Chapter-9

Data collection tools in qualitative and quantitative research

Usman Mahboob

The research we do is based on either observation, literature or empirical. No matter whatever type of research we do, we need some sort of data to further proceed with our findings, and this requires a tool or an instrument that can be used to collect data. The data collection instruments can vary from one discipline to another. For example, in biomedical sciences, a glucometer or measuring tape can be data collection instruments to collect blood glucose level or height of an individual respectively. Similarly, in educational setting, an MCQ or an OSCE can be used as data collection tools to assess the knowledge and skills of study participants respectively.

Moreover there are different types of data collection instruments used in quantitative and qualitative research. Some of the commonly used data collection instruments in health professions are:

Questionnaire

Questionnaire is one of the most commonly used data collection instruments in medical research. It consists of a list of questions or statements that the study respondents have to fill, either by themselves or with the help from researcher. There are variations in questionnaires. Some have a list of closed-ended questions or statements, or both closed and open-ended questions. In few instances, a questionnaire may only have open-ended questions. The last type is usually used to collect qualitative data.

Questionnaires can be used to collect different types of data and variables. For example, demographic variables such as age, gender, and marital status. Other variables may be related to study such as information about the use of contraception, or the daily intake of water, or rating opinion about professionalism of colleagues. Questionnaires can be used in different types of studies such as survey, exploratory, cross-sectional, longitudinal, descriptive, and analytical studies.

Development of questionnaire is a rigorous process and involve multiple steps. Depending on the dynamics of the project, the steps for questionnaire development may vary. However, the first step is usually a good literature review. The key concepts or themes identified from the literature lead to development of questions or statements. These statements are then pilot tested for establishing validity and reliability. The strengths and limitations of questionnaire are dependent on the quality (validity and reliability) and type of research in which they are used.

Specialized, Digital and Machine-based Instruments

This section includes instruments used in biomedical, clinical and laboratory research such as X-ray machines, different types of media in laboratory, glucometer, ECG, weight machine, etc. This list can be long as it will depend on the type of study and specialty that will define its data collection instruments. The quality assurance of the instruments follows the principles of validity and reliability. However, the procedures of quality assurance for each instrument may vary depending on the standards followed for it. The sample and number of participants required for each of these data collection instrument will depend on the type of methodology and rigour. Also, the strengths and limitations of each instrument would be dependent on the validity and reliability measures, and the type of research in which these instruments are going to be used.

Interviews

An interview is a two-way conversation between interviewer and study participant in which the study participant express him/

herself about the topic of research. Interview is a qualitative data collection instrument, and is usually used to understand the behaviour and feelings of the study participants. Interviews can be chosen in situations exploring sensitive issues for example, sexually transmitted diseases or having an executive interview with an influential study participant. There are different types of interviews: unstructured or in-depth, semi-structured, and structured.[1] The type of interview depends on the purpose of the study. For example, exploring the stories of patients with head injury in a narrative research may require an in-depth interview, whereas exploring the 'attributes of a professional doctor' from a doctor may need a semi-structured interview. Usually in-depth interview takes more than an hour whereas the other two formats may take less time due to more control of the researcher. The sample size is usually small as compared to quantitative studies. The strength of an interview is an in-depth understanding of the research problem. The limitation is its contextual nature due to which the results cannot be generalized.

An interview guide is required for an interview that includes: introduction to the topic, details on why the participant has been selected, the total time that would be required, any incentives, and the interview guiding questions with prompts where relevant. The interviewer can add some additional content to his guide for example, themes can only be for the interviewer and not the interviewee in some cases, so as not to control him in answering the questions, and to let him speak openly, during the interview process.

Focus Group Discussion

A focus group discussion (FGD) is a conversation between a homogenous or heterogeneous group facilitated by a moderator.[2] The conversation gives different opinions on the topic under discussion. A Focus Group Interview (FGI) is a variant of FGD in which there is only an interview from the group participants with no or minimal discussion. An FGD is used in situations where the topic of discussion is of common interest to the

participants (a homogenous group), and does not have the issue of disclosure of sensitive information. Further, it is done when getting participants around one table is not difficult; or if the topic needs to be investigated in-depth through discussion to further explore it. The sample required for FGD is small due to the qualitative nature of the data. Usually, 4-10 people would participate in one FGD. The strength of an FGD is the discussion that explores the research topic in-depth. The limitations of an FGD are; when there is any sensitive information that some participants may not like to share, or if one of the group member is dominating or if some of the group members are quite and not expressing themselves. However, an experienced facilitator or moderator can overcome these issues.

The researcher can take help of another person for logistic support or he can assign different roles to the FGD participants. The roles in FGD are: a 'scribe' who would take the notes, a facilitators or moderator who would steer the discussion, a time keeper who would keep the group to complete tasks within time, and participants who would fully participate in the discussion. Use of white board, flip charts and showing videos in some situations may also be part of an FGD. Similarly, as in the interview guide, an FGD guide is also required that can be sent to the study participants beforehand or just before starting the FGD. The guide includes introduction to the topic, why the participant has been selected, the total time that would be required, any incentives, and the guiding questions with prompts where relevant. Moreover, the moderator of FGD may have some additional details in his guide, on how to facilitate the session.

Observations

Observations involve witnessing the study participants over a period of time for a specific behaviour or a routine. The activities to be observed may be normal day activities or simulated situations.[2] The strength is that the researcher gets the real life data instead of a narration in interview or an FGD. Moreover, the behaviour is observed in broader situations to evaluate the impact of a policy or practice.[2] An example can

be observing trainees in a hospital setting if they would follow the standard procedures or they would have devised their own protocol of dealing with different situations and procedures. The observations would require the type of data that the researcher wants to collect such as a count data, workflow data or interaction data.[2] The limiting factors for using observations as data collection instrument can be: time required for observation, access to the sites, and ethical approval to observe a patient or a trainee in hospital setting. [2]

Textual Data

Textual data and analysis involves using the text to collect data. The text can be in the form of patient files, doctor's notes, call writings, and images in patient files such as X-rays. The purpose of this data collection can be understood from examples such as; to report a historical trend for disease pattern, or how the treatment has evolved over time, or to report how the doctors reporting skills have evolved over time. The limitation can be access to such records, and when the complete records are not available.[2] Moreover, the analysis skills of the researcher needs to be good enough to observe the subtle changes in language and reporting.[2] Further, another limitation can be that the analysis would require time to read through hundreds of pages, and understanding of qualitative coding techniques to thoroughly analyze the data.[2]

Conclusion

This chapter has briefly described some of the data collection instruments that are used in health professions research. The quality measures such as validity and reliability have not been discussed as they are quite extensive topics and can be discussed elsewhere. Moreover, the measures for quality assurance vary for different instruments and the type of methodology under which they are utilized. Each data collection instrument has its strengths and limitations. The reader should be able to decide which instrument to select, and whether the selected instrument is fit for the purpose of his/her study.

REFERENCES

1 Silverman D. Interpreting qualitative data. 5th ed. London: SAGE 2015. https://scholar.google.com.pk/scholar?cluster=4724021833128122377&hl=en&as_sdt=0,5 (accessed 29 Sep2017).

2 Paradis E, Dan L. The Tools of the Qualitative Research Trade. Acad Med 2016;91:e17. doi:10.1097/ACM.0000000000001392.2.

---

1. Dr. Usman Mahboob MBBS, MPH, FHEA (UK), Doctor of HPE (UK), Fellow FAIMER (USA)
Assistant Professor in Medical Education
Director, Institute of Health Professions Education & Research
Khyber Medical University,
Peshawar, Pakistan
Email: usman.mahboob@kmu.edu.pk