QUESTIONNAIRE TRANSLATION AND PSYCHOMETRIC PROPERTIES EVALUATION

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ABSTRACT

Even though a majority of the commonly used questionnaires were initially developed in English language, it is still possible to translate these questionnaires into another language. However, one should not simply assume that the validity of the items that are translated from one questionnaire to another remains intact. Therefore, it is important to translate the questionnaire using a process that incorporates the correct psychometric properties, such as the validity and reliability, before one can declare the translated questionnaire ready to be used.

1.0 INTRODUCTION

Different types of questionnaire have been widely translated into other languages. For example, EQ-5D is a questionnaire that was designed and developed by the EuroQoL Group to provide a standardized measure of health status [1]. To date, this questionnaire has officially been translated into 102 languages [2]. It is important to note that when an original questionnaire was translated into another language, one cannot simply assume that the translated items are valid. This is due to the fact that validity is content specific and it cannot be translated in a literal manner. Also, the cultural context of the second language, such as the words used, is different from the original language. Therefore, all translated questionnaires should be subjected to further psychometric property evaluation [3].

A questionnaire translation process should focus in achieving the conceptual equivalence instead of achieving linguistic equivalence. In view of this, the forward –backward-forward translation technique should be applied [4, 5, 6].

In the first step, two independent professional bilingual translators are hired to translate the original English version of the questionnaire into the relevant language. This process is known as the forward translation. A meeting involving the two independent professional bilingual translators and a member from the research group will be conducted to review, reconcile and harmonize the forward translation. This reconciled forward translation will then be translated back into English by another two independent bilingual translators. This process is known as the backward translation [4, 5].
Next, the research group together with the professional forward translators will review and compare the backward translation with the original English questionnaire. The aim of this process is to reconcile the questionnaires by producing the final forward translation [4, 5].

The forward-backward translation method does not apply to languages that are closely related, such as the American English and British English. Instead, the adjusted linguistic validation process should be applied. In the latter method, the work is simply based on the version considered as the “mother tongue” [7].

2.0 PRE-TEST (COGNITIVE INTERVIEWS)

The main purpose of pre-testing of the finalized translated questionnaire is to show whether all items are comprehensive and acceptable. Firstly, experts should be invited to review and also provide feedback on the translated questionnaire [7]. Then, a small group of participants should be recruited as part of this study and they should be informed about the objective of the study. Pre-testing is critical in identifying the problems in the translated questionnaire. For example, researchers normally apply a commonly used method known as the cognitive interview/debriefing. This method requires researchers to ask participants to rephrase the items using their own words immediately after answering the items. This allows the researchers to assess whether participants understand the items totally [4, 5].

The research team will critically review the comments provided by participants via cognitive interview/debriefing. The words and phrases used in the translated questionnaire will be carefully chosen to avoid any misunderstanding for future participants. Researchers may decide to iteratively repeat the pre-testing phase of the questionnaire until the comments from participants are minimized. The final product of this process is known as the finalized forward translation.

The detailed step by step forward-backward-forward translation process is illustrated in Figure 1.

2.1 Validation Study

It is highly recommended to conduct a validation study on the translated questionnaire to examine its psychometric properties such as the validity and reliability of the questionnaire. The appropriate study design for validation study is cross-sectional with at least 100 participants. These participants should be selected from various social demographic as well as socio economic background, so that the sample is more representative of the population [4,5].

2.2 Field Task

The venue of the validation study should be carefully determined, chosen and justified. Once the venue has been decided, a formal letter needs to be sent to the relevant authority in charge of the chosen venue to inform them about the objective of the validation study and also asking for permission to conduct such a study at that venue. For example, if the chosen venue is a school, then the following procedure should be conducted.
1. To inform and seek permission from the Ministry of Education in using the particular primary school in District A, Klang Valley for a validation study.

2. To inform and explain to the Headmaster/Headmistress of the said primary school in District A in Klang Valley about the objective of the study.

3. To seek authorization from the Headmaster/Headmistress of the primary school concerned in District A in Klang Valley in the selection of the sample by applying certain sampling technique.

4. Once the sample selection has been determined, a copy of the inform consent letter, which is a letter explaining the objective of the study asking for consent to take part and guaranteeing the confidentiality of the information gathered, is distributed to the students. The relevant parents need to sign the inform consent letter and have their children to pass it back to the research team prior to have their children involved in the validation study.

5. Once the inform consent letter has been signed by parents, the children involved will be administered the translated questionnaire.

2.3 Ethical Issues

All consent letters need to be signed and returned to the research team prior to commencement of the study. Participants’ consent letter as well as their data collected from questionnaire administration will be kept in a private and confidential manner.

2.4 Documentation of the Validation Study

The introduction of the document should provide a clear and precise objective on why the validation study is needed. The details of the study, such as study design and time period for the collection of data, should be clearly mentioned in the document. Next, it is important to mention how the participants will be selected and also the types of sampling methods used. It is crucial to document whether written or verbal consent is required from participants. The administration process of the translated questionnaire should also be recorded in detail [4].

2.5 Sample Size Determination

Sample size determination is an important step in reliability studies [8, 9, 10]. There are multiple ways of determining the required sample size. One way is to calculate the sample size based on internal consistency, which refers to Cronbach’s alpha value, using an iterative process [11]. Alternatively, sample size can be determined based on the expected inter-rater reliability and number of replicates per participant [12].
2.6 Validity Analysis

The objective of conducting a validity analysis is to ensure that the underlying scale measures what it is supposed to measure. Therefore, a scale is valid to the extent that it measures what it is intended to measure [13]. The validity of a translated questionnaire can be examined by content validity, criterion validity and construct validity.

Content validity is defined as the extension to which a measurement reflects the specific intended domain of content [14]. Content validity of a questionnaire can be assessed by expert panel review. The expert panel will focus in reviewing and deciding whether the wordings used in the translated questionnaire are appropriate.

Criterion validity is a measurement of an agreement in terms of responses collected from a translated questionnaire versus the questionnaire regarded as the gold standard. The criterion validity is normally quantified by using correlation coefficients. Depending on the nature of the data collected, criterion validity can be subdivided into concurrent validity and predictive validity. Concurrent validity is aimed at examining the ability of the questionnaire in distinguishing between groups that it should theoretically be able to distinguish between, for example, people diagnosed with manic-depression and those with paranoid schizophrenia. On the other hand, the ability to predict should theoretically be assessed by using predictive validity. For example, a high correlation would provide evidence that our translated questionnaire can correctly predict something that we theoretically think it should be able to predict [15].

Construct validity looks into the agreement between a theoretical concept and a specific measuring procedure. For example, where a researcher invents a new instrument that intends to measure IQ capabilities, the researcher might need to spend time attempting to “define” intelligence in order to achieve an acceptable level of construct validity. Construct validity can further be subdivided into convergent validity and discriminate validity. Convergent validity is a general agreement between measures where theoretically they should be related. On the other hand, discriminate validity is a general disagreement between measures where theoretically they should not be related [16]. Both convergent and discriminate validities will be examined by using the item-scale correlations; convergent validity indicates correlation between an item and its own scale, while discriminate validity indicates correlation between an item and any of the other scales [17].

Exploratory factor analysis involving the principle component analysis extraction and varimax rotation is commonly used to assess the construct validity [18].

2.7 Reliability Analysis

The reliability of a translated questionnaire can be examined by looking at both the internal consistency and test-retest reliability. The Cronbach’s alpha or scale reliability coefficient can be used to assess the internal consistency reliability [19]. By convention, a Cronbach’s alpha or scale reliability coefficient of 0.70 is considered an acceptable reliability coefficient [20]. The higher the Cronbach’s alpha or scale reliability coefficient, the more reliable the generated scale.
is [21]. On the other hand, the test-retest reliability can be evaluated by using intra-class correlation coefficient (ICC) computed based on a single sample using the one way analysis of variance (ANOVA) model [18]. The value of ICC is considered appropriate if it is at least 0.70 [22].

2.8 Psychometric Properties Evaluation

Psychometric properties are defined as the elements that contribute to the statistical adequacy of the instrument in terms of reliability and validity [23]. When both validity and reliability analyses produce reasonably good results, then, the translated questionnaire can be concluded and declared to have acceptable psychometric properties.
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