Questioning questionnaires

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'The design of questionnaires is a craft that has been badly neglected by the medical profession.'[1]

The use of postal questionnaire surveys is an important part of research, whether in the social or health sciences.[2] Their scientific value lies with how and to whom they are distributed as well as their content or length. Prior to use, a questionnaire must be deemed appropriate, shown to retrieve data that are both valid and reliable, piloted adequately, and ethical. The International Epidemiology Association has recently concluded that the science of epidemiology deserves better questionnaires,[3] citing the lack of attention given to their development and validation. Researchers frequently fail to appreciate the beneficial effects of testing a questionnaire before use so that it consistently and accurately collects the intended information.

Respondents have no guarantees of any public or personal return when completing questionnaires. Surveys can make excessive demands upon the respondent either in the time or the effort required to obtain the answers or to complete the form. The likely consequence for many such questionnaires is to be either partially completed or never returned, resulting in the collection of unrepresentative data.

Ill-conceived surveys have, in the past, caused annoyance within the ophthalmological community. This was particularly so if the questionnaire was difficult to complete, collected data that were unable to answer the research questions and/or used an inappropriate study design. Questionnaire surveys are usually only quasi-epidemiological, since the findings are not normally related to the whole community. Nonetheless they still require the robust techniques employed in formal epidemiological studies,[4] and the likely benefit, either directly or indirectly, to those asked to participate must be justified and explained. Ophthalmologists as a group are happy to comply with national questionnaire surveys, as evidenced by the high response rates to the Royal College's National Audits, but the arrival of questionnaires from underdeveloped studies is likely to reduce this co-operation in the long term.

Rubbish in

Questionnaire surveys of medical professionals tend to fall into one of three categories.

- surveys of policy, practice intentions or opinion
- audits of current practice
- incidence or prevalence surveys

Surveys of policy, practice intentions or opinion

It is known that responses to surveys of opinion, policy or reported practice do differ significantly from actual practice. Respondents are prone to provide an answer that they perceive to be satisfactory, desirable or compliant with the stated aims of the study. There is also a tendency to avoid extreme responses.[2] Reports from such studies do provide useful indicators of current thinking, but limitations must be specified in any feedback.

Audits of current practice and incidence or prevalence surveys

Collectively these surveys attempt to ascertain cases and collect clinical data and have an increased potential for bias compared with those that assess opinion. In practice retrospective surveys rarely identify all the cases of interest. Questionnaire developers frequently overestimate respondents' ability to remember events[2] and this leads to underascertainment. Similarly, underascertainment can result from ambiguity in the case definition or difficulty with the interpretation of exclusion and inclusion criteria. In addition, a study must have a strictly defined time period for ascertainment since, if both old and new cases are included, there can be a bias towards survivors and/or chronic cases. An assessment of both the completeness and accuracy of case identification (validation) is essential[5] and reasons for underascertainment need to be identified and their effect estimated. The assumption that a data set is complete or representative without such an assessment is flawed.

The influence of response bias is a weakness for all surveys. Non-responders and late responders tend to differ from those who reply immediately. This was classically illustrated by the first British Doctors Smoking Study, where non-responders to the initial survey were found to have a 40% increase in mortality compared

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with responders when followed up 20 years later.[6] A high response rate reduces the likelihood of biases, but is still not a guarantee of a representative sample. Analysis of non-responders is important: effort should be expended following them up to find out who they are and why they have not responded. How the results are affected by biases is also important, and where possible this effect should be quantified with conclusions being moderated accordingly.

Rubbish out

Authors commonly draw conclusions that their methodology is unable to support, or report outcomes based upon biased data without acknowledgement of their limitations. It is likely that many questionnaire surveys are never published, as flaws in the methodology, a poor response rate or ambiguity in the findings not only prevent meaningful analysis, but also result in rejection by peer-review.

A hand search of *Eye* and the *British Journal of Ophthalmology* over the last 5 years identified 13 publications reporting questionnaire surveys of ophthalmologists in the UK. Five related to opinion, policy or practice intentions, achieving response rates between 64% and 92%. Of the eight other studies, three included an attempt to compare responders with non-responders or validate their data. Three studies quoted incidence figures based upon retrospective case identification, without an assessment of the level of ascertainment or the potential for error in their results. Accordingly, information is still presented in the public domain that contains conclusions based upon data with unacknowledged biases.

How to do it

Questionnaire surveys, where justified, should originate from a clearly defined set of research aims or questions. For those new to the field, advice from an expert with wide knowledge of the subject should be sought from the outset to make sure similar approaches have not or are not being developed by others. Collaboration with either an epidemiologist or statistician is necessary to find the best method to answer the research aims. If a questionnaire survey is required, researchers should, wherever possible, adopt a questionnaire that has been used successfully in a previous study; only if no suitable alternatives exist should researchers consider devising a questionnaire. In this case the appropriate stages of development must be observed.[2] Piloting is important, as those who develop a questionnaire and those who are asked to fill it out rarely view the questions from the same perspective. If done properly, this will ensure that the questionnaire is easy to complete and contains unambiguous and inoffensive questions that are capable of coping with all possible responses. The correct development of a survey questionnaire is a difficult process, but ultimately of benefit to both researchers and responders.

A questionnaire that seeks to identify cases of interest (especially rare events) retrospectively is not usually appropriate. A systematic, prospective, case ascertainment system is the best approach.[5,7] This can be either through a passive system where professionals are asked to report events at their discretion, or through an active system which depends upon the periodic solicitation of case reports.[8,9] Evaluation trials comparing passive and active surveillance systems consistently report that participants in an active scheme notify around twice as many cases per head of population.[10,11] Whilst an effective method, even active case ascertainment provides no estimation of underascertainment. Ideally, cases should be identified through two or more independent sources and capture–recapture analysis performed.[12]

A questionnaire is an instrument of measurement and, just as with biometry and tonometry, there is the need for rigorous testing to ensure measurements are taken accurately and reliably. Questionnaire surveys can be flawed in design, execution, analysis or interpretation,[13] but pitfalls can be avoided provided that the recognised steps are observed with thoughtfulness and patience.[14] Researchers must remember that this will strengthen their research and improve response rates. This will add credibility to any findings, and ultimately improve the potential impact of their work.

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