**Healthcare Information & Decision Equation: Information🡺Decision 🡺Action🡺Outcome**

**Is it true🡺Is it useful 🡺Is it usable?**

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| **Correlation analysis** is a mechanism to analyze how different variables relate to each other.  **Types of Variables: s**tatistical tests are chosen based on type of variables; the 4 main types are—   * **Nominal** (named categories without any measurable scale such as ethnic groups) * **Dichotomous** or binary (two mutually exclusive categories resulting in “either this or that” such as “death” or “survival”) * **Ordinal** or ranked (three or more variables that can be “ordered” or ranked such as good/better/best or satisfied/neutral/unsatisfied) * **Continuous** (can be anywhere along a continuum, e.g., blood glucose readings) * Variables under study are also classed as “**dependent**” (the outcome under study) or “**independent**” (all others that might affect the “dependent” variable)   **Correlation Analysis** includes the following analysis categories— | | |
| **Analysis Type** | **Purpose** | **Analysis Methods** |
| Univariate Analysis | Methods for analyzing data on a single variable | Frequency distribution |
| Bivariate Analysis | Assess relationship of two variables | Correlation analysis  Linear regression |
| Multivariable Analysis | Assess relationship of multiple variables to a single outcome | Multiple regression  Proportional hazards |
| Multivariate Analysis | Assess relationship of multiple variables to multiple outcomes | (not reviewed) |
| Sometimes “-variate” and “-variable” get misapplied | | |
| **Pearson Correlation Coefficient**   * Commonly used correlation analysis method * Extent of the linear relationship (how independent and dependent variables change together) is calculated for the two variables by calculating the **Pearson correlation coefficient,** referred to as the **r value** * Pearson correlation coefficient (r) is frequently used when both variables are continuous to show **how variables change together**, e.g., salt intake and blood pressure * The *correlation coefficient* has a range of possible values from -1 to +1 * 0 indicates no relationship between the dependent and independent variables * Positive correlation coefficients indicate that as the value of the independent variable increases, the value of the dependent variable increases * Negative correlation coefficients indicate that as the value of the independent variable increases, the value of the dependent variable decreases * r2 (square of the correlation coefficient) represents the proportion of variation in y (on an x-y plot) explained by x (or vice versa)   + Example: “…A moderately strong inverse criterion validity correlation (Pearson correlation coefficient = -0.68) was shown when preoperative patients were administered both the AOFAS and FFI questionnaires, and the resultant scores were compared.” | | |
| **Critical Appraisal Considerations**   * It may be incorrect to draw cause/effect conclusions from correlations   + Example: Height/weight are correlated, but height does not cause weight | | |