

# **Research Methodology and Biostatistics for 5<sup>th</sup> year DVM**

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## **Method of data collection for Qualitative research**

### **1. Questionnaires**

Questionnaire: A data collection tool that can be used in a wide variety of research settings.

In order for the questionnaire to be effective, it must be carefully planned with consideration given to a number of design elements. First and foremost, it is essential that the objectives and information requirements of the study be established. This process could involve consultation with subject 'experts', and with the ultimate 'users' of the information (if the data are being collected for use by another group, *eg* policymakers). Members of the population to be surveyed should also be consulted in this phase of the planning process.

Questionnaires can be **qualitative** or **quantitative**. The former are sometimes referred to as 'explorative' questionnaires and consist primarily of open questions designed to allow the participant to express freely their views and thoughts on the subject matter. Qualitative questionnaires can be used in the hypothesis-generation phase of research when it is necessary to identify all of the issues pertaining to the research subject. These types of questionnaire are often administered through interviews and could be taped (with permission) to allow for a detailed evaluation of the content of the material discussed at a later time.

Quantitative, or structured, questionnaires are designed to capture information about the subjects, their environment, etc.

Questionnaires can be administered through a face-to-face interview, a phone interview, as a mailed questionnaire, or as an internet-based questionnaire. They have their own advantages and disadvantages.

A badly designed questionnaire can completely undermine the results of a study. It is vitally important to consider what information should be collected and how it can best be obtained. The following points should be borne in mind.

## **Planning**

Plan everything very carefully. Make sure that everyone involved knows exactly what they should be doing. Think carefully about what information you need to collect, and then consider how this can best be achieved. Make a draft of the tables and reports you would like to produce, and if necessary work backwards towards the data you need to collect. Decide how the questionnaire will be administered - for example, will you send it through the post, ask people to fill it in on your premises or use telephone or face-to-face interviews?

## **Content**

Make sure that the data collected can be analysed. For example, do not ask for dates of birth when you really want to know age (many computer databases can convert dates of birth to ages, but if you will be analyzing the data manually, by collecting dates you will waste precious time converting to ages manually). Do not collect unnecessary data, but avoid collecting so little data that useful conclusions cannot be drawn. Try to strike a suitable balance.

Produce questionnaires and data collection forms in a clear and methodical way. Consider how the data will be analysed. You may wish to use 'yes/no answers, Likert scales and answer selections in preference to open questions, which can be time-consuming and difficult to analyse. Remember to keep questionnaires as short as possible. People tend to discard questionnaires that are too long or which look too complicated. Aim for no more than one or two sides of A4 paper if possible. A better response will usually be obtained if you include a paragraph explaining why the survey is being conducted, and how the information will be used. Use clear, simple wording, but try to avoid sounding patronising. Minimise the possibility of questions being misunderstood (e.g. the question of 'are you male or female?' may generate 'yes' answers). Avoid leading questions (e.g. 'do you agree that our clinic provides an excellent service?'), or the results will be

inaccurate and credibility will be compromised. Start by asking a simple question that is designed to capture the interest of the respondent. For example, *avoid* beginning with a question such as 'what do you think the VTH's priorities for the next year should be?'. People often react well to the fact that you are taking an interest in them, so it is usually advisable to begin by asking about areas such as their age, gender and occupation. Having said this, it is important to be careful not to put people off by asking too many personal questions at the start.

### **Piloting**

Carry out a short 'dry run' before sending out the first real questionnaire. Ask a number of friends and colleagues to fill it in first. Even if the questionnaire is inappropriate for them, the results may well reveal bugs and other design problems. Try analysing the data from the pilot, too. It is much easier to make changes at this stage. Starting with a pilot can save you a great deal of pain later - ignore this advice at your peril!

### **Distribution and completion**

Consider this topic carefully, because the choice of method could crucially affect the level of response. Postal questionnaires allow subjects plenty of time to complete the forms, in the comfort of their own home. However, it should be remembered that postal questionnaires may achieve a response rate of 25% or less. They are also expensive, because you need to cover the cost of postage to the patient, plus the cost of a stamped addressed envelope. Furthermore, interviewers should not ask leading questions or attempt to interpret answers for respondents. Failure to administer the questionnaire correctly will result in bias

### **Questions**

A range of different types of question are available, including the following.

- 1. Fill-in answer*

Example: How old are you? years

## 2. *Yes/No*

Example: Do you feel that the physiotherapist has spent long enough with you? (Tick *one* box)

Yes     No

## 3. *Selection of answers*

Example: How long did you have to wait in the clinic before you were seen by the Vet? (Tick *one* box).

Less than 10 minutes

Between 10 minutes and half an hour

Over half an hour

## 4. *Likert scales*

This is a method of answering a question by selecting one of a range of numbers or responses (e.g. 1 = excellent, 2 = good, 3 = fair, 4 = bad, 5 = very bad) in preference to open questions which can yield large amounts of text that is time-consuming and difficult to analyse.

Example: How do you rate the overall service you received at the CVMA, VTH?

(Tick *one* box)

Excellent     Good     Fair     Bad     Very bad

Likert scales can have either an even or an odd number of responses. Using an odd number gives respondents the chance to opt for the middle ground (e.g. a choice of excellent/good/fair/bad/very bad allows them to say that they are neither happy nor unhappy, by choosing 'fair'). Using an even number avoids this option, compelling them to go either one way or the other. You need to decide which approach is best for a particular situation.

## 5. *Open questions*

These can provide much more detailed and precise information than other types of question, but they are difficult to analyse. Asking 70 people to tell you about problems they encountered with the service from your department will probably result in most responses being worded differently. Furthermore, some responders may make several separate points in the same answer. You can, of course, group the responses into categories (e.g. 'receptionist was rude - 3', 'no toilet facilities - 5', 'long waiting times - 10', etc.), but you then risk misinterpreting some responses, which can result in bias.

## **2. Interviews**

Interviews are believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires.

It is most appropriate where little is already known about the study phenomenon or where detailed insights are required from individual participants. They are also particularly appropriate for exploring sensitive topics, where participants may not want to talk about such issues in a group environment.

When designing an interview schedule it is imperative to ask questions that are likely to yield as much information about the study phenomenon as possible and also be able to address the aims and objectives of the research. It is usually best to start with questions that participants can answer easily and then proceed to more difficult or sensitive topics. This can help put respondents at ease, build up confidence and rapport and often generates rich data that subsequently develops the interview further.

There are three fundamental types of research interviews: structured, semi-structured and unstructured.

- 1. Structured interviews** are, essentially, verbally administered questionnaires, in which lists of predetermined questions are asked, with little or no variation and with no scope for follow-up questions to responses that warrant further elaboration. Consequently, they are relatively quick and easy to administer and may be of particular use if clarification of certain questions are required or if there are likely to be literacy or numeracy problems with the respondents. However, by their very nature, they only allow for limited participant responses and are, therefore, of little use if ‘depth’ is required.
- 2. Unstructured interviews** do not reflect any preconceived theories or ideas and are performed with little or no organization. Such an interview may simply start with an opening question such as ‘Can you tell me about your experience of visiting the dentist?’ and will then progress based, primarily, upon the initial response. Unstructured interviews are usually very time-consuming (often lasting several hours) and can be difficult to manage, and to participate in, as the lack of predetermined interview questions provides little guidance on what to talk about (which many participants find confusing and unhelpful). Their use is, therefore, generally only considered where significant ‘depth’ is required, or where virtually nothing is known about the subject area (or a different perspective of a known subject area is required).
- 3. Semi-structured interviews** consist of several key questions that help to define the areas to be explored, but also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail. This interview format is used most frequently in healthcare, as it provides participants with some guidance on what to talk about, which many find helpful. The flexibility of this approach, particularly compared to structured interviews, also allows for the discovery or elaboration of information that is important to participants but may not have previously been thought of as pertinent by the research team.

The finding was also established primarily through follow-up questioning (eg. probing interesting responses with follow-up questions, such as ‘Can you tell me a bit more about that?’)

and, therefore, may not have emerged in the same way, if at all, if asked as a predetermined question. The purpose of the research interview is to explore the views, experiences, beliefs and/or motivations of individuals on specific matters.

Before an interview takes place, respondents should be informed about the study details and given assurance about ethical principles, such as anonymity and confidentiality. This gives respondents some idea of what to expect from the interview, increases the likelihood of honesty and is also a fundamental aspect of the informed consent process. Wherever possible, interviews should be conducted in areas free from distractions and at times and locations that are most suitable for participants. For many this may be at their own home in the evenings. Whilst researchers may have less control over the home environment, familiarity may help the respondent to relax and result in a more productive interview. Establishing rapport with participants prior to the interview is also important as this can also have a positive effect on the subsequent development of the interview. When conducting the actual interview it is prudent for the interviewer to familiarize themselves with the interview schedule, so that the process appears more natural and less rehearsed. However, to ensure that the interview is as productive as possible, researchers must possess a repertoire of skills and techniques to ensure that comprehensive and representative data are collected during the interview. One of the most important skills is the ability to listen attentively to what is being said, so that participants are able to recount their experiences as fully as possible, without unnecessary interruptions. Other important skills include adopting open and emotionally neutral body language, nodding, smiling, and looking interested and making encouraging noises (eg, 'Mmmm' during the interview. The strategic use of silence, if used appropriately, can also be highly effective at getting respondents to contemplate their responses, talk more, elaborate or clarify particular issues. Other techniques that can be used to develop the interview further include reflecting on remarks made by participants (eg, 'Pain?') and probing remarks ('When you said you were afraid of going to the clinic what did you mean?'). Where appropriate, it is also wise to seek clarification from respondents if it is unclear what they mean. The use of 'leading' or 'loaded' questions that may unduly influence responses should always be avoided (eg, 'So you think surgery waiting rooms are frightening?' rather than 'How do you find the waiting room at the Surgeon?').

At the end of the interview it is important to thank participants for their time and ask them if there is anything they would like to add. This gives respondents an opportunity to deal with issues that they have thought about, or think are important but have not been dealt with by the interviewer. This can often lead to the discovery of new, unanticipated information. Respondents should also be debriefed about the study after the interview has finished. All interviews should be tape recorded and transcribed verbatim afterwards, as this protects against bias and provides a permanent record of what was and was not said. It is often also helpful to make 'field notes' during and immediately after each interview about observations, thoughts and ideas about the interview, as this can help in data analysis process.

### **3. Focus Groups**

Focus groups share many common features with less structured interviews, but there is more to them than merely collecting similar data from many participants at once. A focus group is a group discussion on a particular topic organized for research purposes. This discussion is guided, monitored and recorded by a researcher (sometimes called a moderator or facilitator).

Focus groups are used for generating information on collective views, and the meanings that lie behind those views. They are also useful in generating a rich understanding of participants' experiences and beliefs.<sup>12</sup> Suggested criteria for using focus groups include:

- As a standalone method, for research relating to group norms, meanings and processes.
- In a multi-method design, to explore a topic or collect group language or narratives to be used in later stages
- To clarify, extend, qualify or challenge data collected through other methods
- To feedback results to research participants.

Focus groups should be avoided according to the following criteria:

- If listening to participants' views generates expectations for the outcome of the research that cannot be fulfilled.
- If participants are uneasy with each other, and will therefore not discuss their feelings and opinions openly



- If the topic of interest to the researcher is not a topic the participants can or wish to discuss
- If statistical data is required Focus groups give depth and insight, but cannot produce useful numerical results.

### **Conducting focus groups: group composition and size**

The composition of a focus group needs great care to get the best quality of discussion. There is no 'best' solution to group composition, and group mix will always impact on the data, according to things such as the mix of ages, sexes and social professional statuses of the participants. What is important is that the researcher gives due consideration to the impact of group mix (eg, how the group may interact with each other) before the focus group proceeds. Interaction is key to a successful focus group. Sometimes this means a pre-existing group interacts best for research purposes, and sometimes stranger groups. Pre-existing groups may be easier to recruit, have shared experiences and enjoy a comfort and familiarity which facilitates discussion or the ability to challenge each other comfortably.

In health settings, pre-existing groups can overcome issues relating to disclosure of potentially stigmatising status which people may find uncomfortable in stranger groups (conversely there may be situations where disclosure is more comfortable in stranger groups). In other research projects it may be decided that stranger groups will be able to speak more freely without fear of repercussion, and challenges to other participants may be more challenging and probing, leading to richer data. Group size is an important consideration in focus group research. It is better to slightly over-recruit for a focus group and potentially manage a slightly larger group, than under-recruit and risk having to cancel the session or having an unsatisfactory discussion. They advise that each group will probably have two non-attenders. The optimum size for a focus group is six to eight participants (excluding researchers), but focus groups can work successfully with as few as three and as many as 14 participants. Small groups risk limited discussion occurring, while large groups can be chaotic, hard to manage for the moderator and frustrating for participants who feel they get insufficient opportunities to speak.

Moderating a focus group looks easy when done well, but requires a complex set of skills, which are related to the following principles:

- Participants have valuable views and the ability to respond actively, positively and respectfully. Such an approach is not simply a courtesy, but will encourage fruitful discussions.
- Moderating without participating: a moderator must guide a discussion rather than join in with it. Expressing one's own views tends to give participants cues as to what to say (introducing bias), rather than the confidence to be open and honest about their own views.
- Be prepared for views that may be unpalatably critical of a topic which may be important to you.
- It is important to recognise that researchers' individual characteristics mean that no one person will always be suitable to moderate any kind of group. Sometimes the characteristics that suit a moderator for one group will inhibit discussion in another.
- Be yourself. If the moderator is comfortable and natural, participants will feel relaxed.

The moderator should facilitate group discussion, keeping it focused without leading it. They should also be able to prevent the discussion being dominated by one member (for example, by emphasising at the outset the importance of hearing a range of views), ensure that all participants have ample opportunity to contribute, allow differences of opinions to be discussed fairly and, if required, encourage reticent participants.

The venue for a focus group is important and should, ideally, be accessible, comfortable, private, quiet and free from distractions. However, while a central location, such as the participants' workplace or school, may encourage attendance, the venue may affect participants' behaviour. For example, in a school setting, pupils may behave like pupils, and in clinical settings, participants may be affected by any anxieties that affect them when they attend in a patient role. Focus groups are usually recorded, often observed (by a researcher other than the moderator, whose role is to observe the interaction of the group to enhance analysis) and sometimes videotaped.

At the start of a focus group, a moderator should acknowledge the presence of the audio recording equipment, assure participants of confidentiality and give people the opportunity to withdraw if they are uncomfortable with being taped. A good quality multi-directional external microphone is recommended for the recording of focus groups, as internal microphones are

rarely good enough to cope with the variation in volume of different speakers. If observers are present, they should be introduced to participants as someone who is just there to observe, and sit away from the discussion. Videotaping will require more than one camera to capture the whole group, as well as additional operational personnel in the room. This is, therefore, very obtrusive, which can affect the spontaneity of the group and in a focus group does not usually yield enough additional information that could not be captured by an observer to make videotaping worthwhile.

The systematic analysis of focus group transcripts is crucial. However, the transcription of focus groups is more complex and time consuming than in one-to-one interviews, and each hour of audio can take up to eight hours to transcribe and generate approximately 100 pages of text. Recordings should be transcribed verbatim and also speakers should be identified in a way that makes

## Reference

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