules, conditional probability - chapter 5 Probability distributions: discrete Binomial, continuous Gaussian, standardized Gaussian with properties and applications, Binomial with Gaussian approximation.
- Sampling distributions: of the arithmetic mean and of the proportion, with an introduction to the concept of inference.
- Confidence interval on the mean and proportion of the population: calculation of the point estimate, construction of the confidence interval, determination of the sample size necessary to estimate the mean and proportion.
- Hypothesis testing on the mean / and proportion / s of the population / s: null hypothesis and alternative hypothesis, first and second type errors, logic of hypothesis testing, construction of the test statistic and derivation of the p-value, statistical significance and practical significance .

Prerequisites

The candidate must have a basic knowledge of the use of personal computers and the English language.

Teaching form

Synchronous frontal lessons, computer classroom exercises, asynchronous contents (clips and quizzes).
It is recommended to subscribe to the e-learning page of the integrated course and to the e-learning pages of the individual modules.

Textbook and teaching resource

Specified in the nei syllabus of each module.

Semester

First semester.

Assessment method

Written exam.

What is it about:

- 33 choice questions (4 or 5 alternatives) for each segment, where each question will give 1 point and 33 will be considered 30 cum laude.

Where will it happen:

- on the university's esamionline platform in the laboratory or with proctoring monitoring (if required by the health emergency) or manual monitoring.

When taking the exam:

- dates are indicated on the portal

How to behave on the portal : - Register for the exam

- Check the grade achieved (made available within 3 days from the date of writing on the elearning page of the course)
- Answer the survey on grade refusal

Office hours

Under request, via email contact with the instructors.

Sustainable Development Goals

NO POVERTY | QUALITY EDUCATION | GENDER EQUALITY