Scientific Medical Research

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Writer: Amal Awwad

S. Corrector: Tala Khamis

F. Corrector: Layla Nazzal
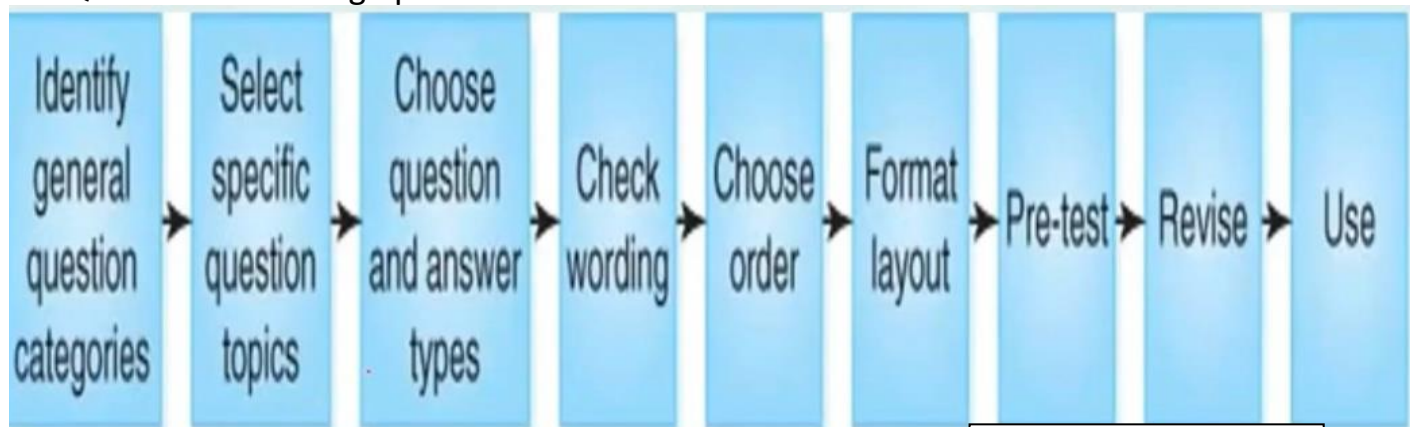
Doctor: Mohammad Darawad

Chapter 18

18.1 Questionnaire design overview.

Questionnaire (survey instrument): a tool for <u>systemically</u> (same Qs for all) gathering information from study participants.

- Should start with <u>general</u> (to break the ice) and specific content.
- Should have logical order.
- Formatting should be visually **appealing** and easy to read (so you don't lose participants).
- Should be pretested.

Questionnaire design plan

Choosing items phases 1–3. You need specialists' help to put general Q related to the variable and even in the specific ones. Or use validated Q banks

Formatting phase

10% of the estimated sample size to fill it and to give you feedback to revise based on it.

Exposure / diseased / population

18.2 Questionnaire content.

- Start by compiling a list of the topics the survey instrument must cover (includes EDP).
- Include Qs that confirm eligibility to participate, and accurately place participants into key categories (case/ control, exposed/ unexposed)
- May include **potential cofounders:** factors that might influence the relationships between key exposures and outcomes. Ex: smokers consume more alcohol so higher liver disease rate, so if you're studying the relation between smoking and liver disease alcohol is a cofounder variable.
- Search literature to identify range of **Q areas.**

18.3 types of Qs.

Decision is based on many conditions including statistical tests

1- Closed ended Qs: allow a limited possible answers Date/time, Numeric, **categorical**
2- Open-ended/ free response: Qs allow participants to explain their answers at length.

Categorical: Ordinal (ranked) or nominal(unordered), (dichotomous →if only 2 options).

All should be Mutually exclusive =احتمال وجوده بمجموعة يلغي احتمال وجوده بمجموعة أخرى

In closed ended we end up using coding ex: Male =1 / Female =2.

FIGURE 18-3 Examples of Types of Questions

Type	Sample Question	Sample Response Option for the Sample Question
Date	What is your birth date?	_ _ - _ _ - _ _ _ _ m m - d d - y y y y
Numeric	What is your height without shoes (rounded to the nearest half inch)?	_ _ . _ inches
Yes/no	During your lifetime, have you smoked more than 100 cigarettes?	❑ Yes ❑ No
Categorical/ multiple-choice: nominal (no rank)	What is your sex?	❑ Female ❑ Male
	What is your favorite type of film?	❑ Action/drama ❑ Comedy/musical ❑ Documentary ❑ Other: _____
Categorical/ multiple-choice: ordinal (ranked)	What is the highest level of education you have completed?	❑ Less than high school ❑ High school ❑ Some college but no degree ❑ College/university degree or advanced degree
	How much do you agree with this statement?: "No matter how much I exercise, I will not be able to lose weight."	❑ Strongly disagree ❑ Disagree ❑ Neutral ❑ Agree ❑ Strongly agree
	On a scale of 1 to 5, with 1 meaning poor and 5 meaning excellent, how would you rate your hearing (without the use of a hearing aid)?	Poor_____Excellent ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5
Paired-comparisons	Do you prefer to drink coffee or tea?	❑ I prefer coffee ❑ I prefer tea ❑ I like coffee and tea equally ❑ I do not drink coffee or tea
Rank-ordering	List the following four political issues in order from most important to you (1) to least important to you (4): crime/safety, environment/energy, foreign policy/defense, taxes/revenue	Number from 1 (most important) to 4 (least important): ___ Crime/safety ___ Environment/energy ___ Foreign policy/defense ___ Taxes/revenue
Open-ended/ free-response	What is your biggest personal health concern at present?	_____ _____

18.4 Anonymity (legal complications if not protected)

- When **anonymity** is important, avoid asking Qs that could allow the participant's identity to be determined based on his response.
- For many types of studies (such as cross-sectional studies), there is no need to collect names, contact info, or other identifiable info, we need it for experimental, cohort and case control (not always) studies because you need to follow up.

18.5 types of responses

🞧 Provide clear instructions about the acceptable types of answers for each Q.

🞧 Numeric, categorical, ranked (Likert items)

🞧 Add response for "not applicable" when relevant to prevent **information bias** : (the participant will choose another option only because the true answer of them doesn't exist in the options , this happens when there is no neutral option)

" I like coffee and tea/ I like neither " , in the above Example are neutral options .

FIGURE 18-4 Examples of Five-Point Responses for Ranked Questions

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Satisfied
Very negative	Somewhat negative	Neither negative nor positive	Somewhat positive	Very positive
Poor	Fair	Good	Very good	Excellent
None	Few	Some	Many	Very many
Never	Rarely	Sometimes	Often	Always
Not important	Slightly important	Somewhat important	Very important	Extremely important

18.6 Wording of Qs

Check each Q and all the response items for clarity and careful wording of responses.

It should be clear as if an 8th grade individual can understand it.

FIGURE 18-5 Problems to Avoid

Problem	Example	Problem with the Example
Big words/ jargon	Have you ever had a myocardial infarction?	Participants may not know that a "myocardial infarction" is a technical term for a heart attack.
Undefined abbreviations	Have you ever been told that you have BPH?	Participants may not know that BPH is short for benign prostatic hypertrophy or that BPH means an enlarged prostate.
Ambiguous meanings	What kind of house do you live in?	Without seeing a list of appropriate responses, it is not clear if the answer should be "an apartment," "a rental," "a split-level duplex," or "a single-family home."
Vagueness	Do you exercise regularly?	"Regularly" is not defined. A person who exercises most days of each week might assume that "regularly" means daily and say "no." Another person who exercises once a month may consider that regular. It would be better to ask "In a typical week, how many days do you exercise for at least 30 minutes?"
Double negatives	I did not find this visit with my doctor to be unpleasant. ❏ Disagree ❏ Neutral ❏ Agree	The wording of this question makes it hard to figure out whether a person who was satisfied with a visit should agree or disagree.
Faulty assumptions	Do your gums bleed during regular dental cleanings? ❏ Yes ❏ No	The question assumes that everyone has routine dental cleanings. If "I do not visit the dentist" is not an answer option, a person who does not have dental cleanings is forced to answer no.

Two-in-one	Do you exercise at least 3 times a week and eat a healthy diet? ☐ Yes ☐ No	Combines two separate questions: one for exercise and one for diet.
Impossible to recall accurately	How many servings of carrots did you eat most weeks when you were a child?	Adults will not be able to remember this level of detail about their childhood diets.
Too much detail	List any prescription medications you have taken for 1 month or longer in the past 10 years.	Unless the respondent has had very few prescriptions, answering this question is impossible without looking up medical records.
Sensitive questions	Have you ever hit, scratched, bruised, or otherwise physically injured an intimate partner?	This question is unlikely to be answered truthfully if the response should be yes, and it may raise concerns about confidentiality and potential legal requirements for reporting abuse.
Hypothetical questions	Have you ever thought that you would like to lose 10 or more pounds?	Anyone could have felt this at some point in time, but the question does not clarify whether this is a long-term longing or a thought that crossed the respondent's mind for the first time upon reading the question.
Leading questions	What is your impression of the quality of work done by the dedicated public servants who work at the county health department?	This question clearly intends to lead respondents toward a positive answer (and may unintentionally have the opposite effect).
Leading answers	What is your impression about the quality of services provided by Center City Hospital? ☐ Fair ☐ Good ☐ Great ☐ Excellent	This question's response options clearly are intended to lead to a positive response; there is no "poor" option.
Answers with a poor scale	How many hours a week do you watch television? ☐ 0 ☐ 1–3 ☐ 4–7 ☐ 8 or more	Even though most people watch more than 1 hour of television daily, which would put them in the "8 or more" response category, they may not want to choose an "extreme" answer. Their inaccurate responses will lead to a false report. Alternatively, these response options may cause respondents to misread the question as how many hours a *day* they watch television.
Lack of specificity	What is your income?	It is not clear if income refers to earnings per hour, week, month, or year, or whether it refers to pre- or post-tax income.
Missing answer options	What color are your eyes? ☐ Brown ☐ Blue	Many possible eye colors are missing.
Overlapping answer options	In a typical week, how many days do you eat fish? ☐ 0 ☐ 1–3 ☐ 3–5 ☐ 5–7	Participants who eat fish 3 days a week or 5 days a week will not know which response to select.

The Dr said " the good news for you, you should study everything in this figure"

18.7 order of Qs.

- Start with easy Qs (demographics) then move to more difficult or sensitive ones.
- Avoid habituation: once responders have given the same answer to so many Qs (agree, agree and agree) that they continue to reply with the same response (to avoid mix up Qs).
- Extra note: we can make reversed statement (affirmative and negative statements) to make sure that the participant recheck if agree or disagree, and this need also a reversed coding. You can see the Dr EX min 27:20

18.8 Layout &formatting. Watch min 30 the Dr show EX.

- Organized, easy to read, and easy to record answers.
- Use readable &large fonts and include adequate white space.
- Provide instructions.

> All interviewers should use the same script.

FIGURE 18-6   Example of a Self-Response Questionnaire

Basic Information

1. What is today's date? _ _ - _ _ - _ _ _ _ m m d d y y y y

2. What is your date of birth? _ _ - _ _ - _ _ _ _ m m d d y y y y

3. What is your sex? ☐ Female   ☐ Male ☐ _____

Health History (Check one answer box for each question.)

4. Have you ever been diagnosed with breast cancer? ☐ Yes   ☐ No   → If **No**, then skip to Question 8.

5. Have you had a mastectomy (either partial or complete)? ☐ Yes   ☐ No

Directive Qs

FIGURE 18-7   Example of a Telephone Interview Script

Fill in today's date. _ _ - _ _ - _ _ _ _ m m d d y y y y

Read: *Thank you for agreeing to participate in this health study.* I'm going to start by asking you some basic questions.

1. What is your date of birth? _ _ - _ _ - _ _ _ _ m m d d y y y y ☐ Refused to answer

2. What is your sex: female or male? ☐ Female   ☐ Male ☐ Other: _____

Read: *Now I'm going to ask you a few questions about your medical history.*

3. Have you ever been diagnosed with breast cancer? ☐ Yes   ☐ No   → If **No**, then skip to Question 7.

4. Have you had a mastectomy (either partial or complete)? ☐ Yes   ☐ No   ☐ Refused to answer

18.9 reliability& validity. MOST important to the Questionnaire.

- **Reliability (precision):** consistent Answers are given to similar Qs.
  - ✓ Look for <u>internal consistency</u>: (all items in a Questionnaire should measure the same variable). (Cronbach's alpha, KR-20 is used to measure the internal consistency).
  - ✓ Test-retest reliability: bring 20-30 participants to fill the questionnaire today, then after a week or a month let them fill it again, and see if there answers are still similar. (all expressed as a number between 0-1).
- **Validity (accuracy):** the responses or measurements are correct. (you used the right tool)
  - ✓ **Content(logical) validity:** Subjects matter experts agree that the questionnaire captures the most relevant details about the study domain.
  - ✓ **Face validity**: content experts and users agree that a survey instrument will be easy for study participants to understand and correctly complete (face= appears).
  - ✓ **Construct validity:** the test measures the theoretical construct it intended to assess. Need a long process of statistical analysis that we call 'factor analysis'. No need for details
  - ✓ **Criterion (concrete) validity:** a new test yields results similar to a <u>standard test</u> for a similar theoretical construct (2 types: concurrent vs. predictive).
  - ✓ You make participants fill both the standard test & the new test you chose.
  - ✓ **EX on concurrent:** we chose DM patients compliance as a new test vs HbA1c as the standard test.
  - ✓ **Ex on predictive:** High school score is a criterion for collage score**.** (X will determine y in the future **x → y**).

> It's not always a 100% but as long as it's above 70% we're good.

Neither reliable (precise) nor valid (accurate)   Reliable (precise) but not valid (accurate)   Both reliable (precise) and valid (accurate)

18.10   Commercial research tool.

Already- validated survey instrument may be useful for incorporation into a new study. These may be free or need to be purchased.

If you try to contact the main researcher (corresponding author) see EX in min 45:40 and ask him for his Questionnaire, usually they help students.

18.11   Translation

1- Back translation (double translation) ensures that the meaning of the original survey is maintained in the translated version. After translating it to Arabic you retranslate it to ENG to check meaning integrity.
2- Two independent translators to keep the integrity of meaning, then choose the best.

18.12   Pilot testing (pretest) we take 10% of participants.

Allows the researcher to correct problems with the survey instrument prior to data collection from participants including: clarity, order, willingness to participate, responses given and time.