

REVIEW ARTICLE



Designing and validation of questionnaire

Sandesh Jain¹, Saumya Dubey¹, Sandhya Jain²

¹Sri Aurobindo College of Dentistry, Indore, Madhya Pradesh, India, ²Department of Orthodontics, Government College of Dentistry, Indore, Madhya Pradesh, India

Keywords

Designing, questionnaire, validity

Correspondence

Dr. Sandesh Jain, Department of Orthodontics, Sri Aurobindo College of Dentistry, Indore, Madhya Pradesh, India. Phone: 91-9425045455. Email: researchorthodontics@gmail.com

Received 04 December 2015;

Accepted 23 January 2016

doi: 10.15713/ins.idmjar.39

Abstract

A designing questionnaire which is worthwhile and easy to interpret and generalizable is an art, and it requires careful planning. The usefulness of questionnaire lies in quantifying the findings of initial exploratory phase. Questions may be open ended (descriptive answer type) or close ended (Y/N type). For a questionnaire to be valid, it should be understood by subjects/participants correctly to answer. Thus, the relevant answer is sought. Questions should be simple and unambiguous. Questions should be devised using all concepts related to aim, and validity and reliability of the questions should be checked by pilot study before conducting the main study.

Designing

The questionnaire provides us objective means of collecting information about people's beliefs, knowledge, attitude, and behavior.

The designing questionnaire which is worthwhile and generalizable is an art, and it requires careful planning.

The usefulness of questionnaire lies in quantifying the findings of initial exploratory phase. It is not helpful in cases where subjects may withhold information due to some or other reasons such as ignorance or subjects may perceive stigmatizing as they may think they are being judged by others.

Types of sampling for questionnaires for research are different according to the type of study of population.^[1,2] Sample should be sufficiently large and representative of the entire population. Opportunity/convenience sampling is used for canvassing a known group of participants. It is avoided where we wish to generalize results to a wider population.

Random sampling is used for wider homogenous population every 9th person is contacted. All have an equal chance of selection. For much wider population stratified sampling is preferred where homogenous groups are identified and the sample is drawn from groups. Cluster sampling is used for heterogeneous groups. In cases where we wish to select randomly but can contact only limited number of people, while quota sampling used for a different group of social class (Hindu, Muslims, etc.) age, gender, etc. A definite number of social class is included in the study.

Snowball sampling is preferred where confidentiality of disease is required. Subject/participants identify other similar subjects.^[3-5]

Questions may be open ended (descriptive answer type) or close ended (Y/N type). Close-ended questions are quick to answer and complete does not require much thinking process, but they do not allow subjects to expand the answer or offer alternative views. Moreover, subjects may tick at random to answer the close-ended questionnaire.

Open-ended questions allow subjects to answer with creativity and allow for expression. However, the responses/answers are difficult to analyze requiring coding and interpretation. Advance Planning is required (for time, skill, etc.) for open-ended questions. Questions poorly designed (close-ended question) include words such as sometimes and frequently. Frequently implies frequency, so a frequency based rating (once/twice a day, etc.) is more appropriate. Avoid using questions with words such as commonly, usually, many, some, and hardly ever. It is advisable to provide introductory information regarding survey and question filling, etc., to all participants. The questionnaire should be formally approved by specialists.

Validity refers to accurately measuring what it claims to measure while reliability is an assessment of reproducibility and consistency of a measurement or instrument.

Different dimensions of validity are:

A. Apparent validity

Question is generated in consultation with opinion of experts and subjects themselves. All questions should be logical.

B. Content validity

Question should envelop most dimensions of the concept under study. Content should be adequate. Composition of instrument

To evaluate its content judgment or advice is sought from medical literature review, expert opinion, pilot studies, or by factorial analysis.

C. Constructs validity

It evaluates the degree to which the instrument reflects the concept to be measured.

D. Face validity - should be judged by subjective assessment and relevance of the questionnaire to the participants, face validity is determined by a review of the items and not through the use of statistical analyzes.

To maintain good construct validity, it is important to define what trait researcher is measuring (definition sb clear). It is an assessment of questionnaire, how well it is constructed. So, as to measure the concept correctly construct validity has two subjects.

- Convergent validity how well construct is related convergent validity tests that construct that should be theoretically related show high correction.
- Discriminant validity mean that constructs that have no theoretical relation show low correction coefficient.

Discriminant validity tests whether the unrelated construct are in fact unrelated or not by the poor correction coefficient.

E.g., If we are injury to develop on measure of self-esteem along with self-worth (SW), social skill (SS) confidence (C), and self-appraisal (SA) convergent validity would test that four other constructs (SW, SS, and C<SA) are in fact related to self-esteem discriminant validity ensures that non-overlapping factors do not overlap.

To estimate the degree to which any two measures are related to each other then we typically use correction coefficient. We look at the pattern of intercorrelation among measures. Correction between theoretically similar measures show high whole correction between theoretically dissimilar measure show low.

For the questionnaire to be valid, it should be understood by subjects/participants correctly to answer. Thus, relevant answer is sought. Questions should be simple and unambiguous. To ensure this pilot study is required. Questions should be adequately piloted to check for the method accuracy. If required then changes are made in a validated form. A question developed in a different time; the country may not be a valid measure in the group we are studying. Just because the question has been piloted or used in previous studies does not mean it is valid or reliable. There is a proper technique to achieve validity and reliability.

Translation is the most common method of preparing instruments for cross-cultural research and has pitfalls that compromise validity. It is not enough to translate a questionnaire literally because of the unique complexities of cross-cultural. The additional challenge is to adapt it in a culturally relevant and comprehensible form while maintaining the meaning and intent

of the original items. There are two methods of translation of questionnaire, i.e. in the simplest and possibly the most common method, a questionnaire is translated (often by unqualified translators), and the translated version is used without further validation. Another approach involves translation by committee. In this case, 2 or more translators work separately or together to produce a consensus questionnaire. Another approach is the back-translation method. In this case, a questionnaire is translated into the target language by one translator and then translated back into the source language by an independent translator who is blinded to the original questionnaire. The back-translation technique is preferred even though it is time-consuming and can be expensive.

Reliability yields consistent results from the sample. If the study is repeated by same or another observer/different researcher, it will yield same results intra/inter observer reliability.

Questions should be devised using all concepts related to aim. To know all aspects related to subjects, open-ended questions on the visual-analog scale or interview should be organized. Validity^[6] of a question is checked by the pilot study to check whether all subjects interpret a question same way or not. Pilot study provides a guide to make necessary changes. Intra and inter observer reliability are then checked in all the questions. Always pilot the questionnaire on participants who represent the population. The purpose of piloting is to check what the problems participants face while filling forms. Do they take more time to complete then expected? Is there any confusion related to any of the questions? It provides guides to make necessary changes in questions.

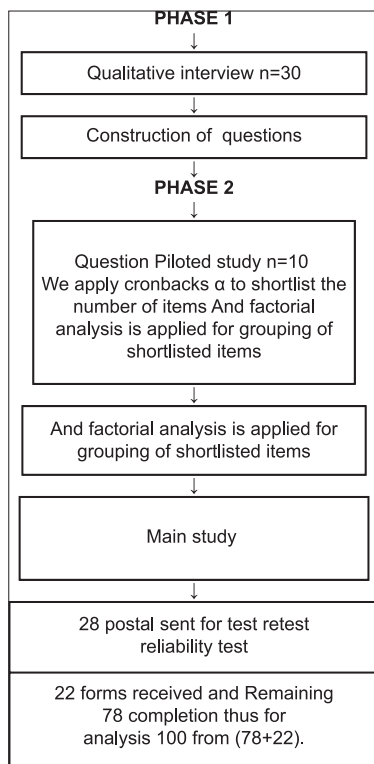
Validity and reliability are threatened by bias. Different forms of bias are mood bias, non-response bias, recall bias, selection bias, etc. Questionnaire form should not have a name or identifying marks except the participant's number. It should have instruction how to fill the form. In the case of a postal survey, it should have a return address. Although there is access to a large sample, postal questionnaire does not control who completes the form and what are the problem with literacy and language.^[7-10]

All measures should be taken care to increase the response from participants such as using simple, unambiguous questions, personalized invitation; the researcher should collect forms, self-addressed envelope in the postal survey, etc.

Type of analysis required for questionnaires should be selected in advanced before undertaking a study (Flowchart 1).

Summary

Thus, questions are created after discussing with concerned personnel. This questionnaire is then piloted on few subjects for its legibility and comprehensibility. If any question is ambiguous, it is rewritten to increase its clarity. This new questionnaire is now used in surveys. Before using it, its reliability is checked. If for any reason, we modify a validated questionnaire we have to revalidate it.



Flowchart 1: Stepwise designing of a questionnaire

References

1. Jain S, Punyani P, Jain D, Jain S. Relevance of statistical and clinical significance in dental research. *Int Dent Med J Adv Res* 2015;1:1-3.
2. Jain S, Sharma N, Jain D. Basic fundamentals of designing a quality research. *J Adv Med Dent Sci Res* 2015;3:88-95.
3. Jain S, Gupta A, Jain D. Common statistical tests in dental research. *J Adv Med Dent Sci Res* 2015;3:1-8.
4. Jain S, Gupta A, Jain D. Estimation of sample size in dental research. *Int Dent Med J Adv Res* 2015;1:1-6.
5. Jain S, Jain S, Punyani PR, Jain D. Basics of interpreting results. *Int Dent Med J Adv Res* 2015;1:1-4.
6. Iwasaki LR, Freytag LE, Schumacher CA, Walker MP, Williams KB. Validation of a modified McGill pain questionnaire for orthodontic patients. *Angle Orthod* 2013;83:906-12.
7. Edwards P. Questionnaires in clinical trials: Guidelines for optimal design and administration. *Trials* 2010;11:2.
8. Kazi AM, Khalid W. Questionnaire designing and validation. *J Pak Med Assoc* 2012;62:514-6.
9. Jain S, Ashaiya A, Chourse S, Jain D. An overview of research methodology pertaining to prosthodontics. *Ann Int Med Dent Res* 2016;2:9-14.
10. Hirpara N, Jain S, Gupta A, Dubey S. Interpreting research findings with confidence interval. *J Orthod Endod* 2015;1:8.

How to cite this article: Jain S, Dubey S, Jain S. Designing and validation of a questionnaire. *Int Dent Med J Adv Res* 2016;2:1-3.