# Introduction – Slides + Notes

**Research** is a systemic inquiry using disciplined methods to solve problems

**\* Types based on the level of control:** (from the least controlled to the most controlled type)

**1- Descriptive**: is used to describe characteristics of a population or phenomenon being studied.
no interventions.
it's important when the phenomenon is being studied for the first time.
**2- Exploratory**: advanced step but it depends on descriptive researches
**3- Predictive**
**4- Quasi Experimental:** less control than experimental
**5- Experimental:** all the important factors that might affect the phenomena of interest are completely controlled

- when we say that this type has higher level of control, it means that it has more restrictive criteria to accept the sample
**- Random assignment**: randomly selected sample that is used to make generalizations ..
- the sample is divided into 2 groups:
**interventional** group and **control** group

## Major Classes of Quantitative research:

**1. Experimental Research (RCT):** researchers actively introduce an intervention or treatment
**2. non-experimental:** collecting data without intervention or treatment

**- Convenience Sampling vs. Random Sampling:**
the selection of subjects in convenience sampling based on their availability and proximity to the researcher whereas the selection in the random sampling is based on certain criteria

# Variable

- it is the characteristic or quality that takes on different values that vary from one person to another..
- examples: blood type, weight, length of staying in hospital
- it should has at least 2 values
    * if we want to study the coping strategies of patients with prostate cancer. here the gender is not a variable

**- Types:**
1. Continuous: has an infinite number of values between two points. eg. height
2. Discrete: has a finite number of values between any two points, representing discrete quantities eg. no. of children (order is important).
3. categorical: has small range of values that do not represent a quantity. eg. marital status (order is not important).
4. dichotomous: takes on 2 values. eg. gender (can be artificial or created by the researcher, eg. age under 65 and age above 65)

**- IV vs DV**
1. Independent Variable (IV) --> the presumed cause
2. Dependent Variable (DV) --> the presumed effect
          Example: Smoking is the IV and Lung Cancer is the DV
 in all types of researches, the 2 types are used except in descriptive researches

**Conceptual and operational definitions**

1. conceptual definition: the abstract or theoretical meaning of a concept being studied (you can use the most common or the one that convinces you).

2. operational definition: the operations (measurements) a researcher must perform to collect the desired information (using different scales, for example: pain scale)

# Phases in Quantitative Study

**PHASE 1: Conceptual Phase**

major steps:
 1. Formulating the Problem
2. reviewing the related literature
3. undertaking clinical field work (if it's feasible or not)
4. Defining framework and developing conceptual definitions
5. formulating Hypotheses (not in descriptive research): include at least 2 variables

**PHASE 2: Design and Planning**

1. select research design (including all steps: such as the way the data will be collected, the setting, etc.)
2. Developing interventional protocols
3. Identifying the population (the individuals or objects with common, defining characteristics)
4. designing the sample plan (subset of the population): how the sample will be selected and recruited
5. specifying methods to measure research variables and collect data
6. developing methods to protect human rights
7. Finalizing and reviewing the research plan

- in this course, we'll focus on Phase 1 and 2 … each group has to write a proposal that contains: introduction, Literature Review and methods

**PHASE 3: Empirical**

1. collecting Data (by questionnaires for example)
2. preparing data for analysis

**PHASE 4: Analytic**

1. Analyzing the data
2. interpreting the results

**PHASE 5: Dissemination**

1. communicating findings (journals, conference presentations, etc)
2. utilizing findings in practice

# Research Problems, Questions and Hypotheses

- **research problem** is a situation or circumstance that requires a solution to be described, explained or predicted
**OR** a discrepancy between the way things are and the way they ought to be
**OR** a knowledge gap in the area that needs to be investigated

- the problem is related to but different from the topic and the purpose

**Developing and refining research problem**

1. selecting a broad topic
2. narrowing the topic: by asking Qs to help focus the inquiry
   examples: what is going on with...? what factors contribute to....?


**Sources of research problem**

1. Experience and clinical field
2. health literature
3. quality improvement efforts
4. social issues
5. theory
6. External suggestions

**Evaluating Research Problem**

- significance of the problem
- Researchability of the problem
- Feasibility of addressing the problem (time, resources, ethics, cooperation of others)
- researcher interest

**Problem Statement**

it identifies the nature, context and significance of the problem

- Should be broad enough to include central concerns
- Should be narrow enough to serve as a guide to study design

**BOX 4.1** Draft Problem Statement on Humor and Stress

A diagnosis of cancer is associated with high levels of stress. Sizeable numbers of patients who receive a cancer diagnosis describe feelings of uncertainty, fear, anger, and loss of control. Interpersonal relationships, psychological functioning, and role performance have all been found to suffer following cancer diagnosis and treatment.

A variety of alternative/complementary therapies have been developed in an effort to decrease the harmful effects of stress on psychological and physiological functioning, and resources devoted to these therapies (money and staff) have increased in recent years. However, many of these therapies have not been carefully evaluated to determine their efficacy, safety, or cost effectiveness. For example, the use of humor has been recommended as a therapeutic device to improve quality of life, decrease stress, and perhaps improve immune functioning, but the evidence to justify its popularity is scant.

**BOX 4.2** Some Possible Improvements to Problem Statement on Humor and Stress

Each year, more than 1 million people are diagnosed with cancer, which remains one of the top causes of death among both men and women (citations). Numerous studies have documented that a diagnosis of cancer is associated with high levels of stress. Sizeable numbers of patients who receive a cancer diagnosis describe feelings of uncertainty, fear, anger, and loss of control (citations). Interpersonal relationships, psychological functioning, and role performance have all been found to suffer following cancer diagnosis and treatment (citations). These stressful outcomes can, in turn, adversely affect health, long-term prognosis, and medical costs among cancer survivors (citations).

A variety of alternative/complementary therapies have been developed in an effort to decrease the harmful effects of stress on psychological and physiological functioning, and resources devoted to these therapies (money and staff) have increased in recent years (citations). However, many of these therapies have not been carefully evaluated to determine their efficacy, safety, or cost effectiveness. For example, the use of humor has been recommended as a therapeutic device to improve quality of life, decrease stress, and perhaps improve immune functioning (citations), but the evidence to justify its popularity is scant. Preliminary findings from a recent small-scale endocrinology study with a healthy sample exposed to a humorous intervention (citation), however, holds promise for further inquiry with immunocompromised populations.

## Basic Terminology

- Research questions are the specific queries researchers want to answer
- Hypotheses: the researcher's predictions about relationships among variables
- Statement of purpose: summary of overall study goal
- Aims or Objectives: the specific accomplishments researchers hope to achieve

## Hypothesis

- suggests a predictable relationship between variables
- 2 variables at least
- must contain terms that indicate relationships (more than, different from, etc)

**- Simple vs complex hypothesis:**
   simple: states an expected relationship between one independent and one dependent variable
   complex: a prediction of a relationship between two or more independent variables and two or more dependent variables.

**- Directional vs. non-directional**
   directional: predicts the direction of a relationship
   non-directional: predicts the existence of a relationship
*Directional hypothesis is stronger.

**- Research vs Statistical (Null)**
   Research: states the actual prediction of a relationship
   Null: expresses the absence of the relationship (only in statistical testing)
* rejecting the null hypothesis supports the research hypothesis