The questionnaire is probably the most common form of data collection tool used in nursing research. There is a misconception that anyone with a clear grasp of English and a modicum of common sense can design an effective questionnaire. Contrary to such common belief, this article will demonstrate that questionnaire design is a complex and time consuming process, but a necessary labour to ensure valid and reliable data is collected. In addition, meticulous construction is more likely to yield data that can be utilized in the pursuit of objective, quantitative and generalizable truths, upon which practice and policy decisions can be formulated. This article examines a myriad of fundamental issues surrounding questionnaire design, which encompass question wording, question order, presentation, administration and data collection, amongst other issues.

INTRODUCTION

During the course of this article, many of the issues surrounding questionnaire design will be examined. These embrace a myriad of elements surrounding the design process, including question wording and order, presentation, administration and data collection. Oppenheim (1966) wrote that

the world is full of well meaning people who believe that anyone who can write plain English, and has a modicum of common sense, can design a questionnaire. Oppenheim (1966, vii)

It will be seen that, on the contrary, questionnaire construction is a time consuming and complex process, but a necessary labour to ensure that the tool developed reduces, to a minimum, errors of comprehension and completion, on both the researcher’s and respondent’s part. In addition, the design of the questionnaire will have a major influence on both the response rate and the quality of information received.

Uses of the questionnaire

The questionnaire has been defined by Franklin and Osborne (1971) as ‘an instrument consisting of a series of questions and/or attitude opinion statements designed to elicit responses, which can be converted into measures of the variable under investigation’. The first requirement of the questionnaire is that it is suitable to collect data that can be used to test the research question or hypothesis (Barker 1994). An ideal questionnaire should be ‘clear, unambiguous and uniformly workable’ (Cohen & Mannion 1985) and yield valid and reliable data, usually in the quantitative paradigm. Questionnaires are not the sole preserve of academia, as they have many uses including screening, audit, administration, polling and public relations, in addition to their more accepted role in research (Stone 1993). They can be utilized to measure behaviour, beliefs, knowledge, attitudes and attributes. The more stringent and scrupulous the questionnaire design, the more likely that the data collected will be useful, and usable.
Prior to the construction of a questionnaire, one must ask some fundamental questions, such as 'what is the purpose of the research?', 'what is the research question to be answered?' and 'is the questionnaire the best method of acquiring this information?'. Ethical issues should be considered carefully at the outset, and any necessary permission to conduct the research should be obtained at this stage. It is useful to challenge the notion that the questionnaire is a benign instrument in the ethical context. The subject matter, the nature of the questions tabled and their psychological impact on the respondent, should be of paramount concern to the researcher. There is potential to make people feel guilty about their lifestyle behaviours, feel diminished by exposing their lack of knowledge or, at worst, induce a cathartic response to some long repressed emotion. All questionnaires represent a potential intrusion into the respondent's privacy, therefore all care should be exercised to spare their embarrassment and promote their confidence to elicit an honest response.

Oppenheim (1992) asserted that the questionnaire opens a quick and seemingly easy avenue to fact gathering, though this assertion belies the complexity of process involved. The process of questionnaire design requires constant forward planning (McGibbon 1997), and repeated piloting to define, and refine, the instrument under construction. The formation of a questionnaire requires a clear definition of the issue under consideration, and the related concepts involved. These can be uncovered by conducting a literature search, arranging interviews with interested parties, organizing ‘brainstorming’ sessions with colleagues and/or by undertaking Delphi studies, to harness the collective knowledge, expertise or opinion of a group of pre-defined ‘experts’. This process should increase content validity, and may uncover perspectives and experiences previously unconsidered by the researcher. In addition, it should facilitate the translation of definitions and concepts into indicators that can be used to measure the subject under discussion.

**Question wording**

Having assembled a series of indicators, the next step is to formulate these into questions, when the issue of question wording becomes paramount. This is a prospective minefield where the overriding principle should be to ensure that the respondent can understand the questions, and be provided with a clear structure to record their response. Questions should be simply worded, generally less than 20 words in length (Oppenheim 1992) and unambiguous. The use of jargon, unusual words, acronyms and abbreviations should be avoided where possible. Questions should be phrased for the lowest, rather than the average, educational level of the target population (Barker 1994), and contain words that virtually all respondents will understand. Care should be taken not to patronize people by over simplification, or the converse of making questions elitist or 'high-brow'. Question formulation should consider issues relating to literacy, comprehension, ethnic and cultural background, as well as the age and understanding of the target population. Analysis of the comprehension level of the questionnaire can be undertaken, by using standardized methods such as the FOG Index (Gunning 1952) or the Reading Difficulty Formula (Flesch 1949).

The researcher must ensure that the questions tabled can be answered, taking into consideration that human memory is fallible, and depends on the length and proximity of the time period elapsed, and the saliency of the topic under investigation (Bowling 1991). It is advisable to avoid being too precise in the response required, or asking the impossible – the information sought should be accessible to all respondents, as forcing the respondent’s to search for information may cause them to abandon the entire questionnaire (Bell 1993). Consideration should be given to whether the words chosen have an alternative meaning, and the researcher should beware of implicit assumptions in question wording (McColl 1993). Double barrelled questions should be omitted, or divided into two separate questions, and questions containing double negatives avoided, as they lead to confusion as to how to respond. Hypothetical questions are notoriously difficult to answer, and often do not yield reliable results (Sinclair 1975). Questions should generally be worded positively, and care exercised to avoid ‘leading’ questions, where the wording suggests the appropriate answer. Likewise, question wording may result in ‘socially desirable responses’, or force the...
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respondent to choose a fixed response, which does not reflect their exact opinion.

**Question type**

This leads us to the problem of question type. The first issue to resolve is whether the questions should be ‘open’, ‘closed’ or a mixture of both. Open questions allow the respondent to formulate their own response, in their own words, and therefore define their own frame of reference. However, they are more time consuming to answer, are believed to lower the response rate and require content analysis by the researcher, assuming they can decipher the handwriting! In designing the questionnaire, the researcher must decide how much space to allow for a response to open ended questions, taking into consideration variables such as the subject under investigation, the depth of response required, and even handwriting size. Too many open questions can be off putting, whilst too few may signal that individual insight is not required, and that the researcher already has all the answers.

Despite this criticism, many questionnaires concentrate on closed ended questions. These are notoriously difficult to construct, but easy to administer, answer and analyse. Parahoo (1997) suggests that the greater number of closed questions included, the more highly structured the questionnaire becomes.

Closed questions can take many forms. Dichotomous questions, seeking yes/no answers, are often used but should be kept to a minimum to reduce the likelihood of successful guessing. In terms of analysis, such questions will only separate respondents into two broad groupings, and finer comparisons are usually required. If yes/no questions are to be asked, ordering of questions is important and should seek to minimize the phenomenon known as ‘response set’ (Cronbach 1984), where the same response is given repeatedly, irrespective of question content.

Fixed choice questions can be used, where the respondent is given a range of alternatives from which to choose, which are generally mutually exclusive, i.e. only one category should apply to the respondent. In design terms, this requires the formulation of a ‘table of specifications’ to ensure that all options are included, and care is required to avoid overlap of categories, so that the response falls into one category only. Checklists, where the respondents are invited to tick all the boxes appropriate to them, can also be utilized. Again, care must be exercised to ensure that the list of alternatives is comprehensive, although the inclusion of an open category, such as ‘other … please specify’ is a useful contingency measure. However, checklists may unwittingly reveal to respondents what the ‘norm’ is, and thus encourage what they perceive to be socially desirable answers. A variation on this theme is ranking questions, where the respondents are required to state their order of preference from a prescribed list. The main criticisms here are that respondents may have equal preference for two items, and offering too many options could lead to confusion. Polit and Hungler (1995) suggest that respondents should be asked to rank no more than 10 items, and preferably less.

Whatever the question format used, it is generally accepted that utilizing multiple questions, albeit worded differently, on each topic will increase the reliability of the individuals’ responses to the questionnaire (Bowling 1991), though this approach must be considered in the context of containing the overall length of the instrument.

**Scales**

In designing a questionnaire seeking to elicit attitudes or feelings, separate sections incorporating attitude scales and/or semantic differentials are often included. Attitude scales, such as those devised by Likert (1932), usually take the form of a series of positive and negative statements, to which the respondent indicates their response by degree, on a continuum containing five to seven response categories. Each response can then be scored by ascribing it a value, dependant upon the degree of agreement/disagreement with the statement, and a total sum for the scale is calculated for each respondent. This cumulative total is then interpreted by the researcher during analysis. Individual questions differ from attitude scales in this regard, as responses to each question are treated on their own, and analysed separately, though the researcher may seek to correlate and cross-tabulate individual variables.

Semantic differentials, originally devised by Osgood et al. (1957) ask respondents to rate a given concept along a continuum, between two
extreme evaluations, with a number of predefined positions in between. According to Waltz et al. (1991), the semantic differential scale should have between five and nine steps, each step is ascribed a value, and the total score obtained by the respondent is taken as an indication of their attitudes or feelings. Both Likert scales and semantic differentials usually incorporate 'odd numbered' steps, thus creating a mid-point. There is some debate about this construction as it allows respondents to neither agree nor disagree, though it must be accepted that some respondents will be genuinely ambivalent to certain elements.

Analysis
Analysis of the questionnaire should be planned as the questions are developed, and pre-coded where possible (Youngman 1978). A codebook should be utilized to record a list of the references, the variable names assigned and all the codes themselves. Such a document will serve as an invaluable reference when keying in data (assuming computer analysis is used) and for utilization by a third party wishing to undertake secondary data analysis.

Question order
Having decided on question wording, the next issue is to consider the question order. The first principle is to ensure that every question is absolutely necessary and serves a crucial function in eliciting the data required. The researcher should seek the minimum of information necessary, as the respondent's time is precious, and asking unnecessary and irrelevant questions will increase the questionnaire completion time. This may have an adverse effect on the respondent's mood, which will in turn be reflected in a reduced response rate. Coolican (1995) advocates the 'principle of parsimony', i.e. limiting effort to the essential whilst maintaining efficiency.

Questions on a similar theme should be grouped together for cohesion, and questions should flow smoothly from one topic to another. Questions on each topic should be completed before compiling questions for the next section, having carefully considered how many questions per item are required to ensure sufficient data is collected. Care should be exercised to ensure that the questions develop in a manner that approximates to the respondent's view of reasonableness and logic.

Easy and basic background questions should be asked first, to ease the respondent into the questionnaire and increase their confidence. For this reason, some authors suggest commencing with demographic details (McGibbon 1997), although Quinn (1995) asserts that, in some circumstances, seeking demographic details can be perceived as threatening and such questions are best left to the end of the questionnaire. Oppenheim (1992) concurs, stating that having aroused sufficient interest in the topic for the respondent to proceed, starting with a tranche of personal questions may well dissipate their enthusiasm, and cause them to abandon the exercise.

It is also suggested that important questions be asked first, as later responses may be influenced by previous questions – behavioural questions should be asked prior to attitudinal questions for the same reason. However, in the case of self-completion and/or postal questionnaires, the impact of such sequencing may be negated by those who read the entire questionnaire prior to completion, gauge the intentions of the researcher and reply accordingly. The source of the questionnaire may have a similar effect by eliciting what is perceived to be the required, rather than the preferred, response. Finally, with regard to question order, the use of techniques such as filter questions, and/or funnel questions can help maintain flow and interest. However, in self-report questionnaires it is recognized that inappropriate questions may be answered, or respondents may answer falsely to 'fast track' their way through the questionnaire.

Presentation
Having decided on question wording and order, the issue of presentation needs to be addressed. It is important to establish an early rapport with the respondent, as failure to do so may result in the questionnaire being discarded. The questionnaire should be accompanied by a covering letter, clearly identifying the source of the questionnaire, the purpose of the study and how the results will be utilized. Assurances with regard to confidentiality and anonymity should
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be given, where these can be guaranteed. Good quality paper creates a good first impression, and some authors suggest that printing on coloured paper may improve the response rate (Newell 1993a). Immediate visual impact will either arouse interest or discourage completion.

For postal questionnaires, good quality, personally addressed envelopes should be used, and paper size gauged to facilitate easy folding into the enclosed stamped addressed envelope, for ease of return. Questions should be typed on one side of the paper only, and made to appear clear, and easy to complete. This can be achieved by using a large, distinct typeface with good spacing between questions. Instructions should be clear, possibly presented in a different typeface to the questions, and/or printed in bold or capital letters. Questions should be numbered, and care taken not to split questions over two pages, as this may cause confusion. The questionnaire should end by thanking the respondent for their participation, and detail instructions on how to return the questionnaire to the researcher.

Response rates

The issue of maximizing response rates is a perennial problem for the researcher, and it is accepted that rates vary depending on the method of administration used. The response to postal questionnaires is particularly poor, and the researcher should consider incorporating an identification coding system into the instrument at the design stage. This would allow the issuing of reminders, targeted at non-responders, in an attempt to increase the return rate. This is more economical and efficient than distributing blanket reminders to all recipients. In the event of a decision to code questionnaires for identification purposes, additional assurances should be given to respondents regarding the maintenance of confidentiality. The use of incentives to respond is prevalent in commercial questionnaires, but is much less common in questionnaires designed to collect scientific, research data. Nonetheless, every effort should be made to maximize response rates, and it must be remembered that the views of non-responders are of equal importance to those who do reply. There is no reason to suggest that the non-responders are in any way typical of the target population, therefore generalization of the findings is fraught with difficulty, and may be impossible depending on the level of response achieved.

Piloting the questionnaire

Having decided on the question wording, order and layout, the next step is to pilot the questionnaire. This will help identify any difficulties with the questionnaire in terms of comprehension, language and clarity, which can be rectified prior to sending the questionnaire to the target population. It should also ensure that question content is comprehensive and enhance the validity and reliability of the questionnaire. Adequate time and resources should be allocated for the pilot exercise to allow for necessary modifications and should be repeated until the instrument is error free. Whilst using informed colleagues for critical comment, and having the document proof read by an objective outsider may be helpful in addition, the questionnaire should be pilot tested on a sample of the target population. This sample should then be questioned in detail on problems and/or omissions and particular attention paid to any peculiarities or abnormalities that arise. Mead (1993) suggests that a great deal can be learnt about the clarity of a questionnaire by observing sample respondents completing it. Facial expressions, body language and pauses may indicate questions that are problematic or unclear.

Administration

With the pilot testing completed and necessary amendments made, the questionnaire should be administrated to the target population, or a representative sample thereof. Choosing the correct audience to question is a major consideration and must be done carefully to maximize the quality and quantity of data returned. Key elements in determining sample size include the size of target population, the complexity of the topic, constraints on the time and resources, type of analysis to be undertaken, and the estimated refusal rate (Newell 1993b). The questionnaire should be then issued, with clear instructions on how to respond, and how and when the questionnaire is to be returned.
Conclusion

In conclusion, it must be accepted that questionnaires are never perfect, and should ideally be custom built to elicit data for a specific purpose (Open University 1991). Furthermore, the data collected must be accepted at face value, given that it is impossible to explore the real, individual meaning of each response, and because questionnaires reveal little of the context in which such responses were formulated. If used wisely and sensitively, the questionnaire has the potential to provide valuable data, upon which practice and policy decisions can be formulated (Parahoo 1997).

During the course of the article it has been demonstrated that questionnaire construction is a complex time consuming process, which encompasses question wording, question order, presentation, administration and data collection, all issues which have been analysed and synthesized in the main body of this article. The design process is littered with pitfalls and potential problems. However, if such hurdles are successfully negotiated, the instrument designed will elicit valid and reliable data, which the researcher can utilize in the pursuit of quantitative, scientific and generalizable truths.

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