



มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University

CHAPTER 4

RESEARCH METHODOLOGY

ระเบียบวิธีวิจัย

Episode 4.3 Descriptive statistics

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Content

- Statistics Concept
- Descriptive Statistics





STATISTICS CONCEPT



Definition

- Statistics is a branch of science that deals with the collection, organization, and analysis of data from the sample to the whole population.
- Statistics is the science of making effective use of numerical data which is related to the collection, analysis, and interpretation of data.
- Statistics is the study of how to collect, organize, analyze, and Interpret data.

(Munro, 2001; Winters, Winters & Amedee, 2010)

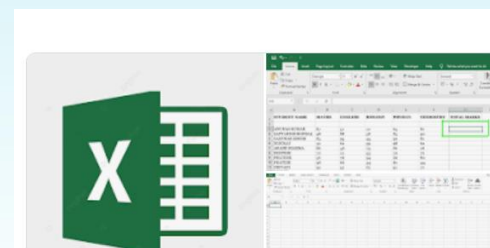
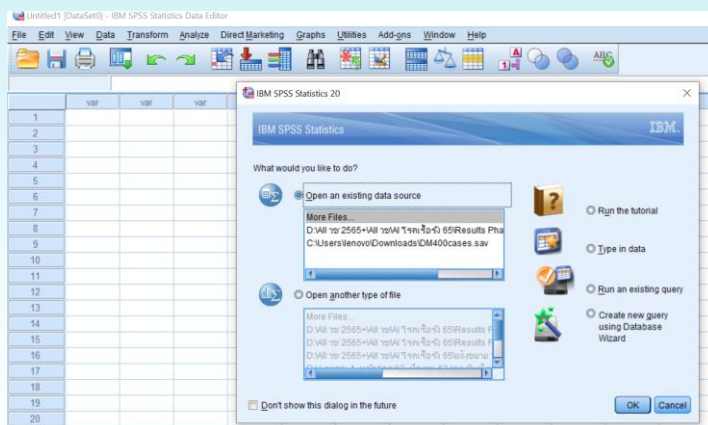
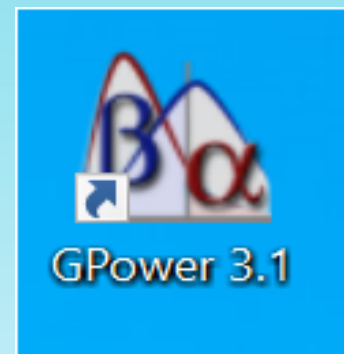


STATISTICS CONCEPT



Role of Statistics in Nursing Research

1. Establishing a sample size
2. Testing of hypothesis
3. Data analysis, interpretation and presentation





Scales of Measurement



- In nursing research, the variables or numbers are defined and categorized using different scales of measurement.
- Each level of measurement scale has specific properties that determine the various uses of statistical analysis.

Levels of measurements

- ✓ Nominal Scale: **gender etc.**
- ✓ Ordinal Scale: **educational background etc.**
- ✓ Interval Scale: **room temperature, testing score, etc.**
- ✓ Ratio Scale: **age, weight, height, BP, BS, etc.**

(Munro, 2001; Winters, Winters & Amedee, 2010)



TYPES OF STATISTICS



There are two approaches to the statistical analysis of data

❖ **Descriptive Statistics:**

Descriptive statistics are techniques that help the investigator to organize, summarize and describe measures of a sample.

❖ **Inferential statistics:**

The inferential approach helps to decide whether the outcome of the study is a result of factors planned within the design of the study or determined by chance.

(Munro, 2001; Winters, Winters & Amedee, 2010)



Descriptive Statistics

What are descriptive statistics?

- Descriptive statistics summarizes or describes the characteristics of a data set.
- Descriptive statistics consists of three basic categories of measures: measures of central tendency, measures of variability (or spread), and frequency distribution.

(Munro, 2001; Winters, Winters & Amedee, 2010)



Descriptive Statistics

What are the three basic categories of measures?

- The three basic categories of measures: measures of central tendency, measures of variability (or spread), and frequency distribution.

1) Measures of central tendency describe the center of the data set (mean, median, mode).

2) Measures of variability describe the dispersion of the data set (range, variance, standard deviation).

3) Measures of frequency distribution describe the occurrence of data within the data set (count).

(Munro, 2001)



Descriptive Statistics:

Measures of central tendency



Mean (Arithmetic) (ค่าเฉลี่ย)

If we have n values in a data set and they have values X_1, X_2, \dots, X_n , the sample mean, usually denoted by (pronounced x bar), is:

$$\bar{x} = \frac{(x_1 + x_2 + \dots + x_n)}{n}$$

$$\bar{x} = \frac{\sum x}{n}$$

Mean = {Sum of Observations} ÷ {Total number of Observations}



Descriptive Statistics:

Measures of central tendency

Median (มัธยฐาน)

The median is a set of data, which is the middle number. Also, arrange all the data from lowest to highest and then take the middle number.

EX1 3, 6, **10**, 14, 19 > median=10

EX2 2, 3, **4, 5**, 9, 10 > median=(4+5)/2=4.5

Mode (ฐานนิยม)

The mode in a set of data is the number that occurs the most.

Ex1 2, 5, **12, 12**, 25 **12** 10 25, 85 > Mode = 12

Ex2: **108 85 108** 90 75 100 **85** > Mode = 108, 85



Descriptive Statistics:

Measures of central tendency



Levels of measurements

- ✓ Nominal Scale: **gender etc.** → **Mode**
- ✓ Ordinal Scale: **educational background etc.** → **Median**
- ✓ Interval Scale: **room temperature, testing score, etc.** → **Mean**
- ✓ Ratio Scale: **age, weight, height, BP, BS, etc.** → **Mean**

(Munro, 2001; Winters, Winters & Amedee, 2010)



Descriptive Statistics:

Measures of variability (Dispersion)

การวัดความแปรปรวน (การกระจาย)

- ✓ VARIABILITY (Dispersion) provides a quantitative measure of the degree to which scores in a distribution are spread out or clustered together.

The measure of variability or dispersion

- range (พิสัย)
- standard deviation (ส่วนเบี่ยงเบนมาตรฐาน)
- variance (ความแปรปรวน)



Descriptive Statistics:

Measures of variability (Dispersion)

Range (พิสัย)

It is the difference between the lowest and highest number in the set.

$$\text{Range} = X_{\text{highest}} - X_{\text{lowest}}$$



Descriptive Statistics:

Measures of variability (Dispersion)



Standard deviation, SD (ส่วนเบี่ยงเบนมาตรฐาน)

It is used the mean as a reference point and approximates the average distance of each score from the mean.

A deviation (x) is the difference between an individual score and the mean.

Formulas of standard Deviation

Standard Deviation (s or SD)* is

$$SD = \sqrt{\frac{\sum x^2}{N}}$$



Descriptive Statistics:

Measures of variability (Dispersion)



Variance, SD^2 (ความแปรปรวน)

The variance is simply the value of the standard deviation before a square root has been taken.

$$\text{Variance} = \frac{\sum x^2}{N} = SD^2$$

(Munro, 2001)



Descriptive Statistics



Table 2 Socio-demographics characteristics of the participants (N=93)

Socio-demographics characteristics	PWHRs n (%)	Family members n (%)
Gender		
Female	74 (79.6)	73 (78.5)
Male	19 (20.4)	20 (21.5)
Age (year)		
Range	42 – 90	18 – 53
Mean (standard deviation)	72.99 (6.8)	32.8 (9.4)
Underlying disease		0 (0.0)
Hypertension with Hypercholesterolemia	44 (47.3)	-
Hypertension with Diabetes	27 (29.0)	-
Hypertension with Controlled Heart Disease	9 (9.7)	-
Hypertension with Diabetes with Chronic Renal Failure	7 (7.5)	-
Hypertension with Rheumatoid Arthritis	4 (4.3)	-
Hypertension with Migraine	1 (1.1)	-
Hypertension with Chronic Obstructive Pulmonary Disease	1 (1.1)	-
Education level		
Primary school	77 (82.7)	63 (67.7)
Secondary school	12 (12.9)	26 (28.0)
High vocational certificate	2 (2.2)	1 (1.1)
Bachelor degree	2 (2.2)	3 (3.2)
Number of year of formal study		
Range	6 – 16	6 – 16
Mean (standard deviation)	7.18 (2.3)	8.26 (3.3)
Living condition (number of family members, peoples)		
Range	2 – 12	2 – 12
Mean (standard deviation)	4.73 (2.2)	4.73 (2.2)
Family economic status		
Sufficient income and deposit	68 (73.1)	68 (73.1)
Sufficient income	12 (12.9)	12 (12.9)
Insufficient income and owed	9 (9.7)	9 (9.7)
Insufficient income	4 (4.3)	4 (4.3)
# community participation /month		
Range	0 – 10	-
Mean (standard deviation)	1.14 (1.6)	-
# religious ritual /week		
Range	0 – 4	-
Mean (standard deviation)	1.86 (1.2)	-
Relationship		
Daughter / Son	-	45 (48.4)
Daughter in law	-	39 (41.9)
Wife / Husband	-	5 (5.4)
Sibling / Offspring	-	4 (4.3)

= Frequency of

(Waelveerakup, Lapvongwatana, Leelacharas, Davison, 2019)



Thank you



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