Biostatistics

Semester: *A'(1st)*	***Teaching units ECTS: 7***	***Code: ΜΠ2***
Hours: 2 *Theory/ 1 Core Exercise practice*		***Type****: Compulsory*

Aim of the module: The module is designed to provide students with an understanding of skills needed for the planning, organisation and practice of research in healthcare science. Special emphasis is given in practical application of the statistics methods and in proper interpretation of the statistical results. On successful completion of this module students will be able to develop statistical skills required to enable research in healthcare area and data analysis. Moreover, they will be able to evaluate the proper use of statistical methodology in published scientific articles and to investigate strengths and limitations in the methodology of a research study.

Student aims: With the successful fulfillment of the module the student will be capable of:

1) Realize the role of importance of Statistics in a broad range of use in collection, organization and analysis of the data in healthcare professions
2) Understand the basic concepts of Biostatistics and the broad range of application in the field of Physiotherapy
3) Identify the differences between the descriptive, inductive statistics, parametric and non-parametric statistics and to apply the proper statistical analysis
4) Understand, apply, and interpret the results of the statistical methodologies in order to design and analyze different research approaches
5) Recognise the use of complex statistical methodologies in order to interpret medical data and the interaction between the variables
6) Use of IT based approaches to data analyses and the presentation of the result

Module content:

Within the frame of the module the **thematic units** of research that will be developed: Historical background, (characteristics, aims, type-modes, and usefulness of scientific research). Role of deontology & research ethics especially in the Health field. Search strategies for information, databases, literature sources in the Health field. Research process (research question, research proposal, research protocol, research designs and research hypothesis). Quantitative and qualitative research, sampling, research bias, reliability and validity, data collection and organization). Overview (narrative, systematic review, meta-analysis). Presentation of research findings. Research critical analysis. Critical reading. Writing and oral presentation of a research study.

Course contents: During the course the following Thematic Units will be developed:

- The role of Biostatistics in Healthcare and Physiotherapy field.
- Basic concepts in Biostatistics, variables and scales.
- Sampling methods and calculation of the sample size in correlation with the research hypothesis and the research design.
- Presentation of statistical data, statistical tables, statistical charts, summary reports or references.
- Descriptive statistics: Frequency distributions of qualitative and quantitative characteristics. Representative position and dispersion values. Transformations. Normal values.
- Quantitative characteristics. Comparison of average values: Concept of statistical significance.
- Possible mean value error. Comparison of mean value with fixed value.
- Comparison of two mean values.
- Type I error and type II error. Power. Average value reliability limits and average value difference.
- Qualitative characteristics: Biaxial tables. Proportions. Ratio reliability limits. Ratio comparison.
- Correlation of quantitative characteristics: Parametric and non-parametric correlation coefficient. Simple linear dependance (regression).
- Introduction to multiple linear dependency (regression). Covariance of two variables, analyzing variance. Measurement tools reliability check.
- Modern methods of analysis and interpretation of reliability studies in the field of studies. Design, collection, analysis and interpretation of epidemiological study data.
- Statistical packages: SPSS, MedCalc etc.: Introduction to the use of statistical packages. Data analysis exercises with the use of a computer.

Methods and means of teaching: 13 weeks X 2 hours & 1-hour exercise practice

Assessment methods:

- Final Written examination (60%), that could contain:
- Delivery and presentation of individual written study. (30%)
- Delivery of group written study & presentation (10%).

References (indicative):

1. Bowers, D. Fundamental concepts in Biostatistics, P. H. Paschalidis, 2011
2. Pegano, M. and Gauvreau K. Principles of Biostatistics, Ellin, 2002
3. Trihopoulos, D. Tzonou, A. and Katsougianni, K. Biostatistics, Parisianos, 2000
4. Kirkwood, B. and Sterne, J. Essentials of Medical Statistics. Blackwell Science, 2003
5. Field, A. Discovering Statistics using IBM SPSS statistics, 4th ed., Sage Publication, 2013