Given that qualitative research is characterised by flexibility, openness and responsivity to context, the steps of data collection and analysis are not as separate and consecutive as they tend to be in quantitative research [13, 14]. As Fossey puts it: â€œsampling, data collection, analysis and interpretation are related to each other in a cyclical (iterative) manner, rather than following one after another in a stepwise approachâ€• [15]. The researcher can make educated decisions with regard to the choice of method, how they are implemented, and to which and how many units they are applied [13]. As shown in Fig. 1, this can involve several back-and-forth steps between data collection and analysis where new insights and experiences can lead to adaption and expansion of the original plan. Some insights may also necessitate a revision of the research question and/or the research design as a whole. The process ends when saturation is achieved, i.e. when no relevant new information can be found (see also below: sampling and saturation). For reasons of transparency, it is essential for all decisions as well as the underlying reasoning to be well-documented.

Fig. 1 Iterative research process Full size image

While it is not always explicitly addressed, qualitative methods reflect a different underlying research paradigm than quantitative research (e.g. constructivism or interpretivism as opposed to positivism). The choice of methods can be based on the respective underlying substantive theory or theoretical framework used by the researcher [2].

Data collection

The methods of qualitative data collection most commonly used in health research are document study, observations, semi-structured interviews and focus groups [1, 14, 16, 17].

Document study

Document study (also called document analysis) refers to the review by the researcher of written materials [14]. These can include personal and non-personal documents such as archives, annual reports, guidelines, policy documents, diaries or letters.

Observations

Observations are particularly useful to gain insights into a certain setting and actual behaviour â€“ as opposed to reported behaviour or opinions [13]. Qualitative observations can be either participant or non-participant in nature. In participant observations, the observer is part of the observed setting, for example a nurse working in an intensive care unit [18]. In non-participant observations, the observer is â€œon the outside looking inâ€•, i.e. present in but not part of the situation, trying not to influence the setting by their presence. Observations can be planned (e.g. for 3 h during the day or night shift) or ad hoc (e.g. as soon as a stroke patient arrives at the emergency

room). During the observation, the observer takes notes on everything or certain pre-determined parts of what is happening around them, for example focusing on physician-patient interactions or communication between different professional groups. Written notes can be taken during or after the observations, depending on feasibility (which is usually lower during participant observations) and acceptability (e.g. when the observer is perceived to be judging the observed). Afterwards, these field notes are transcribed into observation protocols. If more than one observer was involved, field notes are taken independently, but notes can be consolidated into one protocol after discussions. Advantages of conducting observations include minimising the distance between the researcher and the researched, the potential discovery of topics that the researcher did not realise were relevant and gaining deeper insights into the real-world dimensions of the research problem at hand [18].

Semi-structured interviews

Hijmans & Kuyper describe qualitative interviews as â€œan exchange with an informal character, a conversation with a goalâ€• [19]. Interviews are used to gain insights into a personâ€™s subjective experiences, opinions and motivations â€“ as opposed to facts or behaviours [13]. Interviews can be distinguished by the degree to which they are structured (i.e. a questionnaire), open (e.g. free conversation or autobiographical interviews) or semi-structured [2, 13]. Semi-structured interviews are characterized by open-ended questions and the use of an interview guide (or topic guide/list) in which the broad areas of interest, sometimes including sub-questions, are defined [19]. The pre-defined topics in the interview guide can be derived from the literature, previous research or a preliminary method of data collection, e.g. document study or observations. The topic list is usually adapted and improved at the start of the data collection process as the interviewer learns more about the field [20]. Across interviews the focus on the different (blocks of) questions may differ and some questions may be skipped altogether (e.g. if the interviewee is not able or willing to answer the questions or for concerns about the total length of the interview) [20]. Qualitative interviews are usually not conducted in written format as it impedes on the interactive component of the method [20]. In comparison to written surveys, qualitative interviews have the advantage of being interactive and allowing for unexpected topics to emerge and to be taken up by the researcher. This can also help overcome a provider or researcher-centred bias often found in written surveys, which by nature, can only measure what is already known or

expected to be of relevance to the researcher. Interviews can be audio- or video-taped; but sometimes it is only feasible or acceptable for the interviewer to take written notes [14, 16, 20].

Focus groups

Focus groups are group interviews to explore participantsâ€™ expertise and experiences, including explorations of how and why people behave in certain ways [1]. Focus groups usually consist of 6â€“8 people and are led by an experienced moderator following a topic guide or â€œscriptâ€• [21]. They can involve an observer who takes note of the non-verbal aspects of the situation, possibly using an observation guide [21]. Depending on researchersâ€™ and participantsâ€™ preferences, the discussions can be audio- or video-taped and transcribed afterwards [21]. Focus groups are useful for bringing together homogeneous (to a lesser extent heterogeneous) groups of participants with relevant expertise and experience on a given topic on which they can share detailed information [21]. Focus groups are a relatively easy, fast and inexpensive method to gain access to information on interactions in a given group, i.e. â€œthe sharing and comparingâ€• among participants [21]. Disadvantages include less control over the process and a lesser extent to which each individual may participate. Moreover, focus group moderators need experience, as do those tasked with the analysis of the resulting data. Focus groups can be less appropriate for discussing sensitive topics that participants might be reluctant to disclose in a group setting [13]. Moreover, attention must be paid to the emergence of â€œgroupthinkâ€• as well as possible power dynamics within the group, e.g. when patients are awed or intimidated by health professionals.

Choosing the â€œrightâ€• method

As explained above, the school of thought underlying qualitative research assumes no objective hierarchy of evidence and methods. This means that each choice of single or combined methods has to be based on the research question that needs to be answered and a critical assessment with regard to whether or to what extent the chosen method can accomplish this â€“ i.e. the â€œfitâ€• between question and method [14]. It is necessary for these decisions to be documented when they are being made, and to be critically discussed when reporting methods and results.

Let us assume that our research aim is to examine the (clinical) processes around acute endovascular treatment (EVT), from the patientâ€™s arrival at the emergency room to recanalization, with the aim to identify possible causes for delay and/or other causes for sub-optimal treatment outcome. As a first step, we could conduct a document study of the

relevant standard operating procedures (SOPs) for this phase of care â€“ are they up-to-date and in line with current guidelines? Do they contain any mistakes, irregularities or uncertainties that could cause delays or other problems? Regardless of the answers to these questions, the results have to be interpreted based on what they are: a written outline of what care processes in this hospital should look like. If we want to know what they actually look like in practice, we can conduct observations of the processes described in the SOPs. These results can (and should) be analysed in themselves, but also in comparison to the results of the document analysis, especially as regards relevant discrepancies. Do the SOPs outline specific tests for which no equipment can be observed or tasks to be performed by specialized nurses who are not present during the observation? It might also be possible that the written SOP is outdated, but the actual care provided is in line with current best practice. In order to find out why these discrepancies exist, it can be useful to conduct interviews. Are the physicians simply not aware of the SOPs (because their existence is limited to the hospitalâ€™s intranet) or do they actively disagree with them or does the infrastructure make it impossible to provide the care as described? Another rationale for adding interviews is that some situations (or all of their possible variations for different patient groups or the day, night or weekend shift) cannot practically or ethically be observed. In this case, it is possible to ask those involved to report on their actions â€“ being aware that this is not the same as the actual observation. A senior physicianâ€™s or hospital managerâ€™s description of certain situations might differ from a nurseâ€™s or junior physicianâ€™s one, maybe because they intentionally misrepresent facts or maybe because different aspects of the process are visible or important to them. In some cases, it can also be relevant to consider to whom the interviewee is disclosing this information â€“ someone they trust, someone they are otherwise not connected to, or someone they suspect or are aware of being in a potentially â€œdangerousâ€• power relationship to them. Lastly, a focus group could be conducted with representatives of the relevant professional groups to explore how and why exactly they provide care around EVT. The discussion might reveal discrepancies (between SOPs and actual care or between different physicians) and motivations to the researchers as well as to the focus group members that they might not have been aware of themselves. For the focus group to deliver relevant information, attention has to be paid to its composition and conduct, for example, to make sure that all participants feel safe to disclose sensitive or potentially problematic information or that the discussion is not dominated by (senior) physicians only. The resulting combination of data collection methods is shown in Fig. 2.

Fig. 2 Possible combination of data collection methods Full size image

Attributions for icons: â€œBookâ€• by Serhii Smirnov, â€œInterviewâ€• by Adrien Coquet, FR, â€œMagnifying Glassâ€• by anggun, ID, â€œBusiness communicationâ€• by Vectors Market; all from the Noun Project

The combination of multiple data source as described for this example can be referred to as â€œtriangulationâ€•, in which multiple measurements are carried out from different angles to achieve a more comprehensive understanding of the phenomenon under study [22, 23].

Data analysis

To analyse the data collected through observations, interviews and focus groups these need to be transcribed into protocols and transcripts (see Fig. 3). Interviews and focus groups can be transcribed verbatim, with or without annotations for behaviour (e.g. laughing, crying, pausing) and with or without phonetic transcription of dialects and filler words, depending on what is expected or known to be relevant for the analysis. In the next step, the protocols and transcripts are coded, that is, marked (or tagged, labelled) with one or more short descriptors of the content of a sentence or paragraph [2, 15, 23]. Jansen describes coding as â€œconnecting the raw data with â€œtheoreticalâ€• termsâ€• [20]. In a more practical sense, coding makes raw data sortable. This makes it possible to extract and examine all segments describing, say, a tele-neurology consultation from multiple data sources (e.g. SOPs, emergency room observations, staff and patient interview). In a process of synthesis and abstraction, the codes are then grouped, summarised and/or categorised [15, 20]. The end product of the coding or analysis process is a descriptive theory of the behavioural pattern under investigation [20]. The coding process is performed using qualitative data management software, the most common ones being InVivo, MaxQDA and Atlas.ti. It should be noted that these are data management tools which support the analysis performed by the researcher(s) [14].

Fig. 3 From data collection to data analysis Full size image

Reference

[Kendall's Muscles: Testing and Function with Posture and Pain]

[Accidental Ethnography: An Inquiry into Family Secrecy (Writing Lives Book 7)]