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Clinical Statistics

Statistically Significant & Clinically Relevant

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Note to Participants: There are interactive pop-up questions throughout this lecture. If you choose to pause the lecture and return at a later time, a natural break time would be after answering the interactive questions. (You are able to pause at any time and the presentation will "remember" where you were. It's just a more natural time to pause after the interactive questions.) For your convenience, this outline reflects where/when within the lecture the interactive questions occur.

This lecture has 40 slides and is 41 minutes in duration.

Notes

I. Purpose

II. Crux of all research designs
   A. What is my research question?
   B. What type of numbers am I dealing with?
   C. Are my data normally distributed?

III. Designs/statistics
   A. Three basic types
      1. Describe
      2. Compare
      3. Relationship/association
   B. Levels of measurement
      1. Nominal or discrete
      2. Ordinal
      3. Continuous/interval/ratio
      4. Be careful when converting from one level to another (and back again)! Example: Clinical Outcomes Scoring Instruments
   C. Distribution
      1. Discrete and ordinal numbers are distribution free
      2. Parametric (continuous numbers – normally distributed)
      3. Non-parametric (continuous numbers – not normally distributed –may not have a large enough sample size)

Interactive Questions — slide 12 @ 12 minutes

   D. Algorithms for:
      1. Descriptive statistics

Interactive Questions — slide 17 @ 15 minutes

      2. Comparative statistics

Interactive Questions — slide 21 @ 22 minutes

      3. Relationship/association statistics

Interactive Questions — slide 27 @ 29 minutes

Notes

E. Sample size calculation

IV. Sensitivity/specificity
- A. Sensitivity
- B. Specificity
- C. False negative proportion
- D. Positive predictive value (PPV)
- E. Negative predictive value (NPV)

V. Power
- A. Ability to say “no” and *never* change your mind.
- B. Example: O.J. Simpson trial (first one) and reasonable doubt.
  1. Not enough data to say not guilty beyond a reasonable doubt.
  2. Similar to power because:
     a. Need enough data to know that “no” (NSD) is the correct answer.
     b. Once you get to “yes,” (SD), power is irrelevant.
- C. To determine power, need to know:
  1. Population variability
  2. Number of units of measurement that are clinically relevant.
- D. α & β
  1. α = Type I error: sample size is too large
  2. β = Type II error
     a. Sample size is too small.
     b. Power minimizes.

Interactive Questions — slide 36 @ 37 minutes

VI. Summary

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