Measurement & data collection
unit 7
part 1

Foundation of nursing research fifth edition by Rose Marie Nieswiadomy

- The Objective of this lecture is to
  Identify the various methods used in data collection including:
- Observational methods.
- Types of questionnaire & interviews.
- Scales.

Existing Data Versus Original Data

One of the first decisions that investigators make with regard to research data concerns whether to use existing data or to collect data generated specifically for the study.

*Most researchers develop original data, but they often can take advantage of existing information..

Existing **records are an important data source for nurse researchers. A wealth of** data gathered for other than research purposes can be fruitfully(successfully) exploited(promote) to answer research questions.

Hospital records, patient charts, care plan statements, and the like all constitute rich data sources to which nurse researchers may have access.

The primary advantages of using existing data are that they are economical and time-saving. On the other hand, it may be difficult to find existing data that are ideally suited to answering a research question.

Major Types of Data Collection Methods

If existing data are unsuitable for a research question, researchers must collect new

data. Three types have been used most frequently by nurse researchers: observations, biophysiologic measures and self-reports,

- Observation methods

  Observation research is concerned with gathering data through visual observation. For observation to be considered as scientific research, a carefully planned study is necessary . The researcher must decide the followings:

1. what behaviors will be observe,

2. who will observe the behaviors,

3. what observational procedure will be used , and

4. what type of relationship will exist between the observer and the subjects.

- In structured observations, the expected behaviours are <u>predetermined</u> , and the frequency of occurrence is noted during data collection .

- In unstructured observations, the researcher describes events or behaviors as they occur, with <u>no preconceived </u>ideas of what will be seen

Relationship between observer and subjects

A- nonparticipant observer(overt), the observer openly identifies that she or he conducting research and provides subjects with information about the type of data that will be collected.

B- nonparticipant observer(covert),is one who does not, before the beginning of data collection , identify herself or himself to the subjects who are being observed . generally this type of research is not ethical

C-participant observer(overt)becomes involved with participants openly and with full awareness of those people who will be observed.

D-participant observer(covert) the observer interacts with the participants and observes their behavior with out their knowledge. This type of observer might be called a 'plant' or 'spy' by people who find out the real purpose of the researcher's behavior. there are very few situations in which this type of observation is ethical.

Evaluation of Observational Methods

Certain research questions are better suited to observation than to self-reports, such as when people cannot adequately describe their own behaviors . This may be the case when:

*people are unaware of their own behavior (e.g., stress-induced behavior),

* when behaviors are emotionally laden (e.g., grieving behavior), or

* when people are not capable of reporting their actions (e.g., young children or the mentally ill)

Observational methods have an intrinsic appeal(attractiveness) for directly capturing behaviors and events. Moreover, nurses are often in a position to watch people's behaviors and may, by training, be especially sensitive observers.

A number of factors interfere with objective observations, including the following:

- Emotions, preconceptions, attitudes, and values of observers may result in faulty inference.

- Personal interest and commitment may color what is seen in the direction of what observers want to see.

- Anticipation of what is to be observed may affect

  what *is observed.*

- Rash   decisions before adequate information is collected may result in incorrect classifications

  or conclusions.

Observational biases probably cannot be eliminated completely, but they can be minimized through careful training.

BIOPHYSIOLOGIC MEASURES

Biophysiologic measures include both in vivo and in vitro measures.

In **vivo** measures are those performed **directly** within or on living organisms, such as blood pressure, body temperature, and vital capacity measurement.

In vivo instruments are available to measure all bodily functions, and technologic advances continue to improve the ability to measure biophysiologic phenomena more accurately, and conveniently.

With in **vitro** measures, data are **gathered from** participants by extracting biophysiologic material from them and subjecting it to analysis by specialized **laboratory** technicians. In vitro measures include chemical measures (e.g., the measurement of hormone, sugar, or potassium levels); microbiologic measures (e.g., bacterial counts and identification); and cytologic or histologic measures (e.g., tissue biopsies).

SELFREPORT INSTRUMENTS

A researcher collecting structured self-report data for a quantitative study almost always uses a formal, written instrument.

The instrument is an **interview schedule when the questions are asked** orally in either face-to-face or telephone interviews.

It is called a **questionnaire or an SAQ (self administered** questionnaire) when respondents complete the instrument themselves.

- A questionnaire

  Is a paper- and –pencil self report instrument . It contain questions that respondents are asked to answer in writing

- Language and reading level of questions

  A questionnaire should be written in respondent's preferred language and should be appropriate for the knowledge and reading of the least educated respondent.

- Length of the questionnaire and questions:

The length of the questionnaire may influence respondent's willingness to participate in the research. It would probably be advisable to limit the required completion time to 10 minutes or less, which means the questionnaire should probably not be longer than two or three pages . Questions should be kept as short as possible. A desirable length for a question less than 20 words. A question may need to be divided into two questions if the length become excessive or the question asks the respondent to consider more than one idea at a time.

- # Wording of the questions:

The most difficult aspect of questionnaire construction is the actual wording of individual questions . Here are some general guidelines:

1- State questions as Affirmative Rather Than Negative Manner.

2- Avoid Ambiguous Questions

Ambiguous questions contain words that have more than one meaning or can be interpreted differently by various people . Examples of such words are many , usually, few, large, several, and generally

3- Avoid double negative questions

It is difficult for respondents to reply to question like this: 'don't you disagree with the idea….'

4- Questions should contain neutral wording

example of neutrally worded question ' what is your opinion about cigarette smoking?

example of completely biased question 'you do not believe that people should smoke cigarette , do you?'

5- Avoid Double -Barreled questions

Double –Barreled questions ask two questions in one. Example of such questions might be .'Do you plan to pursue a master degree in nursing and seek an administrative position upon graduation ?'when question contains 'and' it is quite likely that two questions are being asked rather than one.

- Types of questions :

There are many ways to categorize questions These categories of questions :demographic , open –ended, closed- ended, contingency, and filler questions.

- Demographic questions

Gather data on the characteristics of the sample , such as , age, education level, religion. Nearly every questionnaire seeks some kind of demographic data. These data are used to describe the study sample . Also these data may be subjected to statistical analysis to examine relationships between these respondent characteristics and other variables of interest in the study .

- **Open –Ended Questions**

  The researcher asks respondents to complete questions in their own words in open-ended questions. Essay and fill in blank are types of open –ended questions. It may be used in combination with closed –ended questions.

- **Close –Ended Questions**

  The most structured questions are closed –ended questions in which the respondents are asked to choose from given alternatives. There may be only two alternatives, as in a true- or- false question, or there may be many , as in checklist type of question where respondents are asked to check all items that apply to them. Other typed of closed-ended questions include multiple –choice questions and matching questions.

Examples of Closed-Ended Questions

1. Dichotomous question

Have you ever been hospitalized?

1. Yes

2. No

 2. Multiple-choice question

How important is it to you to avoid a pregnancy at this time?

1. Extremely important

2. Very important

3. Somewhat important

4. Not important

- Contingency (possibility) questions

  Questionnaire items that are relevant for some respondents and not for others are called contingency questions. For example , a researcher might want to determine if a client has been satisfied with type of nursing care received during previous hospitalization .

  $\longrightarrow$

If the client has not been hospitalized previously , an answer could not be provided to this particular question.

1- Have you ever been hospitalized before?

'yes' ----→ How would you rate the care you received during your last hospitalization?

'No '

2- the arrow indicates that respondents who answer 'yes' also should answer the question on the right. Respondents who answer 'No' will continue downward on the questionnaire

- Filler questions

  Filler questions are items in which the researcher has no direct interest but are included on a questionnaire to reduce the emphasis on the specific purpose of other questions. For example if the main purpose of the study was to gain information concerning patient's perceptions of the nursing care they had received , the researcher might include a lot of other questions about food they had been served , visiting hours, and so on.

Patients might answer more honestly if few questions about the nursing care they received were scattered in among a lot of other questions. If the subjects could determine that only purpose of the study was obtained their perception of nursing care, they might hesitate to criticize the nursing care they had received

part 2

- **Interview**

Is a method of data collection in which a interviewer obtains responses from a subject in face-to –face encounter or through a telephone call. Interviews are frequently used in descriptive research studies and qualitative studies. Data are recorded on an interview schedule or may be recorded.

Types of interviews

1- unstructured interviews , the investigator is given a great deal of freedom to direct the course of interview . the investigator may start with broad opening statement like , 'Tell me what it was like for you after your husband had his heart attack'

Depending on how the spouse responds to this opening question, further questions are formulated.

2- structured interviews involve asking the same questions, in the same order, and in the same manner of all respondents in a study . structured interviews are most appropriate when straightforward factual information is desired.

Interviewers must try to remain very objective during the interview and avoid unnecessary interactions with respondents.

3-Most interviews fall some where in between the structured and un structured types of interviews.

During semi structured interview , both closed-ended and open –ended questions are included. In this type of interview, data are gathered that can be compared across all respondents in the study.

Interviews Versus Questionnaires

Researchers using structured self-reports must decide whether to use interviews or questionnaires, and the decision can affect the findings and the quality of the evidence.

Questionnaires, relative to interviews, have the following advantages

1. Questionnaires are less costly and require less time and effort to administer; this is a particular advantage if the sample is geographically dispersed. Internet questionnaires are especially economical and are likely to be an increasingly important means of distributing questionnaires.

2. Questionnaires offer the possibility of greater perceived privacy

3. The absence of an interviewer avoids biases reflecting respondents' reaction to the interviewer rather than to the questions themselves.

The strengths of interviews outweigh those of questionnaires:

1. Response rates tend to be high in face-to-face interviews. Respondents are less likely to refuse to talk to an interviewer than to ignore a questionnaire, especially a mailed questionnaire.

2. Many people simply cannot fill out a questionnaire; examples include young children, the blind, and the very elderly. Interviews are feasible with most people

3. Questions are less likely to be misinterpreted by respondents because interviewers can determine whether questions have been understood.

4. Interviewers can produce additional information through observation of respondents' living situation, degree of cooperativeness, and so on—all of which can be useful in interpreting responses.

Most advantages of face-to-face interviews also apply to telephone interviews.

Complicated or detailed instruments are not well suited to telephone interviewing,

but for relatively brief instruments, telephone interviews combine relatively low costs with high response rates.

In conclusion

Questionnaires are less costly and time-consuming than interviews, offer the possibility of anonymity (namelessness), and run no risk of interviewer bias;

However, interviews tend to yield higher response rates, to be suitable for a wider variety of people, and to yield richer data than questionnaires.

Scales and Other Forms of Structured Self-Reports

Several special types of structured self-report are used by nurse researchers. Some of these are social-psychological scales, Q sorts.

A **scale is a device that assigns a numeric score to people along a continuum,** like a scale for measuring weight.

Social-psychological scales are often incorporated into questionnaires or interview schedules. Social-psychological scales quantitatively discriminate among people with different attitudes, perceptions, and psychological traits.

The most commonly used attitude scales are the Likret scale and the semantic differential scales

1- Likret scale

This scale was named after its developer, Rensis Likert. **Likert scale, consists of several** declarative statements (**items) that express a viewpoint on a topic.** Respondents are asked to indicate how much they agree or disagree with the statement. These scales usually contain five to seven responses for each item, ranging from strongly agree to strongly disagree . A person's total score is determined by summing item scores (these scales are sometimes called **summated rating scales).**

2- The semantic differential scales

Another technique for measuring attitudes is the **semantic differential (SD). With** the SD, respondents are asked to rate concepts (e.g., dieting, exercise) on a series of *bipolar adjectives**, such as good/bad, effective/ineffective, important/unimportant.***

Respondents place a check at the appropriate point on a seven-point scale that extends from one extreme of the dimension to the other. SDs are flexible and easy to construct, and the concept being rated can be virtually anything— a person, concept, controversial issue, and so on.

The scoring procedure for SD responses is similar to that for Likert scales. Scores from 1 to 7 are assigned to each bipolar scale response, with higher scores generally associated with the positively worded adjective. Responses are then summed across the bipolar scales to yield a total score.

example

Kind   -- √ ----   ------   -----   ---------   unkind

1- friendly ----   ------   -------   ----   ---- unfriendly

2- sensitive ------   ----------   --------   ------- insensitive

3- caring ------   ----------   -------- -----------un caring

    The semantic scale is generally easier for subject to complete than Likert scale

3- visual analog scale (VAS)

Another type of psychosocial measure is the **visual analog scale (VAS), which** can be used to measure subjective experiences, such as pain, fatigue, and dyspnea . The VAS is a straight line, the end anchors of which are labeled as the extreme limits of the sensation or feeling being measured (Participants mark a point on the line corresponding to the amount of sensation experienced. Traditionally,

a VAS line is 100 mm in length, which makes it easy to derive a score from 0 to 100 by simply measuring the distance from one end of the scale to the mark on
 the line.

- Example

line should measure 100 mm in length

No Pain at all |-- ------------x--------------| Pain as bad

as it   could be

Q sort

Also called Q methodology, is a means of obtaining data in which subjects sort statements into categories according to their attitude toward , or rating of, the statements. The number of items be placed into each category or pile by subjects is predetermined by the researcher. This arrangement usually calls for piles to be distributed in the form of a bell shaped carve. If 100 items were being used, the distribution might look like this
1   4   11   21   26   21   11   4   1

The first pile from the left should contain the item about which the subject has the most positive attitude , and the last pile on the right should contain the items about which the subject has most negative attitude or the weakest belief about the importance of the item . Q sorts can be applied to a wide variety of problems. On the other hand, it is difficult and time-consuming to administer Q sorts to a large sample of people.

- A Delphi technique

  uses several rounds of questionnaires to seek consensus(general agreement) on a particular topic from group of expert , this procedure is appropriate for examining the opinions, beliefs , or future predictions of knowledgeable people on topic of interest

Scales are susceptible to several common problems, however, many of which are referred to as **response set biases including :**

1- Tendency to misrepresent attitudes or traits by giving answers that are consistent with prevailing social views

2-Tendency to consistently express extreme attitudes or feelings (e.g., strongly agree), leading to distortions because extreme responses may be unrelated to the trait being measured

3- Tendency to agree with statements regardless of their content by some people (yea-sayers)**. The opposite tendency for other** people (nay-sayers) to disagree with statements independently of the question content is less common.

- ## Self –test

Circle the letter before the best answer.

1- which of the following is an advantage of an interview method of data collection versus a questionnaire

A-Data are less expensive to obtain

B-the collected data tend to be more complete

C- Data collectors do not to be trained

D-Data may be collected more easily from a wide spread geographical area.

2- A purpose of observation research is to

A- determine beliefs of people

B-examine attitudes of people

C- obtain examples of people 's behaviour

D-analyze personal experience s of people

3- which of the following data-collection methods is most likely to obtain objective data?

A- observational methods

B-questionnaire

C-physiological measures

D- interviews

Self –test

4- There are several ways in which the wording of a question can bias the respondent and are not desirable in the formation of research questions. Which of the following is an example of an "ambiguous question" using the information on *Wording of Questions* in this lecture?

A.   How many servings of vegetables do you eat a day (serving defined as 1 cup of raw or ½ cup of cooked vegetables)?

B.   Do you often eat 5 or more servings of vegetables per day (serving defined as 1 cup of raw or ½ cup of cooked vegetables)?

C.   Do you not eat 5 or more servings of vegetables per day (serving defined as 1 cup of raw or ½ cup of cooked vegetables)?

D.   Do you eat 5 or more servings of vegetables per day as recommended by the United States Department of Agriculture (USDA) (serving defined as 1 cup of raw or ½ cup of cooked vegetables)?

5- Most research studies gather some information through the use of demographic questions. Which of the following is the reason for collecting demographic data?

A. Demographic questions tell the researcher whether the intervention in a study is having an effect on the outcome being studied.

B. Demographic questions are used to gather data on the characteristics of the sample of a given study.

C. It is required that all research studies collect information about the subjects in the study using demographic questions.

D. Demographic questions give the researcher information on the population of interest.

6- What is the purpose of using filler questions on a research questionnaire?

A.   Filler questions are used to weed out dishonest answers given by subjects.

B. Filler questions are used to reduce the emphasis on a specific topic.

C. Filler questions are used to emphasize a particular purpose of the study.

D. Filler questions are used to take up space and make the questionnaire longer.

7-   Which of the following would you classify as an *advantage* of using interview as a data-collection method for a nursing research study?

A.   Training programs are needed for the interviewer and this is an advantage of the method.

B.   An advantage in using interviews is the high response rate of this data-collection method.

C.   One advantage of the interview method of data collection is that the interview is frequently either video or audio recorded.

D.   One advantage of interviews is that advanced planning is done because the specifics of who, when, and where need to be addressed when setting up an interview.

8- Which type of data-collection method uses a checklist of possible behaviors?

A.   A checklist is not used in nursing research because it would not be compatible with the humanistic approach characteristic of all nursing research data-collection methods.

B.   Structured observations use a checklist to record frequency of previously identified behaviors.

C.   A semistructured observation is the most likely type of data collection to use a checklist.

D. Unstructured observations require a checklist.

9- A questionnaire that contains 5 choices for each question that range from 1 "strongly disagree" to 5 "strongly agree" with a neutral option of 3 "uncertain or no opinion" is an example of a ------------ .

10- **When the researcher has statements or words written on cards that reflect attributes of a phenomenon and asks the subjects to put those cards into piles that reflect their thoughts or attitudes about the words on the cards the method of data collection being used is .-------------**

11- *When the researcher uses multiple rounds of asking expert respondents to sort and prioritize information about a phenomenon the data-collection method being used is ------------ .*

12- Which type of data collection is presented in this chapter as "probably used more frequently in nursing research than any other data-collection method"?

A.   Psychological measures are probably the most frequently used data-collection method in nursing research.

B.   Questionnaires and interviews are probably used most frequently in nursing research.

C.   Direct observation of nursing care is probably the most frequently used data-collection method in nursing research.

D.   Physiological measures are probably the most frequently used data-collection method in nursing research.