
MEDICAL RESEARCH
MODIFIED NO. 6
كتابة: لجين بلال , ميس مصطفى
تدقيق:
الدكتور: منير أبو هلالة

Summary
Week 3 part 1: Questionnaires and surveys design

Dr Munir Abu-Helalah

MD MPH PHD

Associate Professor of Epidemiology and Preventive Medicine

Color code
Slides
Doctor
Additional info
Important

Questionnaire design

- Clarify the nature of the research problem and objectives
- Develop research questions to meet research objectives
- Define target population and sampling frame
- Determine the sampling approach, sample size, and expected response rate
- Make a preliminary decision about the method of data collection

➢ **Clarify the nature of the research problem and objectives**

Before creating the questionnaire, we must first formulate a research question, then outline the objectives, do a literature review, and write the proposal. Additionally, we stated that it is crucial to have the objectives, outcomes, and a solid literature review to examine prior research to determine whether or not this work has been done and its limits. In other words, what factors should you take into account when conducting your own study? What are the expected responses or valid questionnaires that you can use? Based on our experience and the literature review, we have research questions that should address the study objectives.

➢ **Develop research questions to meet research objectives**

We stated that we must begin not with the questions related to the study objectives but rather from the beginning; start with demographics and general information such as age, gender, marital status, education, subject level, medical history, drug history, immunization, parity, etc. For instance, if we are conducting a study on smoking, we will include the following information: smoking cigarettes, vaping, water pipes, ex-smokers, and smoking duration. Once all of these items have been written down, begin the questionnaire.

- **Define target population and sampling frame**

Knowing the target group is crucial. For example, asking a medical student a medical question in a survey completely differs from asking someone in the general community. For instance, if we would like to conduct a nationwide study on the prevalence of type 2 diabetes, hypothyroidism, or hypertension, we must have a proper sampling frame. Having a representative sample is necessary, but how can we achieve this? This will be discussed in coming lectures.

- **Determine the sampling approach, sample size, and expected response rate**

The most important thing about the sampling approach is avoiding convenience sampling and quota sampling, as the samples will not be representative, and therefore, results cannot be generalized. The sample size depends on the target population. If your target population is gastric cancer patients, you must be aware that per year there are approximately 100-120 cases. However, if the target population is type 2 diabetes mellitus patients, there are more than 100,000 cases each year, so you must calculate the sample size accordingly. For the expected response rate, a good way to predict it is by conducting a pilot study, so you can determine the best way to reach the subjects, the duration of completing the questionnaire, proper language, etc. If the response rate is below what is expected, the results will be affected and will not be generalizable.

- **Make a preliminary decision about the method of data collection**

This is something that should be discussed with the team in the initial stages of planning and then tested during the pilot phase. For example, in the beginning, you might decide that your method of data collection is by conducting face-to-face interviews with the subjects, but in the pilot, you might find that participants can read, write and fill out the questionnaire on their own and that the response rate is much higher if questionnaires are self-completed.

A well designed questionnaire

- Good appearance (easy for the eye) without decorations
- Short and simple, except if sensitive question
- Relevant and logical

  ⇒ High response

  ⇒ Easier to collect
  to summarize
  to analyse

  - Collect data relevant to the study objectives, do not just collect information for the sake of data collection

- Minimises potential sources of bias

For example, interviewer bias can be minimized by providing the participants with the reference manual

Questionnaire design

Questionnaire Construction

- **Should be written after the analytic plan is developed and should be designed to collect the information required to perform the desired analyses**

- **Self-administered vs. interviewer-administered**

Pros: Saves time, quicker, easier to handle sensitive questions Cons: Not suitable for illiterate subjects	Pros: Higher response rate, completeness Cons: Requires more resources

- **Appealing to the eye and easy to complete and code.** Questionnaire appearance affects response rate as well as the ease of data summarization and analysis

Broad Considerations:

- Sequencing of questions (For instance, we don't ask "Do you think smoking is a risk factor for Ischemic Heart Disease?" and then several questions later, we ask "What are the risk factors for ischemic heart disease?". This could lead to what is called position bias)
- Identification of concepts (To ensure that the questionnaire meets the objectives)
- How many questions are required to capture each concept?
- Question wording
- Overall length of questionnaire
- Placing of sensitive questions (Don't start with them)
- Ability of respondents
- Level of measurement
- Open-ended versus closed-end questions

For difficult questions that need clarification and explanation, it is preferable to do face-to-face interviews. However, if resources are low, clear key instructions must be included.

Close-ended questions are better for data analysis, but sometimes open-ended questions or other options are added to get more responses. For example, you conducted a survey on the satisfaction of the emergency department in hospital X and you asked the patients what the best and the worst things you came across in the emergency department you need to add "OTHER option" to get more information from the subjects

Questionnaire Design – Typology of a Questionnaire:

Determine the types of questions to include and their order.

Check the wording and coding of questions.

Decide on the grouping of the questions and the overall length of the questionnaire.

Determine the structure and layout of the questionnaire.

Structure of a questionnaire

1. Identification (What is the study, who you are, what are your objectives, what is your organization, and instructions for answering), (In some studies, there are “Filtering questions”, which are used to ensure that only respondents who meet specific criteria or have relevant experience continue with certain parts of the questionnaire, while others may be directed to skip questions that don’t apply to them. Examples:

"Have you given birth in the past 12 months?"

- If "Yes," continue to the next question about breastfeeding.
- If "No," skip to questions about general health or exit the questionnaire.

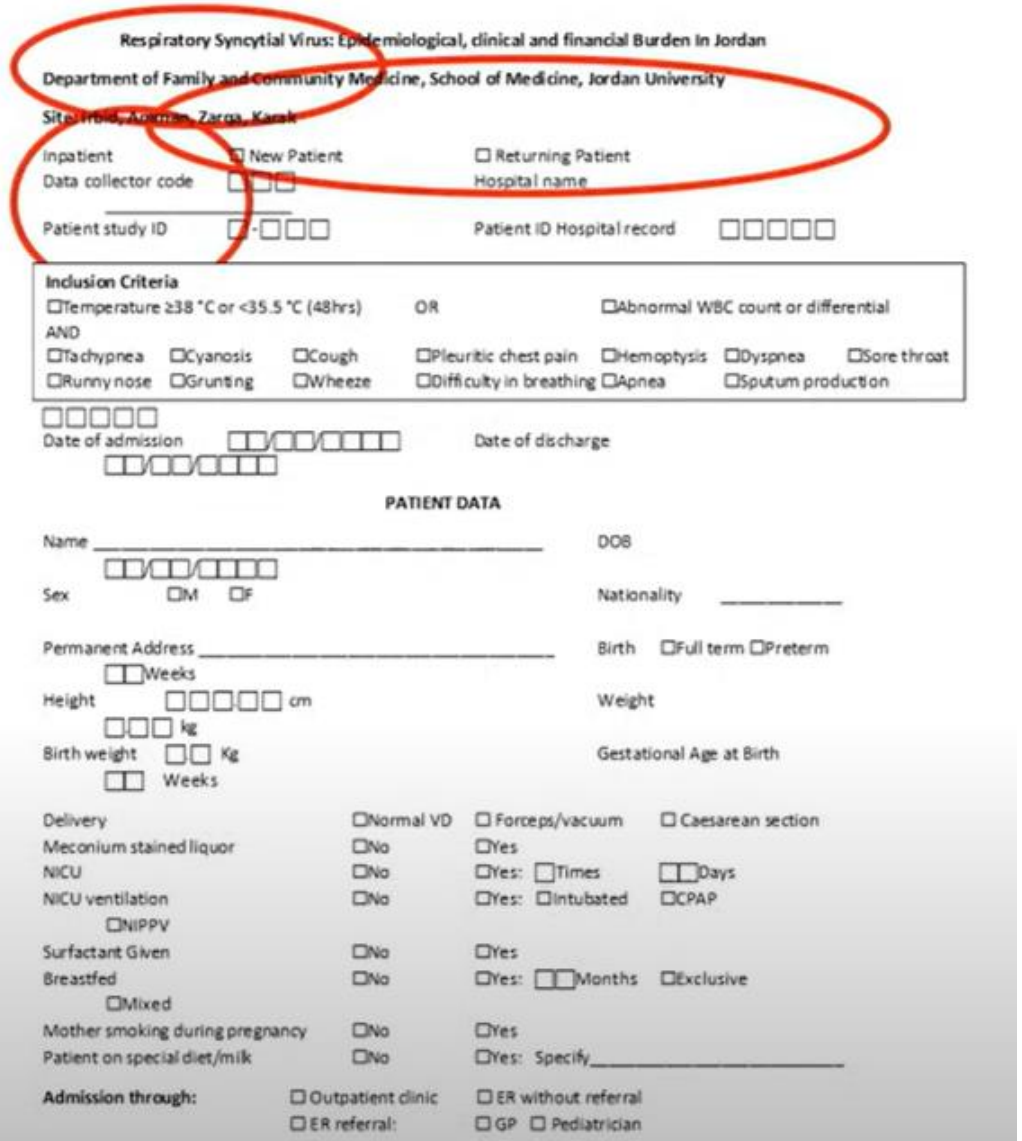
“Did you breastfeed your child after birth?"

- If "Yes," proceed to questions about breastfeeding duration, challenges, and support.
- If "No," skip to questions about feeding alternatives and reasons for not breastfeeding.

2. Interview introduction
3. Instructions on how to answer
4. Questions
5. Conclusion

1 - Identification

- On first page
  - Return address
  - Study title
- On all pages
  - Identifier
  - Page numbers
- Data protection: Identifiers kept separately from names



Respiratory Syncytial Virus: Epidemiological, clinical and financial Burden in Jordan

Department of Family and Community Medicine, School of Medicine, Jordan University

Site: Irbid, Amman, Zarqa, Karak

Inpatient ☐ New Patient ☐ Returning Patient

Data collector code ☐☐☐ Hospital name

Patient study ID ☐-☐☐☐ Patient ID Hospital record ☐☐☐☐☐

Inclusion Criteria

☐Temperature ≥38 °C or <35.5 °C (48hrs) OR ☐Abnormal WBC count or differential

AND

☐Tachypnea ☐Cyanosis ☐Cough ☐Pleuritic chest pain ☐Hemoptysis ☐Dyspnea ☐Sore throat

☐Runny nose ☐Grunting ☐Wheeze ☐Difficulty in breathing ☐Apnea ☐Sputum production

☐☐☐☐☐

Date of admission ☐☐/☐☐/☐☐☐☐ Date of discharge ☐☐/☐☐/☐☐☐☐

PATIENT DATA

Name _____ DOB ☐☐/☐☐/☐☐☐☐

Sex ☐M ☐F Nationality _____

Permanent Address _____ Birth ☐Full term ☐Preterm ☐☐Weeks

Height ☐☐☐.☐☐ cm Weight ☐☐☐ kg

Birth weight ☐☐ Kg Gestational Age at Birth ☐☐ Weeks

Delivery	☐Normal VD	☐ Forceps/vacuum	☐ Caesarean section
Meconium stained liquor	☐No	☐Yes	
NICU	☐No	☐Yes: ☐Times	☐☐Days
NICU ventilation	☐No	☐Yes: ☐Intubated	☐CPAP ☐NIPPV
Surfactant Given	☐No	☐Yes	
Breastfed	☐No	☐Yes: ☐☐Months	☐Exclusive ☐Mixed
Mother smoking during pregnancy	☐No	☐Yes	
Patient on special diet/milk	☐No	☐Yes: Specify_____	

Admission through: ☐ Outpatient clinic ☐ ER without referral ☐ ER referral: ☐ GP ☐ Pediatrician

Return address:

Including a return address on the first page of a questionnaire is essential for two main reasons:

1. **Establishing Credibility and Trust:** Respondents feel more comfortable sharing personal information if they know the questionnaire is from a legitimate source. A return address reassures them that the information they provide is being sent to a credible organization.
2. **Facilitating Returns and Inquiries:** In case respondents have questions, need to return the questionnaire physically, or want to contact the organization, a clear return address makes the process easier.

Please refrain from asking people for their names if the survey is about attitudes or opinions. In reality, we must reassure them that their replies will remain confidential and that we won't ask for any personal information so they can freely respond. For instance, if you have a survey about emergency department satisfaction, the response would be legitimate and representative as I won't ask the patients for their identities. However, you must obtain the patient's identification after obtaining the consent form if you wish to carry out a study on diabetic patients. We'll discuss it in more detail in the coming weeks.

Also, in some questionnaires, we must state on the first page: “ In this study, we ask the patients for permission to view their medical files” (consent form)

2 – Introduction

- Covering letter/ interview introduction
  - Who are you / you work for
  - Why are you investigating
  - Where did you obtain the respondent's name
  - How and where can you be contacted
  - Guarantee of confidentiality
  - Length of interview (be honest)

⇒ usefulness of study should be clear to all respondents

- You must introduce yourself, assure the patients about confidentiality, and obtain consent.
- A covering letter must be included especially in a self-completed questionnaire.
- It is extremely important to inform the participants of the study objectives, and how the study is beneficial to them and to the community at large.

Example of introduction

- *Good morning ,*

  My name is ..... , I work for .....

  You may have been already informed that a survey on risk factors of type II diabetes mellitus will be done this week at representative areas in Jordan in Irbid, Amman, Kerak and Zarqa govenorates. This study has been approved by the Jordan University Institutional Review Board (IRB) Committee. Only anonymized data will be analysed. You have been randomly selected to participate in this study. Your participation is voluntary. The interview will take about 10 minutes.

- Sometimes, we add: " The survey will not affect the services you receive at the hospital".
- During the pilot, if you discover that the interview or the completion of the questionnaire takes more than 10 minutes, you should consider changing the questionnaire or modifying the number of questions.

3 – Instructions

Remember the reference manual:
"How often have you been feeling down or depressed lately?"
(Always, usually, sometimes, rarely, never)
You must specify what each answer represents

- Minimise potential sources of bias
- Guide for Interviewers
- Guide for Respondents in self-administered questionnaires
  - Which questions can be skipped => where to jump to
  - Selection of multiple answers possible
- Use different fonts (e.g. bold or italics)
- Interviewer guidance manual helps to reduce bias and to improve reliability

Example: I will ask you a few questions about your family history of type II Diabetes Mellitus .

You will answer by yes or no

If no, go to question 27

Presentation and layout

- Clear and consistent
- adequate space to answer
  - large font size
  - appropriate page breaks
- avoid
  - messy layouts
  - too many and fancy logos
- printing questionnaire on coloured paper may help

4 – Questions

1. Content
2. Order
3. Format
4. Coding
5. Pitfalls

4.1 – Content of questions

- Clear focus on research question
  - avoid sidetracking
  - avoid unnecessary information

4.2 – Question order

- Decide on the order of items/questions
  - easy → difficult
  - general → particular

- Example: Smoking cessation study, start with smoking habits, then questions related to addiction
- Demographics, medical history, topic of your interest, then questions on medication and lifestyle modification

  - Group questions by topic
  - Be aware of ordering effects (Avoid positioning bias)
  - Don't put the most important items last
  - Where to place sensitive questions?

Order of Questions

- Most important questions go first
- Controversial questions should be positioned after less controversial questions

Starting questions

- “Door-opener” such as demographics and filtering questions
- Simple
- Closed format
- Relevant to main subject
- Non-offending
- Demographic but personal questions (For example, if the marital status is not related to the study, you should not ask about it)

4.3 – Format of questions

- Adjust the question and the data collection method to responding audience
  - professionals vs. public
  - Educated vs. illiterate
  - Keep sentences simple and short
- Define keywords ("fully vaccinated") (Have a clear definition for each term)
- Remember options (For opinions/attitudes/knowledge)
  - "don't know"
  - "don't want to answer"

Questionnaire Format

- When designing questionnaires
  - Allow ample white space
  - Allow enough space for responses to be typed for open-ended questions
  - Ask respondents to clearly mark their answers
  - Use objectives to help determine format
  - Be consistent in style

Steps to design a questionnaire:

The proposal before the questionnaire!!!!

1. Write out aims, objectives primary and secondary outcomes of your study.
2. Write out concepts/information to be collected that relates to these aims. This is the skeleton of the questionnaire! Before writing the questions, write down the items, i.e.: for a study about smoking, you can write: Demographics like age, gender, education, and income, then smoking-related questions like smoking state, type of smoking, addiction, and so on. Then write the actual questions.
3. Review the current literature to identify already validated questionnaires that measure your specific area of interest.
4. Compose a draft of your questionnaire.
5. Revise the draft.
6. Assemble the final questionnaire.

To design a strong study using questionnaires, it's essential to review existing validated tools that address areas like mental well-being, satisfaction, and complex medication use. These tools can guide you, and you can add your own questions to identify predictors of responses. However, it’s important not to draft or distribute the questionnaire before finalizing the study's aims, objectives, primary and secondary outcomes, and writing a clear proposal. This ensures that you don’t miss crucial items that could affect the results. In your proposal and study protocol, justify each item you include, avoiding irrelevant items that won’t add value. This approach helps prevent gaps in your study and keeps the questionnaire focused and meaningful.

Step 1: Define the aims of the study

- Write out the problem, aims, objectives, and primary and secondary outcomes using one sentence per point.
- Formulate a plan for the statistical analysis of each aim.
- Make sure to define the target population

Step 2: Define the variables to be collected

- Write a detailed list of the information to be collected and the concepts to be measured in the study. Are you trying to identify:
  - Attitudes
  - Needs
  - Behavior
  - Demographics
  - Some combination of these concepts
- Translate these concepts into variables that can be measured. (This is the idea of having quantitative research, having measurable variables)
- Define the role of each variable in the statistical analysis:
  - Predictor
  - Confounder
  - Outcome (variables are outcomes if you look at knowledge, attitude, and practices)

- **Predictors:** Variables or factors that can be used to anticipate or estimate an outcome. In epidemiology and research, predictors are particularly important because they help researchers identify patterns or factors that could influence health outcomes, behaviors, or responses. (e.g., educational status, age…).
- **Confounders**: are factors that can distort or confuse the relationship between the main variables being studied. They are variables that are associated with both the predictor (exposure) and the outcome, creating a potential bias in the study results, or wrong conclusions.

Let's say you're studying the relationship between **heavy alcohol intake** and **lung cancer**. You find that people who drink heavily have a higher rate of lung cancer. You might initially think that heavy drinking directly causes lung cancer.

However, **smoking** is a common confounder in this scenario because:

1.Smoking is associated with both heavy drinking and lung cancer:

1. Many heavy drinkers are also smokers.
2. Smoking is a well-known risk factor for lung cancer.

2.Without accounting for smoking, you might mistakenly conclude that alcohol alone is responsible for the increased lung cancer risk in heavy drinkers. This is because smoking (the confounder) is "hidden" in the data, and it's actually the smoking that contributes to the increased risk of lung cancer, not just the alcohol.

Another example: A study on hyperthyroidism: Group A: 500 females vs. 500 males, prevalence 5%, and Group B: 900 females vs. 100 males, prevalence 6%."

Here, you will conclude that the prevalence in Group B is higher because you didn't stratify the sample according to gender. Gender is a confounding factor.

Step 3: Review the literature

- Review current literature to identify related surveys and data collection instruments that have measured concepts similar to those related to your study's aims.
- Saves development time and allows for comparison with other studies if used appropriately.
- Proceed with caution if using only a subset of an existing questionnaire as this may change the meaning of the scores. Contact the authors of the questionnaire to determine if a smaller version of the instrument exists that has also been validated.

Why is a literature review important? It increases your understanding of the subject, strengthens your proposal, and makes your questionnaire comprehensive. When you conduct a literature review, you can ensure that you don't overlook anything crucial and gain insight from other people's data collection experiences by examining the questionnaire response rate of other studies to determine whether or not there were problems and how to deal with them. You can also learn about the variables that might be included in your study by looking at the limits of earlier research.

Step 4: Compose a draft :

After doing a literature review, write the items, and then write the questions revise them, and assemble the final questionnaire.

- Determine the mode of survey administration: face-to-face interviews, telephone interviews, self-completed questionnaires, computer-assisted approaches.
- Write more questions than will be included in the final draft.
- Format the draft as if it were the final version with appropriate white space to get an accurate estimate as to its length – longer questionnaires reduce the response rate.
- Place the most important items in the first half of the questionnaire to increase response on the important measures even in partially completed surveys.
- Make sure questions flow naturally from one to another.

Step 5: Revise

- Shorten the set of questions for the study.
- If a question does not address one of your aims, discard it.
- Refine the questions included and their wording by testing them with a variety of respondents.
  - Ensure the flow is natural.
  - Verify that terms and concepts are familiar and easy to understand for your target audience.
  - Keep recall to a minimum and focus on the recent past.

Step 6: Assemble the final questionnaire [1]:

- Decide whether you will format the questionnaire yourself or use computer-based programs for assistance:
  - SurveyMonkey.com
  - Adobe Live Cycle Designer 7.0
  - GCRC assistance
- At the top, clearly state: in the introduction
  - The purpose of the study
  - How the data will be used
  - Instructions on how to fill out the questionnaire
  - Your policy on confidentiality
- Include identifying data on each page of a multi-page, paper-based questionnaire such as a respondent ID number in case the pages separate.

To sum up:
You choose your survey to be online or not depending on purpose & identification

When using online surveys, such as Google surveys, exercise caution. Please refrain from using online surveys in some situations where you need to ask for sensitive information such as a person's name or birthdate. In these situations, Google surveys can be used to collect data from individuals without requiring sensitive questions or identifiers. You should be aware that the IRB committee, not you as the investigator, will determine whether to use an online survey or not and that you must first obtain their ethical permission before conducting one.

Assemble the final questionnaire [2]:

- Group questions concerning major subject areas together and introduce them by heading or short descriptive statements.
- Order questions in order to stimulate recall.
- Order and format questions to ensure unbiased and balanced results.

When we have a long list of questions like 50 questions, please try to group them. For example, if your questions included demographics, medical history, knowledge, attitudes, and practices, group them

Assemble the final questionnaire [3]:

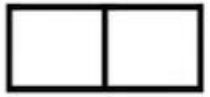
- Include white space to make answers clear and to help increase response rate.
- Space response scales widely enough so that it is easy to circle or check the correct answer without the mark accidentally including the answer above or below.
  - Open-ended questions: the space for the response should be big enough to allow respondents with large handwriting to write comfortably in the space.
  - Closed-ended questions: line up answers vertically and precede them with boxes or brackets to check, or by numbers to circle, rather than open blanks.
- Use larger font size (e.g., 14) and high contrast (black on white).

Questionnaire order

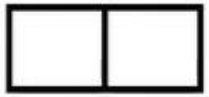
- Logical sequence
- Group questions by topic, and place a few sentences of transition between topics

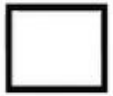
Facilitating the data processing of questionnaires

- Precode
- Space for each digit



- Facilitate data entry

Age (in years_____ 

Sex (1=male, 2 females)_____ 

Marital status (1,married,2 single, 3 divorced _____ 

- Coding sche[illegible]unknown 9 or 99 or 99/ other 8 or 88 or 888

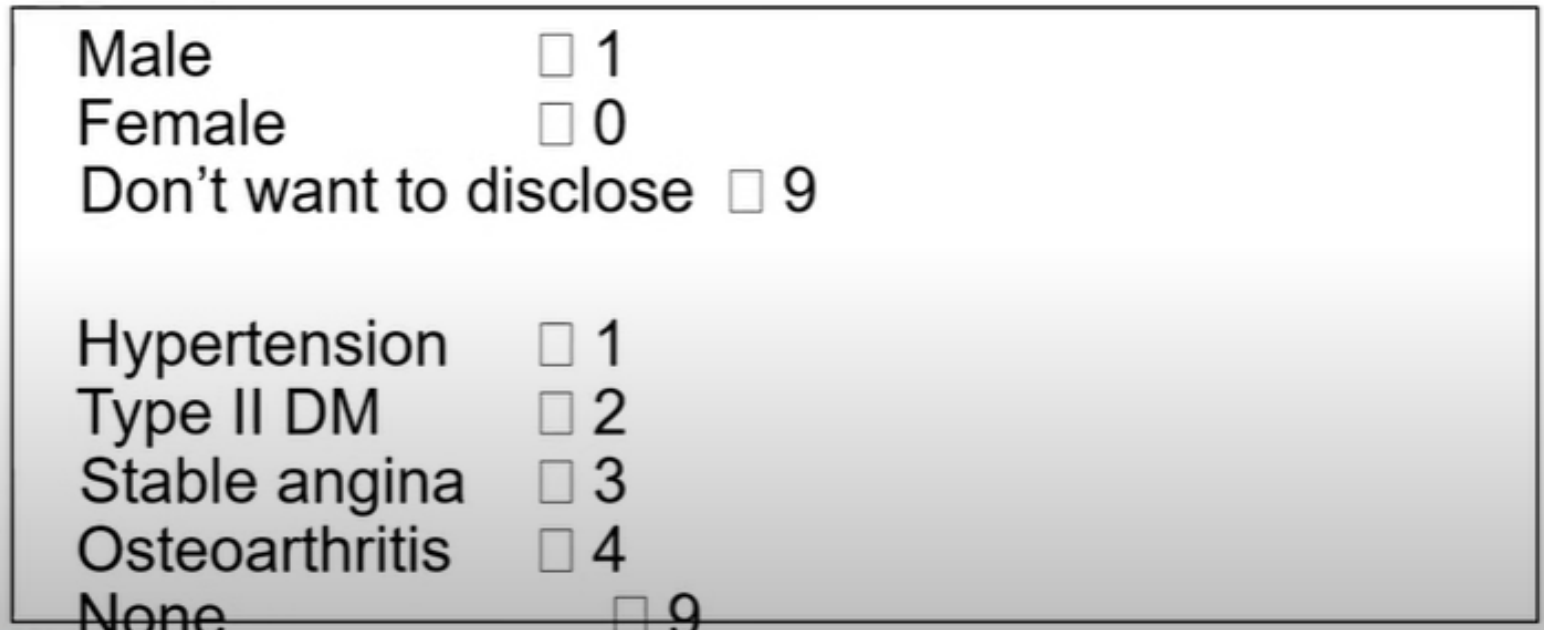
- Code the missing variables

Example: If you have finished a study and received the findings, but you discovered that 20 subjects' genders are missing. To find these 20 subjects, you must revisit the questionnaire. Sometimes the missing data is not truly missing; you may be thinking that the data entry or data collector did not include these things. When you don't have code 99, it indicates that the data entry clerk will use our code; however, when you do, you can be sure that the data entry clerk didn't overlook it. This is because the subject either didn't want to add their gender or it was a self-completed questionnaire. The participants didn't see it, thus there's no need to waste time and look again.

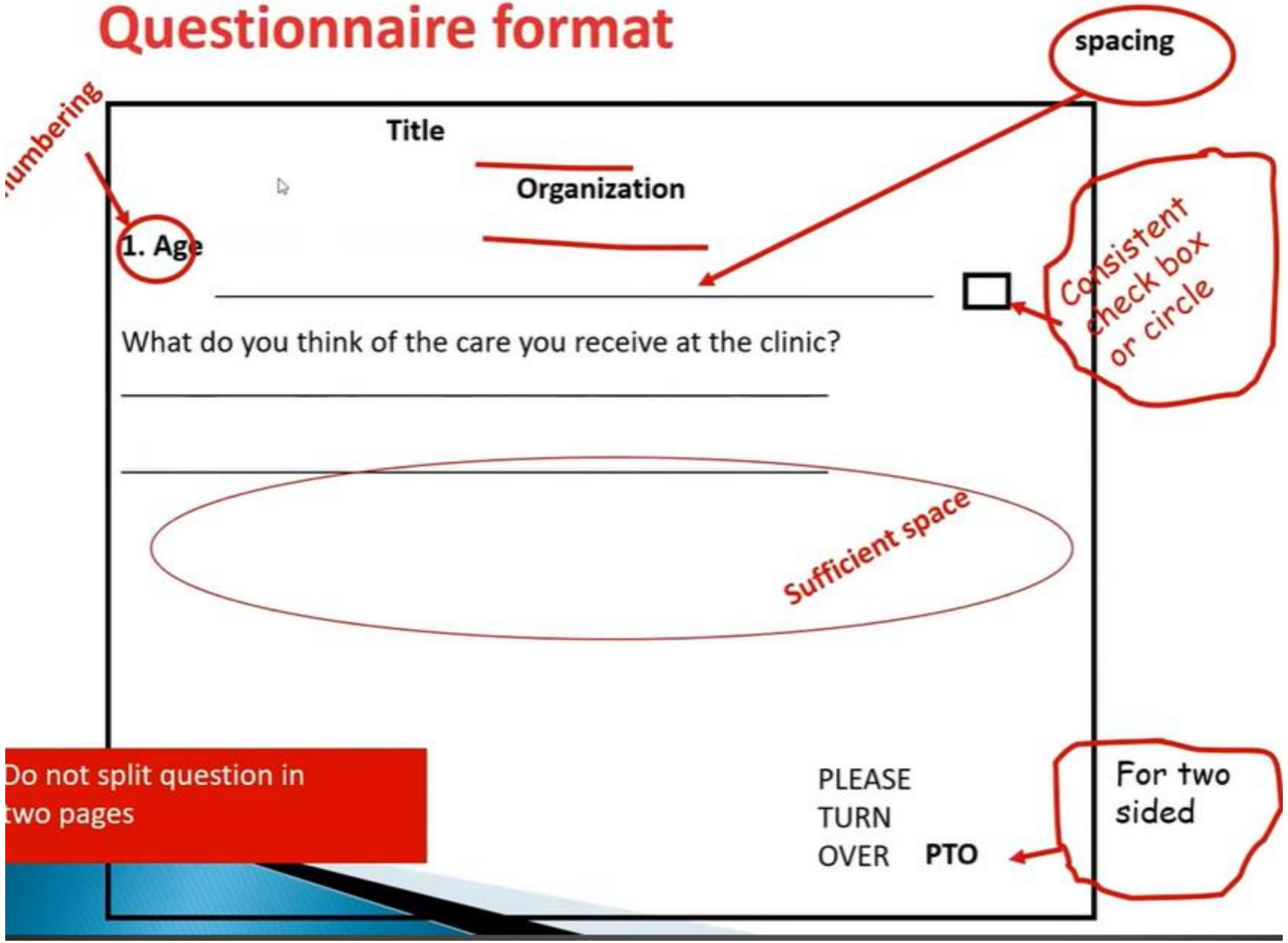
Coding

- Answers can be pre-coded
- Quicker and easier data entry

- Examples:



Questionnaire format



Tips in Question Design

- Don't ask people to answer a question unless you'd be prepared to answer it yourself
- Focus on behaviours, not labeling groups of people
- Keep your values/assumptions out of the questions
- Make sure questions are not too demanding (assume too much knowledge)
- Avoid abbreviations and professional jargon
- Use simple, direct and familiar words/terms
- Make questions clear, specific and as short as possible

- Keep your values/assumptions out of the question

For instance, you should refrain from voicing your opinion if you oppose smoking in public places and your research has questions about this topic.

- Avoid abbreviations as not everybody knows them, especially if the subjects are from the general community, they are unlikely to be familiar with medical abbreviations.

Ethical issues

- **Some services should be a part of any survey**
- **Informed consent-: Please leave the Institutional Review Board committee to decide to have a consent form or not.**

The IRB will determine whether or not you, as the investigator, will take the patient's name. Additionally, you don't always need a consent form to inquire about knowledge, attitude, or behaviors. However, if you need to open your patient's files and look through them, you'll need their authorization, which is what the consent form is for. And once more, the IRB committee will determine whether or not you require a consent form. You can explain why you didn't include a consent form with the questionnaire you submitted for approval since you think asking for personal information like name and birthdate could influence study participants. For instance, if you're conducting a study on the satisfaction of patients leaving the emergency room and you don't want to ask them their names because you don't want them to worry that the study's findings will influence the care they receive going forward, don't ask for their names or identifiers. However, in the end, please provide justification to the hospital's institutional review board (IRB).

- **General statement: Only in cases of sensitive questions or permission to access medical databases or investigations are required**

- **Confidentiality and the right place for the interview**

Please refrain from asking sensitive questions in public, especially those pertaining to mental health, medical history, or other sensitive topics. The doctor gave an example of a study he conducted on breast cancer in Jordan and explained that he did so because he promised the patients that their information would be kept confidential. The results of the investigation were outstanding.

Additionally, you should make sure that you approach them at the appropriate time and location. According to the doctor, there will likely be very little response if you leave the patients in the waiting area. Selecting the appropriate time is also important because you won't get the greatest answers if you approach a subject late at night or around lunch.

- Remember…
- Each question in the survey needs to be justified and linked to the research objectives

5 – Conclusion

- Don’t forget to thank the interviewed persons
- Tell them when the results will be available and where

Example of conclusion

This is the end of the interview. Thanks for answering this questionnaire. The result of this study will be available on the School of Medicine, University of Jordan website within 6 weeks time.
Do you have any others questions you wish to ask ?

In some outbreak investigations you might want to add:

We are still in a very early phase of our investigation. Would you agree to be contacted again in case further questions arise?

Summary:
Questionnaire design

1. Compose the wording
- *Use plain language and simple questions*
- *Use mostly close-ended questions*
2. Determine layout
3. Prepare a first draft

4– Pretesting: expert in the field, family member, friend, colleagues

More than one pre-test may be needed

Pretesting the Questionnaire

- Discover poor question wording or ordering
- Identify errors in questionnaire layout or instructions
- Determine if respondents were unable or unwilling to answer questions
- Suggest additional response categories
- Determine if the questionnaire is appropriate length

Steps in questionnaire design

5. Pilot

- Pilot it with the target group and as you intend to

Therefore, if you are conducting a study on second to sixth-year medical students, you should first conduct a pilot study with 30 students from year two, 30 students from year four, 30 students from year six, etc., and get their input before distributing the results to the entire study.

Evaluate and modify on the basis of the pilot

6. administer it

-Conduct survey, including protocol for maximizing response rates

Include manual Assess response rate

A pilot test

- Is an evaluation of the specific questions, format, question
- sequence and instructions prior to use in the main survey.
- Pilot testing is a crucial step in conducting a survey. Even modest pretesting can avoid costly errors.

A pilot test

Questions answered by the pilot test include:

1. Is each of the questions measuring what it is intended to measure?
2. Are questions interpreted similarly by all respondents?
3. Do close-ended questions have a response which applies to all respondents?
4. Are the questions clear and understandable?
5. Is the questionnaire too long?
6. How long does the questionnaire take to complete?
7. Are the questions obtaining responses for all the different response categories or does everyone respond the same?

A pilot test

Always remember:

Even modest edits can avoid costly errors!

You might ask a question in a confusing way, or the participants may misunderstand it. Alternatively, if your questionnaire is lengthy and self-completed, a participant might rush through it, skipping or giving random answers just to finish quickly. This could mean that they don't complete important sections, like pages one and two, accurately or thoughtfully.

This emphasizes the importance of refining and testing questions to ensure they are clear and concise, and that the survey format encourages thoughtful responses.

Pilot your questionnaire!

- Pilot with a group of people
  -> Similar to your target subjects, usually 30 subjects

If the whole population is 100 or smaller, you can do it on 10 potential participants

For multi-study: One site is enough

- Highlight problems before starting
- Misunderstandings
- Look for alternative wording
- Evaluate for missing data, consistency, and reasonableness of answers
- Ask pre-test participants for direct feedback
- Use duplicate administrations to assess reproducibility

  - Final polishing Exclude the questionnaires from the pilot study in your research and be sure to note in the results section that you conducted a pilot study, including the number of participants and the location of data collection for the pilot, highlighting that the participants are not taken into account in the final evaluation.

Steps in questionnaire design

6. administer it

-Conduct survey, including protocol for maximizing response rates

Include manual (Assistance if needed, particularly for self-completed questionnaires, and explanations for any complex or unclear questions)

Assess response rate (A key finding from the pilot, if low, you must solve the issue)

You must have a protocol for minimizing low-response rate

Questionnaire Design – Administering a Questionnaire

1. Identify the best practice for administering the type of questionnaire utilized.
2. Train and audit field workers, if required.

You need to see how the assistant approaches the subject how they include eligible subjects, and how they ask all the questions

3. Ensure a process is in place to handle completed questionnaires.
4. Determine the deadline.

Conclusions

- You need plenty of time!
  - Design your questionnaire from research hypotheses that have been carefully studied and thought out.
  - Discuss the research problem with colleagues and subject matter experts is critical to developing good questions.
  - Review, revise, and test the questions
  - Examine the questionnaire as a whole for flow and presentation.

Rushing through the research process can lead to mistakes or make it difficult to publish the study successfully, and if published, it may have a low impact. To avoid this, we need to carefully design questionnaires around our hypothesis, conduct a thorough literature review, carry out pre-testing and piloting, and then proceed with fieldwork. Afterward, we'll assess the response rate of the participants.

Bias

Systematic difference in the response measurement

When studying stress levels among medical students, selecting a valid and reliable questionnaire is crucial. Suppose I distribute a questionnaire that is flawed or improperly validated, leading to a report that 60% of students experience significant stress or anxiety. Due to the invalidity of this tool, I may draw the biased and inaccurate conclusion that stress is alarmingly high among medical students. Conversely, if I use a well-validated questionnaire, the responses might indicate that only 30% of students experience such stress. In this case, I can be confident that the results genuinely reflect a 30% anxiety level without being skewed by measurement bias. This illustrates how using a biased tool can artificially inflate results, leading to erroneous conclusions that do not accurately reflect the true experiences of the population.

- Recall bias
  - Cases more likely to remember than controls

Recall bias occurs when participants in a study have difficulty accurately remembering or reporting past events, often due to the passage of time or the emotional weight of the event. This bias can lead to inaccurate or skewed data, as individuals may either underreport or overreport details based on their memory or perception.

Examples:

1) If you ask someone to recall their food intake and physical activity from the previous year, they might struggle to remember specific details.
2) If a mother is asked about her drug use during the first trimester, particularly when her child has a congenital condition, she may feel pressured to recall accurately.

- Observer bias
  - Different interviewers – different interpretations
  - Different interpretations of similar questions

Reference manual !!!!

- Non-response bias
  - telephone interviews
  - Incompleteness
  - Wrong answers

How to reduce bias

- Structured questionnaire
- Ensure high response rate
- Pretesting and piloting
- Training of interviewers

Non-responders

- Understanding the characteristics of those who did not respond to the survey is important to quantify what, if any, bias exists in the results.

Maximising the response rate

If you were sending out a questionnaire, what would you do to maximise the response rate?

In groups, 5 minutes

Ways to Improve Response Rates

- Keep questionnaire short
- Ensure confidentiality (key thing in interviews)
- Target the appropriate population
- Make it convenient for respondents
- Clearly communicate research purpose
- Give advance notice (advertising)

If you want to interview patients coming to a clinic, give them a call beforehand, introduce yourself as an investigator, and let them you would like to interview them during their visit

- Reward for completing the questionnaire

Techniques for minimising non-response

- Good design
  - Thoughtful layout, easy to follow, simple questions, appearance, length, degree of interest and importance, thank people for taking part
- Pre-notification
- Explanation of selection
- Sponsorship, e.g. letter of introduction / recommendation
- Cover letter

Techniques for minimising non-response

- Incentives
  - Small future incentives, e.g. prize draw
  - Understanding why their input is important
- Reminders
- Confidentiality
- Anonymity
- Pre-paid return envelopes envelopes with pre-paid postage that allow recipients to return documents or forms without needing to pay for postage themselves. They're commonly used in surveys, questionnaires, or studies where researchers need participants to send back completed forms, samples, or data.

Some issues in use of questionnaires

- Newly diagnosed and sub-clinical disease
- Controlled patients, uncontrolled patients and newly diagnosed patients
- Healthy control versus general population sample
- General population might have highly prevalent chronic diseases such as ischaemic heart disease, AIDS, diabetes

•**Hypothyroidism**: A patient might be newly diagnosed with hypothyroidism but have symptoms that overlap with sub-clinical conditions such as fatigue and weight gain. Questionnaires may struggle to capture the full extent of the disease without clinical confirmation.
•**Hypertension**: Patients with newly diagnosed high blood pressure might not show any symptoms (sub-clinical), making it difficult for questionnaires to differentiate between those needing treatment and those who do not.

•**Hypothyroidism**: A healthy control group would have no thyroid dysfunction, while a general population sample might include individuals with undiagnosed or mild thyroid issues, leading to mixed results in survey outcomes.
•**Hypertension**: The general population may include undiagnosed hypertensive individuals, unlike a healthy control sample where no hypertension is present. This difference could skew survey data on blood pressure-related lifestyle impacts.

Critical appraisal checklist for a questionnaire study

- As a medical student and future physician, it is crucial to develop the skill of critically evaluating any publication or proposal you encounter. For example, if a patient or colleague presents an article claiming a new medication effectively lowers blood pressure, you must carefully review the study, assess the credibility of the publishing journal, and conduct a thorough critical appraisal. Initially, this process might be time-consuming, taking up to 20 or 30 appraisals to gain efficiency. However, with continued practice, you'll be able to complete comprehensive assessments within 15 to 30 minutes.

In a study on lifestyle interventions for type 2 diabetes, researchers might use a questionnaire to collect data on diet, exercise, and treatment adherence. While effective for gathering subjective responses, it may not be the best method for assessing clinical outcomes like blood glucose levels. A more suitable approach could combine questionnaires with clinical tests to pair self-reported data with objective health metrics for a comprehensive analysis.

Research question and study design

- What information did the researchers seek to obtain?
- Was a questionnaire the most appropriate method and if not, what design might have been more appropriate?
- Were there any existing measures (questionnaires) that the researchers could have used? If so, why was a new one developed and was this justified?
- Were the views of respondents sought about the design, distribution, and administration of the questionnaire?

In studying anxiety among medical students, researchers might find existing validated questionnaires such as the Generalized Anxiety Disorder-7 (GAD-7) scale. If they chose to develop a new questionnaire, they would need to justify this decision, perhaps by highlighting unique stressors specific to medical education that aren't covered by current tools. This justification ensures the new tool adds value and is not redundant.

Format

- Was the title of the questionnaire appropriate and if not, what were its limitations?
- What format did the questionnaire take, and were open and closed questions used appropriately?
- Were easy, non-threatening questions placed at the beginning of the measure and sensitive ones near the end?
- Was the questionnaire kept as brief as the study allowed?
- Did the questions make sense, and could the participants in the sample understand them? Were any questions ambiguous or overly complicated?

SAMPLING

- What was the sampling frame for the definitive study and was it sufficiently large and representative?
- Was the instrument suitable for all participants and potential participants?
- In particular, did it take account of the likely range of physical/mental/cognitive abilities, language/literacy, understanding of numbers/scaling, and perceived threat of questions or questioner?

Piloting

- Was the questionnaire adequately piloted in terms of the method and means of administration, on people who were representative of the study population?
- How was the piloting exercise undertaken—what details are given?
- In what ways was the definitive instrument changed as a result of piloting?

Instructions

- Did the questionnaire contain adequate instructions for completion

—eg answers, or an explanation of whether a ticked or written response was required?

- Were participants told how to return the questionnaire once completed?
- Did the questionnaire contain an explanation of the research, a summary of what would happen to the data, and a thank you message?

Distribution, Administration and Response

How was the questionnaire distributed?

How was the questionnaire administered?

Were the response rates reported fully, including

details of participants who were unsuitable for the research or refused to take part?

Have any potential response biases been discussed?

Coding and analysis

What sort of analysis was carried out and was this appropriate? e.g. correct statistical tests for quantitative answers, qualitative analysis for open ended questions

What measures were in place to maintain the accuracy of the data, and were these adequate?

Is there any evidence of data dredging—that is, analyses that were not hypothesis driven?

Results

What were the results and were all relevant data reported?

- Are quantitative results definitive (significant), and are relevant non-significant results also reported?

- Have qualitative results been adequately interpreted (e.g. using an explicit theoretical framework), and have any quotes been properly justified and contextualized?

Conclusions and discussion

What do the results mean and have the researchers drawn an appropriate link between the data and their conclusions?

- Have the findings been placed within the wider body of knowledge in the field (eg via a comprehensive literature review), and are any recommendations justified?

Major steps in surveys

- **determine what information is needed to establish objectives and draw up the table shells you will be using to analyze the data**
- **Determine**
  - **Sampling universe (what is the population you are sampling from?) geographic area to be sampled, as well as who in the population is to be included in the survey (children under 5, women of reproductive age, patient with type I DM) need to be determined**
  - **Sample size**
  - **Sampling method**

- Quick note: This slide, plus the next three, aren't from the doctor's original set, but they're super handy summaries of the first three weeks' material. Make sure you don’t skip them—they’re worth it!

Steps in conducting a study

Step 1: Determine the objectives of your study

- Why conduct a Survey?

Who is the population of interest?

- What issues need to be explored?
- What question(s) are you trying to answer?
- Who will be using your findings?
- How will these findings be used?

Step 2: Determine the exposure and outcome variables and decide how you will define them

- Sources:literature, experts, focus groups, preliminary interviews
- Be able to justify the inclusion of each variable
- Avoid temptation to include variables that “might be interesting”
- Realize you may need more than one study
- Decide how variables to be classified

Step 3: develop preliminary “skeleton” tables

- Begin with simple descriptive characteristics
- Develop shells for two way tables
- Develop shells for any stratified tables

Step 4: determine

- Who will be the study subjects
- Methodology
- Sample size

Step 5: design a questionnaire

- Decide on what questions to ask
- Set the types of response formats
- Set the layout of the questionnaire
- To fill in the blanks in the skeleton tables
- The analysis should drive the questionnaire rather than vice-versa!
- Pilot your questionnaire

Step 6: Establish a sampling plan for data collection and work out the logistics

- establish the methodology for collecting the information,
  - Types of questionnaire
  - Day-to-day methods
  - Plans for specimens

Step 7: Determine the personnel needs

- Types of people and necessary person-hours
- Develop appropriate descriptions of responsibilities for each level of personnel
  - Supervisors
  - Surveyors
  - Drivers/guides
  - translators

Step 8: Field test the questionnaire in the population in which it is to be used and determine whether there are operational problems

- Revise the questionnaire / methods
- Develop other necessary forms
  - record-keeping forms for interviewers to keep track of sites visited

Step 9: Develop instruction manuals for survey personnels

- To detailing how questionnaires are to be filled
- How the sample is to be selected
- How field supervision will be performed

Step 10: select and train the personnel to be used to collect the data

- Keys to the training are:
  - Information
  - Examples
  - practice

Step 11:Develop check list of materials needed for field work

- Forms
- Papers
- Pencils
- Clipboards
- Paperclips
- Sleeping bags
- tents
- Per diems
- Payment schedule
- Review of data forms

Step 12: collect the data

- assuring:
  - quality
  - completeness

  (through supervisory visits and review of data forms

Step 13:Edit your data to determine errors in collection, coding, transcription, or data entry

- If field entry, build in edit checks
- Look for abnormal values, unexpected population distribution
- Perform plausibility edits

- Go back to the source whenever possible
- Avoid second-guessing
- Be consistent
- Fix errors as soon as it occurs
- Document the fix

Step 14: do the data analysis

- Calculate the response rates
- Fill out the skeleton tables
- Collapse categories
- Think about what your data means
- Measures of association and statistical tests keeping in mind:
  - Study design (matching, design effect)

Step 15: interpret your data

- Meaning of the results
- Significance testing

Step 16:Writing up

- Immediately
- Disseminate to the appropriate people

Ready to use questionnaires

- In general, for a tool to be validated for use in assessment, it should be:
- Valid
- ✓ Assess clinical important difference: smallest improvement considered worthwhile by a patient
- ✓ Tool sensitive for changes
- Reliable
- Precise
- Easy to administer
- Acceptable by the study population.

Ready to use questionnaires

- In general, for a tool to be validated for use in assessment, it should be:
- Valid
- ✓ Assess clinical important difference: smallest improvement considered worthwhile by a patient
- ✓ Tool sensitive for changes
- Reliable
- Precise
- Easy to administer
- Acceptable by the study population.

Additional sources

1. Book pages
2. Youtube videos
3. Webpages…etc

عندما تشعر بالاعياء, ارتاح لكن لا تستسلم, النجاح لا يأتي الا أولئك
الذين يواصلون المشي حتى وان كانت الخطوات بطيئة.

VERSIONS	SLIDE #	BEFORE CORRECTION	AFTER CORRECTION
V1→ V2			
V2→V3			

امسح الرمز و شاركنا بأفكارك لتحسين أدائنا !!