GOD HAS NO RELIGION

Mahatma Gandhi
15 August 1947
SAMPLE SIZE DETERMINATION

TROPICAL MEDICINE
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By...
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Why ?

- n is large enough to provide a reliable answer to the research question
- too small n → a waste of time
- too many n → a waste of money & other resources
- May be unethical e.g. delayed beneficial therapy
When?

- Quantitative research
  - Descriptive study
  - Analytical study
    - Cohort study
    - Case-control study
    - Cross-sectional study
- Intervention study
  - Experimental study (RCT)
  - Quasi-experimental study (Non-RCT)
- In “Research Methodology”
RESEARCH QUESTION IN POPULATION

1. Question?
2. Check Answer
3. Objectives
4. Methodology
5. Data Collection
6. Data Analysis
7. Summary & Suggestions
8. Utilization & Publication

RESULTS OF STUDY IN SAMPLE

95% CI p-value
RESEARCH QUESTION IN POPULATION

1. Question?
2. Check Answer
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95% CI p-value

RESULTS OF STUDY IN SAMPLE
RESEARCH QUESTION IN POPULATION

1. Question?
2. Check Answer
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Prob. Sampling
- Simple
- Stratified
- Systematic
- Cluster

Sample Size
\[ n = \frac{Z^2 \sigma \ pq}{d^2} \]
\[ n = \frac{Z^2 \sigma^2}{d^2} \]

RESULTS OF STUDY IN SAMPLE
Inferential statistics needs representative sample

- Two components of representative sample
  - Probability sampling
  - Adequate sample size

- Inferential statistics (95% CI, p-value)
  - Predict results in the study population by using the discovered results in the relevant samples
Probability sampling

• Single stage
  • Simple random sampling
  • Systematic sampling
  • Stratified random sampling
  • Cluster sampling

• Multi-stages
  • Each stage must base on 4 methods above
Non-probability sampling

- Convenience (accidental) sampling
- Purposive (judgemental) sampling
- Quota sampling
- Snow ball (network, chain) sampling
Adequate sample size

- n is usually determined by the primary objective of the study
- method of calculating n should be given in the proposal, together with the assumptions made in the calculation
Steps of sample size determination

• Determine primary objective of the study
• Translate it into relevant statistics
  • Proportion (describe, compare)
  • Mean (describe, compare)
  • Correlation
• Calculate sample size regarding the defined statistics
• Justify for related measurement
  • Before-after measurement in the same individual
  • Matching
WINPEPI
a free sample-size calculator

• Search google for “winpepi”

WINPEPI (PEPI-for-Windows) - Brixton Health
www.brixtonhealth.com/pepi4windows.html
Joe Abramson has developed an augmented Windows version (WINPEPI) of the PEPI.
You can read a description of WINPEPI (published in Epidemiologic...
WINPEPI
a free sample-size calculator

- Download the latest version & install

WINPEPI (PEPI-for-Windows)

Joe Abramson has developed an augmented Windows version (WINPEPI) of the PEPI suite of programs for epidemiologists. Clicking [link](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3041648/pdf/1742-5573-8-1.pdf). A list of currently available functions:

The latest update (version 11.47) was posted to this site on May 19, 2015.

- Download the latest version of WINPEPI as an executable (.EXE) file (8.8 mb).

The downloaded file will be WinPepiSetup.exe. Alternatively, you can download it in a ZIP archive:

- Download the latest version of WINPEPI as a .ZIP archive (8.8 mb)

which you will have to open to access WinPepiSetup.exe.
Welcome to the WinPepi Setup Wizard

This will install WinPepi on your computer.

It is recommended that you close all other applications before continuing.

Click Next to continue, or Cancel to exit Setup.

Information

Please read the following important information before continuing.

When you are ready to continue with Setup, click Next.

If any WinPepi statistical programs are open, close them before continuing with the installation.

The latest WinPepi programs and manuals will be put in the folder you select.

If WinPepi was installed previously, use the same folder as before; the old versions will be replaced.

IMPORTANT: When asked to select additional tasks, select "Create a desktop icon". This will give you a WinPepi portal providing easy access to the programs, their manuals, an index to the statistical procedures, and saved results.

Select Start Menu Folder

Where should Setup place the program's shortcuts?

Setup will create the program's shortcuts in the following Start Menu folder.

To continue, click Next. If you would like to select a different folder, click Browse.

Select Destination Location

Where should WinPepi be installed?

Setup will install WinPepi into the following folder.

To continue, click Next. If you would like to select a different folder, click Browse.
Select Additional Tasks

Which additional tasks should be performed?

Select the additional tasks you would like Setup to perform while installing WinPepi, then click Next.

Additional icons:

- Create a desktop icon

Completing the WinPepi Setup Wizard

Setup has finished installing WinPepi on your computer. The application may be launched by selecting the installed icons. Click Finish to exit Setup.

Information

Please read the following important information before continuing.

When you are ready to continue with Setup, click Next.

If you find you have more than one WinPepi icon on your desktop, retain the newest one (the shortcut to winpepi.exe version 11.47).

A PDF reader must be available in your computer, or you will not be able to read the manuals.

To uninstall WinPepi, click on "Add or Remove Programs" in the Control Panel. Alternatively, merely delete the files.
WINPEPI
a free sample-size calculator

- Start using by clicking on the desktop shortcut
WinPepi PORTAL
Copyright J.H. Abramson, May 19, 2015
Version 11.47

As a handy gateway to WinPepi, you should have a shortcut to this program (winpepi.exe) on your desktop. The programs and manuals may also be accessed directly, by clicking on their icons or names on your screen. The index can also be shown by pressing F9 in any WinPepi program or by clicking on FINDER.PDF or its icon.

- View an index to the statistical procedures and programs.

### OPEN A WINPEPI PROGRAM
- COMPARE2 (comparison of two independent groups or sample)
- DESCRIBE (descriptive epidemiology)
- ETCETERA (miscellaneous procedures)
- LOGISTIC (multiple logistic regression)
- PAIRSetc (analysis of matched observations)
- POISSON (Poisson regression)
- WHATIS (calculator and other aids)

### Latest versions:
- COMPARE3.59, DESCRIBE 2.82, ETCETERA 3.00, LOGISTIC 1.54
- PAIRSETC 3.46, POISSON 1.27, WHATIS 4.60.

TO RETURN TO THIS PORTAL, press "WinPepi" in the top menu of any WinPepi program.
## 4 Modules for sample size calculation

**Modules**
- Describe
- Compare2
- Pairsetc
- Etcetera

**Functions**
- Estimate proportion, mean
- Compare 2 proportions, 2 means (assessment of association between variables)
- Related measurement
- Correlation
DESCRIBE provides procedures for use in descriptive epidemiology to appraise separate samples in comparative studies, but does not include procedures for the statistical analysis of matched data. This is because such analysis typically requires more data than is available from the procedures included in this system.

For each type of study that can be chosen, the number of cases is estimated, and a method is also given for the estimation of the number of cases for each stratum. For a simple random sample, the number of cases is estimated as

\[
\frac{N \times (1 - p)}{p + \frac{1}{1 - p}}
\]

where \(N\) is the total size of the population, \(p\) is the prevalence rate of the condition, and \(\frac{1}{1 - p}\) is the reciprocal of the prevalence rate. For a stratified sample, the number of cases in each stratum is estimated as

\[
\frac{N_s \times (1 - p)}{p + \frac{1}{1 - p}}
\]

where \(N_s\) is the size of the stratum in the population. For a cluster sample, equal-sizes are assumed; enter the estimated design effect or rate of homogeneity. "Prevalence rate" = cases per (e.g.) 1,000. "Acceptable error" or "acceptable difference" = half the total width of the desired confidence interval. Press <Ent> or <Space> after entries, <Esc> to erase.
Though divided by sky and sea, and sea, and sea,
Love brings thy lover to thee forever.
Divided would ye be in hatred, in hatred, in hatred,
Under a sky cleft asunder, though heaven be one.

Seni Pramoj
Ex-Priminister
of Thailand
THANK YOU FOR YOUR ATTENTION