UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Analytical Methods and Introduction To Socio-Health Research

2627-1-K0103D001

Aims

The course aims to provide the student with the methodological knowledge and tools necessary to understand, design, and evaluate research processes in the socio-sanitary field, with a specific focus on obstetric, maternal-infant, community, and hospital care contexts.
The teaching program intends to develop competencies essential for the critical analysis of healthcare and social phenomena, the generation and interpretation of scientific evidence, and the utilization of research as a tool to improve clinical, organizational, and interpersonal quality within healthcare services.
Furthermore, the course explores the fundamentals of statistics applied to research, epidemiology, health technology assessment (HTA), psychometrics, and informatics for research, fostering the acquisition of skills oriented toward Evidence-Based Practice and multidisciplinary socio-sanitary research.

In particular:
Knowledge and understanding
The student will gain knowledge of the primary methodological approaches to socio-sanitary research, statistical and epidemiological methods applied to care contexts, the fundamentals of Health Technology Assessment (HTA), the principles of psychometrics, and IT tools for data and scientific literature management.
Furthermore, the student will understand the methodological foundations of quantitative research applied to healthcare and social care services, key epidemiological indicators, and tools for the critical appraisal of scientific evidence, with a specific focus on the health needs of women, newborns, families, and the community.

Applying knowledge and understanding
The student will be able to apply descriptive and inferential statistical tools to the analysis of socio-sanitary data, interpret epidemiological results, and utilize IT tools for literature searches and scientific information management.
Furthermore, the student will be able to critically appraise scientific studies, utilize validated scales and questionnaires within healthcare and social care fields, identify indicators for evaluating the quality of care, and apply principles of Evidence-Based Practice and Health Technology Assessment to decision-making and organizational processes.

Making judgments

The student will be able to critically evaluate the methodological quality of scientific studies, interpret epidemiological and statistical data, identify research biases and limitations, and make independent judgments on the appropriateness, effectiveness, and sustainability of socio-sanitary and clinical interventions.
Furthermore, the student will be able to recognize emerging knowledge needs within clinical, organizational, and community contexts, identifying potential areas for the development of midwifery and multiprofessional research.

Communication skills
The student will be able to communicate statistical and epidemiological results appropriately using specific scientific language, present data and indicators in a concise and structured format, and collaborate within interdisciplinary research and quality improvement teams. Furthermore, the student will be able to utilize scientific sources and research data to support decision-making, organizational, and clinical processes within socio-sanitary contexts.

Learning skills
The student will acquire competencies essential for independently deepening their knowledge of research methodologies and data analysis tools, critically updating themselves on scientific literature, and developing continuous learning skills within the fields of socio-sanitary research, healthcare innovation, and evidence-based professional practice.

Contents

RESEARCH STATISTICS - Principles of descriptive and inferential statistics applied to socio-sanitary research. Variables, distributions, sampling, and data interpretation. Basic statistical tests and critical appraisal of research results.

EPIDEMIOLOGY AND HEALTH TECHNOLOGY ASSESSMENT - Foundations of general and clinical epidemiology applied to socio-sanitary contexts. Observational and experimental studies. Epidemiological indicators and health needs analysis. Evidence-Based Practice, appropriateness of care, and health technology assessment (HTA).

PSYCHOMETRICS - Principles of measurement within healthcare and social care fields. Scales and questionnaires for detecting clinical, care, and interpersonal phenomena. Reliability, validity, and the utilization of psychometric tools in research.

COMPUTER SCIENCE FOR RESEARCHS - Methodologies for literature searches and scientific database consultation. Computerized management of data and scientific information. Utilization of IT tools for organizing, analyzing, and sharing research data.

Detailed program

STATISTICS FOR RESEARCH – Statistical unit, sample and population, variables and data, construction of graphs and tables. Descriptive statistics: position and dispersion indices; measurement errors: precision and accuracy; correlation and linear regression. Probability: operations with probabilities, conditional probability and the concept of statistical independence, the diagnostic test. Random variables, Binomial and Gaussian distributions. Introduction to statistical inference: point estimation and sampling distributions; confidence interval; hypothesis testing. Logic of hypothesis testing, type I and II errors, p-value, relationship between confidence intervals and hypothesis tests, statistical significance versus clinical significance, examples of most commonly used tests.

EPIDEMIOLOGY AND HEALTH TECHNOLOGY ASSESSMENT – The course will focus on the following elements: Introduction to public health; the concept of health. Demand and needs for health services. Principles, concepts

and tools of epidemiology. Epidemiology of the main diseases and their determinants. The data sources. Principles and concepts of public health. Public health tools: primary, secondary and tertiary prevention. Public health within health systems. Financing and delivery of public health services. The main methods of epidemiology applied to the assessment of the health status of populations and the analysis of the effectiveness of health interventions will also be explored in depth. The course will introduce the principles and methods of Health Technology Assessment (HTA), with particular reference to the clinical, economic, organisational, ethical and social evaluation of health technologies, as a support for decision-making processes and the planning of health services.

PSYCHOMETRICS – The course will address the theoretical principles and foundations of psychometrics. The concepts of variables and measurement, the types of scales, the levels of measurement will be explored in depth; the main quality indicators of the measurement instruments will be analysed, with reference to reliability and validity (content, criterion and construct). The processes of development, cultural adaptation and validation of psychometric instruments will be illustrated, as well as the main methods of statistical analysis of psychometric properties. The course will promote a critical reading of the scientific literature relating to measurement instruments.

COMPUTER SCIENCE FOR RESEARCH – IT principles for managing research data. Structure and organization of datasets, data types and formats, coding and documentation of variables. Quality, validation and data cleaning. Traceability and reproducibility of transformations. Practical exercises with software tools.

Prerequisites

As defined by the Academic Regulations.

Teaching form

8 ECTS, of which 60 hours in delivery mode consisting of lectures, practical exercises on cases and datasets in presence and 8 hours in remote delivery mode.

Textbook and teaching resource

As reported in the teaching modules.

Semester

First year, fist semester.

Assessment method

Open-ended questions (with exercises) and/or closed-ended tests (with multiple choice choices).

Office hours

By appointment, scheduled with the teachers via e-mail.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY | DECENT WORK AND ECONOMIC GROWTH | REDUCED INEQUALITIES