Designing & Implementing a Data Collection Plan

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Data Collection in Quantitative Research

Basic decision is the use of:

- New data, collected specifically for research purposes, or
- Records (e.g., patient charts; Hospital records)
- Historical data
- Existing data set (secondary analysis

Secondary analysis

Involves the use of data gathered in a previous study to test new hypotheses or address new questions

- Efficient & economical because data collection is typically the most time-consuming & expensive part of a research project.
- Outcomes research frequently involves secondary analyses of clinical datasets.
- e.g., survey data about health habits from a national sample of adults could be analyzed to study smoking among rural men

Secondary analysis

Advantages: Bypass Time consuming and costly steps in the research process

Disadvantages:

- If researchers do not play a role in collecting the data, the chances are high that the data set will be deficient in one or more ways, such as in the sample used, the variables measured, and so forth.

Advantage of records

- Economical; the collection of original data is often time-consuming and costly.
- Unaware of the records' biases
- Privacy rules

Secondary data VS records

The difference between using records & doing secondary analyses is that:

- Researchers doing a secondary analysis typically have a ready-to-analyze data set.
- Researchers using records have to assemble the data set, & considerable coding and data manipulation usually are necessary.

Examples of Records, Documents, & Available Data

- Hospital records (e.g., nurses' shift reports)
- School records (e.g., student absenteeism)
- Corporate records (e.g., health insurance choices)
- Letters, diaries, minutes of meetings, etc.
- Photographs

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

Dimensions of data collection approach

- Structure: In structured data collection, the same information is gathered from all participants in a comparable, pre-specified way.
- Quantifiability
- Researcher obtrusiveness
- Objectivity

Major types of data collection methods

1. Self-reports.
1. Observation.
1. Biophysiologic measures.

Self reports

Self-reports

- Are the most common data collection approach in both qualitative & quantitative nursing studies.
- Qualitative researchers typically go into the field knowing the most likely sources of data, but they do not rule out other possible data sources that might come to light as data collection progresses.

Self-report

- It is strong method in directness & variation: If researchers want to know how people feel or what they believe, the most direct approach is to ask them.
- The strongest argument: yields information that would be difficult or impossible, to gather by any other means.
- Disadv: validity & accuracy of self-reports
- Self-report methods normally depend on respondent's willingness to share personal information, but projective techniques are sometimes used to obtain data about people's way of thinking indirectly (drawings).

Self-reports

- **But** can we be sure participants actually feel or act the way they say they do?
- The most serious issue concerns the validity and accuracy of self-reports
- Investigators often have no choice but to assume that most respondents have been frank.

Observations

Observation

- It is versatile
- Disadvantages:

✓ Ethical difficulty (concealment)

✓ Reactivity

✓ Observer bias

Biophysiologic measures

- Strengths:

✓ Objectivity

✓ Precision

✓ Sensitivity.

Research Instruments

Selecting and developing instruments

We select the instrument based on:

- ✓ Resources.
- ✓ Availability and familiarity.
- ✓ Population appropriateness.
- ✓ Administration issues.
- ✓ Reputation.

Instrument Construction

- Carefully monitor the wording of each question for clarity, sensitivity to respondents' psychological state, absence of bias, & reading level
- Draft instruments are usually critically reviewed by peers or colleagues & then pretested with a small sample of respondents.
- The development & pretesting of self-report instruments can take many months to complete.

Structured Self-Reports

Data are collected with a formal instrument

Interview schedule

- ✓ Questions are pre-specified but asked orally:

Either face-to-face or by telephone

Questionnaire

- ✓ Questions pre-specified in written form, to be self-administered by respondents

Advantages of questionnaires

- Less costly
- Require less time & effort to administer
- Internet questionnaires are especially economical & are likely to be an increasingly important means of distributing questionnaires
- Offer the possibility of anonymity or greater perceived privacy
- The absence of an interviewer avoids biases reflecting respondents' reaction to the interviewer rather than to the questions themselves

Advantages of Interviews

- ✓ Higher response rates
- ✓ Appropriate for more diverse audiences (young; children, the blind, & the very elderly)
- ✓ Opportunities to clarify questions or to determine comprehension (less likely to be misinterpreted)
- ✓ Opportunity to collect supplementary data through observation i.e. respondents' living situation, degree of cooperativeness,…etc all of which can be useful in interpreting responses.

Questionnaires VS Interviews

- Many people cannot fill out a questionnaire i.e. young children, the blind, very elderly. Interviews are feasible with most people.
- Questions are less likely to be misinterpreted by respondents because interviewers can determine whether questions have been understood.

Questionnaires VS Interviews

- Interviewers can produce 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

Questions

Types(form) of Questions in a Structured Instrument

- Closed-ended (fixed alternative) questions
- E.g., “Within the past 6 months, were you ever a member of a fitness center or gym?” (yes/no)
- The purpose of such questions is: to ensure comparability of responses and to facilitate analysis.

Open-ended questions

- E.g., “Why did you decide to join a fitness center or gym?”

Closed-ended questions

- Closed-ended questions are:

✓ more difficult to construct than open-ended ones but easier to analyze.

✓ more efficient: people can complete more closed-ended questions than open-ended ones in a given amount of time

Closed-ended questions

- Major drawback:

✓ researchers might overlook some potentially important responses اغفال بعض الاجوبة التي قد تكون مهمه

✓ can be superficial

Open-ended questions

- Allow for richer information if the respondents are verbally expressive and cooperative
- Some respondents object to choosing from alternatives that do not reflect their opinions precisely

Question

Which of the following would be an advantage of using a questionnaire?

A. Higher response rates

B. Diversity of audience is not a problem.

C. Lower cost

D. Questions can be clarified if needed.

Answer

C. Lower cost

- Rationale: Because each subject does not have to been seen face-to-face, questionnaires are associated with lower costs that interviews.

Composite Psychosocial Scales

Scales: used to make fine quantitative discriminations among people with different attitudes, perceptions, traits

Likert scales

- 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
- Five response alternatives: a score of 5 would be given to someone strongly agreeing, 4 to someone agreeing, and so forth.

Example Likert scale

Likert Scale Example

For each of the listed statements, please check the one response that best expresses the extent to which you agree or disagree with that statement.

Statements	Definitely Agree	Generally Agree	Slightly Agree	Slightly Disagree	Generally Disagree	Definitely Disagree
I buy **many things** with a credit card.	___	___	___	___	___	___
I wish we had **a lot more** money.	___	___	___	___	___	___
My friends **often come** to me for advice.	___	___	___	___	___	___
I am **never influenced** by advertisements.	___	___	___	___	___	___

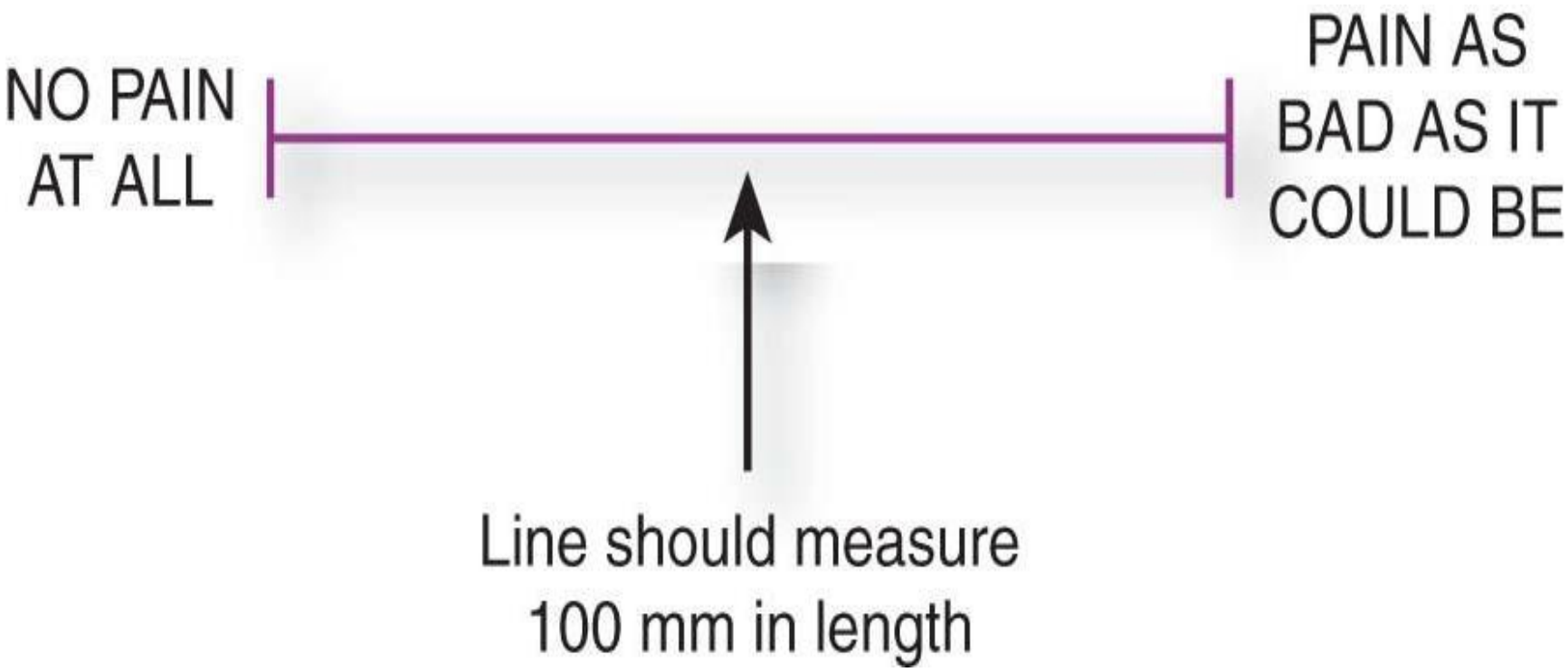
Likert scales

- The second statement is negatively worded, and so scoring is reversed e.g. a 1 is assigned for strongly agree, and so forth.
- This reversal is necessary so that a high score consistently reflects positive attitudes toward condom use.
- A person's total score is determined by summing item scores (these scales are sometimes called summated rating scales)

Visual Analog Scale (VAS)

- Used to measure subjective experiences (e.g., pain, nausea)
- Measurements are on a straight line measuring
- End points labeled as extreme limits of sensation
- Participants mark a point on the line corresponding to the amount of sensation experienced.

Example of a Visual Analog Scale



Example of a Visual Analog Scale

Figure 3: Wong-Baker FACES
Pain Rating Scale

0	2	4	6	8	10
NO HURT	HURTS LITTLE BIT	HURTS LITTLE MORE	HURTS EVEN MORE	HURTS WHOLE LOT	HURTS WORST

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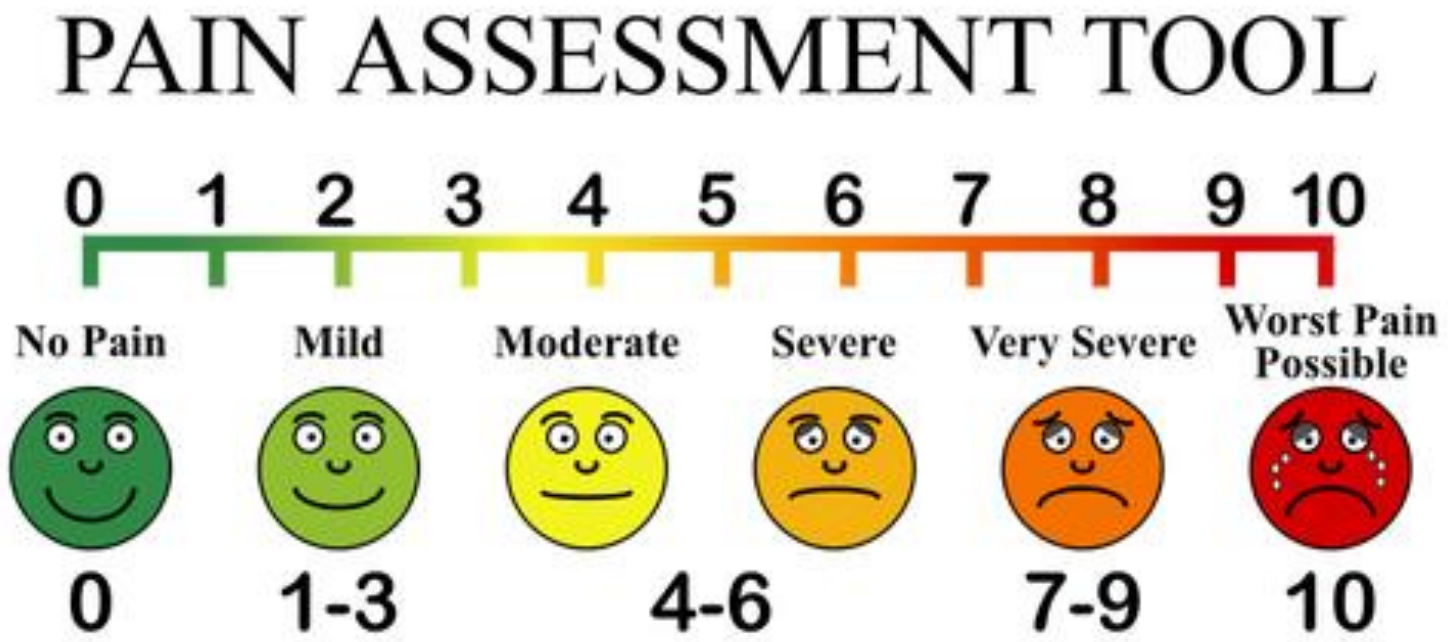
Example of a Visual Analog Scale



Response Biases

- Biases reflecting the tendency of some people to respond to items in characteristic ways, independently of item content
- Examples:
- Social desirability response bias
- Extreme response set
- Acquiescence موافقة response set (yea-sayers)

Observation

- Structured observation of pre-specified behaviors
- Focus of observation: patient mood swings), or (e.g., gestures, facial expressions)
- Concealment
- Duration
- Method of recording observations(paper-and-pencil ; sophisticated equipment)

Structured Observations

- To document specific behaviors, actions, and events
- Category systems → checklists
- Formal systems for systematically recording the incidence or frequency of pre-specified behaviors or events
- Systems vary in their exhaustiveness شموليتها

Example on observation tool

Student Classroom Behavior Observation Scale

Set a stopwatch to repeat every 2 minutes for 16 minutes. When the stopwatch goes off, classify the student's behavior in the following categories. Note: 1 is the first 2 minute, 2 is the second 2 minute, etc.

S/No	Type of Question	1	2	3	4	5	6	7	8	Total
1	Asking a question				√					1
2	Watching the teacher		√	√						2
3	Talking to classmate									0
4	Working on practice problem						√		√	2
5	Answering a question by the teacher					√				1
6	Not paying attention							√		1
7	Preparing materials	√								1

- Exhaustive system: All behaviors of a specific type recorded, and each behavior is assigned to one mutually exclusive category.
- Non-exhaustive system: specific behaviors, but not all behaviors, recorded

Example of nonexhaustive categories:

- Liaw and colleagues (2006) studied changes in patterns of infants' distress at different phases of a routine tub bath in the neonatal intensive care unit (NICU).
- The researchers developed a system to categorize behavioral signs of distress (jerks, tremors, grimaces, arching).
- Behaviors unrelated to distress were not categorized.

Evaluation of Observational Methods

- Excellent method for capturing many clinical phenomena & behaviors
- Potential problem of reactivity when people are aware that they are being observed
- Risk of observational biases factors that can interfere with objective observation

Rating Scales

- Ratings are on a descriptive continuum, typically bipolar.

Ratings can occur:

- At specific intervals
- Upon the occurrence of certain events
- After an observational session (global ratings)

Example rating scale

Q4 How do you rate the following?

		Very poor	*Poor*	*OK*	*Good*	*Very good*
Q4a	Service	☐	☐	☐	☐	☐
Q4b	Cleanliness	☐	☐	☐	☐	☐
Q4c	Parking	☐	☐	☐	☐	☐
Q4d	Quality of Food	☐	☐	☐	☐	☐
Q4e	Choice of Food	☐	☐	☐	☐	☐

Biophysiologic Measures

In vivo measurements

- Performed directly within or on living organisms (e.g., blood pressure measures, Temp)
- Performed outside the organism's body (e.g., urinalysis)

Biophysiologic Measures

In vitro measures include:

- Chemical measures (e.g., the measurement of hormone, sugar, or potassium levels)
- Microbiologic measures (e.g., bacterial counts and identification)
- Cytologic or histologic measures (e.g., tissue biopsies).

Evaluation of Biophysiologic Measures

- Strong on accuracy, objectivity, validity, & precision
- May be cost-effective for nurse researchers
- But caution may be required for their use, and advanced skills may be needed for interpretation.

Implementing a data collection plan

- Selecting research personnel.

✓ experience

✓ Unremarkable appearance

✓ Personality

✓ Availability

- Training data collectors

End