Original Research

Cross-cultural adaptation, content validation, and reliability of the Nigerian Composite Lifestyle CVD Risk Factors Questionnaire for adolescents among Yoruba rural adolescents in Nigeria

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Abstract

Background
Assessment of lifestyle risk factors must be culturally and contextually relevant and available in local languages. This paper reports on a study which aimed to cross-culturally adapt a composite lifestyle cardiovascular disease (CVD) risk factors questionnaire into an African language (Yoruba) and test some of its psychometric properties, such as content validity and test–retest reliability in comparison to the original English version.

Methods
This study utilised a cross-sectional design. Translation of the English version of the questionnaire into Yoruba was undertaken using the guideline by Beaton et al. The translated instrument was presented to 21 rural adolescents to assess comprehensibility and clarity, using a sample of convenience. A test–retest reliability exercise was conducted among 150 rural adolescents, using purposive sampling. Data were analysed using an intraclass correlation (ICC) model 3, Cohen kappa statistics and prevalence rates.

Results
ICC ranged between 0.4 and 0.8. The Yoruba version was completed in 15 to 20 minutes, and it was reported to be culturally appropriate and acceptable for rural Nigerian adolescents.

Conclusions
The Yoruba translation of the Nigerian composite lifestyle risk factors questionnaire performs at least as well as the original English version in terms of content validity and reliability. It took a shorter time to complete and thus may be more acceptable to rural adolescents.

Introduction

Cardiovascular disease (CVD) poses significant health burdens in all nations.[1] There has been a steady increase in growth in CVD burden in developing countries, which largely reflects an increase in the prevalence of risk factors and a relative lack of access to adequate advice and care. In developing countries a relatively younger population is afflicted by CVD.[2]

Lifestyle factors are significant predisposing risks for CVD.[3–5] Many of these risk factors have been seen in adolescents. Life style risk factors are usually assessed with questionnaires and most of the questionnaires assessing lifestyle risk factors are in English language. Examples of such questionnaires include Alcohol Use Disorder Identification Test (AUDIT) and Physical activity questionnaire for adolescents.[6,7]

The utility of an instrument in assessing lifestyle risk factors depends on its availability in local languages, and its applicability to local settings and context. Many health measuring instruments have been translated into various languages to enhance utility and uptake.[8–10] However, many lifestyle health measures for adolescents are only available in English.[11,13] The authors observed from personal experiences that it appears that adolescents are expected to understand English language even when they are not native speakers of English, because many are expected to speak English in school. However, this expectation is challenged by rural adolescents in developing countries who may not have the opportunity to learn or speak English, and adolescents who are not in school. For instance, in Nigeria, only half the adolescent population attends secondary school (54.2% males, 54.3% females).[14] More importantly according to Atilola et al., 2015,[15] contextualising information in questionnaires is vital in getting correct response, people think in their culture, therefore when adolescents have to complete questionnaires in English language, they will first interpret it in their native language which will result in the loss of context of the original questionnaire . Thus establishing lifestyle risks with English-language questionnaires in non-English-speaking Nigerian rural adolescents may not be possible. There is therefore the need for cross cultural adaptation of instruments for children and adolescents in developing countries in order to have meaningful research which will be contextually relevant

Nigeria is a multilingual nation with 3 major languages and more than 500 dialects.[16] The southwestern part of Nigeria is made of 6 states (provinces) and the local language of this tribe is Yoruba spoken by 22 million Nigerians. The Yorubas constitute a major tribe in Nigeria and Yoruba language is also spoken in some West African countries such as Benin republic, Togo, Sierra Leone and in Cuba. It is argued that traces of the language can also be found in communities as far away as Brazil.[17] Most of the adolescents in the rural area are proficient only in the local language, as many of them do not attend school. Thus in order to establish their lifestyle risk for CVD, there is a need to cross culturally adapt health measuring instruments in order to enhance their utility in the southwestern part of Nigeria and other West African Countries.

The Nigerian composite lifestyle CVD risk factors questionnaire for adolescents was developed by Odunaiya et al.,[18] in English, for Nigerian adolescents. The questionnaire was developed for the purpose of assessing CVD risk factors among this group and to underpin surveillance of CVD risk factors among adolescents. The Nigeria composite lifestyle CVD risk factors questionnaires has 6 subscales; socio-demographic subscale, CVD indicators subscale which asks questions on common signs and symptoms of CVD such as breathlessness and chest pain, smoking subscale, alcohol subscale, physical activity subscale and nutrition subscale. It has acceptable content validity and test–retest reliability ranges from 0.3 to 0.7 in all the subscales. The process of development, initial content validation and reliability of the English version has been described earlier.[18] Though this questionnaire was developed for Nigerian use and it is valid for the Nigerian adolescents' population, only adolescents who are proficient in English are able to complete this questionnaire. Thus to make it available to all adolescents in southwest Nigeria, it needs to be available in Yoruba. Therefore the objective of the study was to cross culturally adapt the original English questionnaire to Yoruba and to assess how the Yoruba version performs in content validity and reliability (which are basic psychometric properties of any instrument) compared to English version.

Methods

The was a validation study and utilised cross-sectional design for many of its components. The participants were rural adolescents aged 15 to 18 years without any learning difficulty in a secondary school in Egbeda local government of Oyo state, Nigeria. A minimum sample size of 108 was deemed fit for reliability of 0.9 and a sample size of 20 to 30 was deemed appropriate for pretesting. Based on this calculation 150 adolescents completed the questionnaire and data from 111 participants was used in reliability testing while 21 adolescents were involved in debriefing for content validation. Methods described by Beaton et al.[19] were used for the cross-cultural adaptation process.

Ethical considerations

Ethical approval was obtained from Stellenbosch University (South Africa) research ethics committee. Permission was obtained from the Local Educational Authority and the principal of a public secondary school at Egbeda local government a rural area in Oyo State. Informed consent was obtained from adolescents' parents, assent/consent from participating students were also obtained.

Location

Data were collected at Egbeda Community High School, a rural area in Oyo State for reliability study of both English and Yoruba versions of the questionnaire.

Translation

Translation was undertaken using the guideline by Beaton et al.[19] Bilingual translators (whose mother tongue was Yoruba language and who were proficient in English) with different profiles and background were involved in the process of translation. The translators translated the English version into Yoruba. The 2 translators met to compare and synthesise their translations, so that only 1 translation was produced. The synthesised version was then given to an independent third translator who was blinded to the process of translation to date. This translator back translated the Yoruba version of the questionnaire to English. This step was done to highlight any inconsistencies or conceptual errors in translation, and to ensure that the translated version reflected the same item content as English version.

Content validation (consultation with experts)

The principal investigator sent the translated questionnaire to experts for their input and all experts sent their comment to the principal researcher. Based on the comment, the questionnaire was given back to the translator to assign symbols to each word as necessary.

Content validation (pretesting among adolescents or debriefing)

Adolescents attending the participating high school were randomly-selected from class lists to participate in content validation of the Yoruba questionnaire version. They were asked to comment on its comprehensibility and clarity. Beaton proposed 30 to 40 people as sample size for pretesting. According to ISPOR 20, there is no rule to the sample size for content validation, for interview, 20 to 30 is the usual number. We however involved 21 adolescents in the content validation since it was a qualitative approach. An interview was conducted with each adolescent using an interview guide.

Test–retest reliability

Reliabity of responses to the questionnaire was assessed using test–retest design principle. A sample size of 108 was deemed adequate for reliability of 0.9 with confidence interval of 0.15. 150 questionnaires were distributed to be completed by adolescents. However, 111 questionnaires were suitable for analysis. The participants were given the English version of questionnaire to complete, 30 minutes later, they were given Yoruba version. For test–retest, 48 hrs afterwards, they were given another copy of the English version, followed by Yoruba version of the questionnaire.

Data analysis

Data for content validation were analysed qualitatively using expert consensus and content analysis of adolescents' comments. The analysis sought for comprehensibility and clarity, by asking adolescents to identify any question they did not understand. Furthermore adolescents were asked to list any question they felt should to be added to, or excluded from, the questionnaire.

Translation

The back translation was compared with the original English version.

Content validation

Expert panel inputs were received and consensus was necessary to ascertain content validity.

Validation by adolescents

If at least 2 adolescents made any changes or said any question was not understood, experts were to reconvene to consider the comment.[18] However, adolescents all understood the questions in the Yoruba version and did not request for any changes to be made.

Test–retest reliability

Intraclass correlation (ICC) and kappa statistics were applied to determine reliability. For kappa, agreement between the first administration and the second administration of priority questions (questions used in determining risk exposure) on nominal scale in Yoruba version of the questionnaire was assessed using Cohen kappa at 95% confidence interval. All the subscales were also analysed with ICC. The mean difference of scores of other priority questions in ordinal

Table 1: Interclass correlation (ICC) for the Yoruba version of the Composite Lifestyle Cardiovascular Disease (CVD) Risk Factors Questionnaire for Nigerian adolescents

CVD subscale	ICC	95% confidence interval
CVD indicators	0.6	0.3 to 0.7
Smoking	0.4	0.08 to 0.6
Alcohol	0.8	0.6 to 0.9
Physical activity	0.4	0.2 to 0.6
Nutrition	0.7	0.6 to 0.9

Table 2: Intra-language reliability between the Yoruba and English versions of the Composite Lifestyle Cardiovascular Disease (CVD) Risk Factors Questionnaire

CVD subscale	Intraclass correlation	95% confidence interval
CVD indicators	0.6	0.5 to 0.8
Smoking	0.2	0.1 to 0.5
Alcohol	0.8	0.7 to 0.8
Physical activity	0.4	0.3 to 0.7
Nutrition	0.5	0.3 to 0.7

scale in the first and second administration were compared using the paired t-test with a significance level of 0.05. If there was a significant difference between test 1 and test 2, then the question is not reliable. If there was no significant difference in the mean difference of 1st and second administration. Intra-language reliability was determined using intraclass correlation.

Results

Translation process

There were no major disagreement in content and context in the translation process. However a major issue addressed was that of symbols called *ami ori oro* assigned to words which were missing in the synthesised translation. Yoruba language is a tonal language, thus words spelt similarly but meaning different things are distinguished by giving symbols to the specific letters of alphabets which would guide the pronounciation of the word and therefore the meaning. These symbols were not given in the forward translation and the expert insisted that the symbols be given to words. (example is *Èwù* and *Éwù*). These 2 words are spelt the same way but mean different things because of the symbols assigned to the letters

Back translation was very wordy making up to 8 pages of document instead of 7 as the original English version but there were no disagreement in the concept.

Content validation (pretesting)

Twenty-one students participated in this step of the validation process. This sample reflected boys and girls aged 15 to 18 years. All invited students participated. The students did not recommended any changes to the Yoruba version questions. The students found all questions comprehensible and clear. There was no addition or subtraction from the questions in the questionnaire.

Reliability testing

Mean age was 16.2 ± 0.99 with 49.6% male and 50.4 % female. The students completed the Yoruba version of the questionnaire more quickly than the English version (10 to

15 minutes, and 15 to 20 minutes, respectively). We noted the time it took the student who finished completeing the questionnaire first and the student who was the last to finish for both English and Yoruba versions. This gave us the time range for completeing both English and the Yoruba versions. Intraclass correlation (ICC) ranged between 0.4 and 0.8 in various subscales. Kappa showed 62.1% of the items had > 70% agreement While 7 items showed good kappa values of 0.4 to 0.6. Two items showed substantial kappa agreement and 1 item in alcohol subscale showed perfect agreement. Other items especially in smoking and physical activity subscales showed 0.1 to 0.19 kappa scores. Kappa could not be generated for 4 questions because the response options of adolescents in the first and second administration of the questionnaire did not tally. Table 1 shows the ICCs for the Yoruba version for the questionnaire subsections.

Table 1 shows ICC for the Yoruba version. Highest reliability estimate (0.8) was seen in the alcohol subscale and the least reliability estimate (0.4) was observed in smoking subscale. The reliability estimates of the Yoruba version were also good in nutrition and CVD indicators sections as shown in Table 1.

Table 2 shows the intra-language reliability (English versus Yoruba laguages). The ICC's indicate that the alcohol subscale had the highest intra language reliabity (0.8) while smoking was the least intra-language reliability (0.2).

Table 3 shows kappa statistics for Yoruba version. Two questions in CVD subscale showed good kappa agreement (0.57, 0.53), only 1 question in smoking subscale showed near perfect agreement (0.8) but others showed fair, moderate or poor agreement. One question in alcohol susbcale showed perfect agreement and others showed moderate agreement.

Table 3: Agreement between the first and second administration of the Yoruba version of the Composite Lifestyle Cardiovascular Disease (CVD) Risk Factors Questionnaire

Questions	% Agreement	Kappa (95% confidence interval)
Difficulty in breathing during exercise	71.3	0.15 (–0.5 to 0.3)
Chest pain during exercise	80.6	0.57 (0.41 to 0.73)
Difficulty in breathing with no exercise	85.8	0.53 (0.33 to 0.73)
Either parent with CVD	93.6	0.19 (–0.17 to 0.56)
Smoking intention in future	74.3	0.81
Physical education in school timetable	72.1	0.43 (0.25 to 0.61)
Adding salt at table	83.4	0.64 (0.48 to 0.74)

Table 4: Reliability testing of selected questions using paired t-test of mean difference between first and second administration of the Composite Lifestyle Cardiovascular Disease (CVD) Risk Factors Questionnaire

Questionnaire item	Test 1 ± standard deviation	Test 2 ± standard deviation	P-value
Smoking in the last 30 days	1.00	1.01± 0.09	0.32
Volume of smoking	1.02 ± 0.19	1.03 ± 0.22	0.53
Smoking everyday in the last 30 days	1.13 ± 0.59	1.18 ± 0.75	0.62
Frequency of 6 drinks in an occasion	1.09 ± 0.49	1.11 ± 0.54	0.79
Frequency of 60-minute exercise per day in the last week	1.45 ± 1.27	1.33 ± 0.90	0.27
Physical activity type and frequency in the last week	6.78 ± 8.84	6.89 ± 9.5	0.92
Frequency of practical physical education in the last week	1.70 ± 1.2	1.64 ± 1.1	0.69
Meat frequency in the last week	5.63 ± 1.9	5.75 ± 2.0	0.63
Breakfast cereal frequency in the last week	4.50 ± 2.35	4.44 ± 2.11	0.84
Vegetable frequency in the last week	6.9 ± 2.04	6.15 ± 2.16	0.89
Fruit frequency in the last week	5.77 ± 1.87	5.82 ± 2.02	0.82
Food preference	1.77 ± 0.55	1.74 ± 0.53	0.71

In nutrition subscale all the questions showed moderate agreement. Questions that involved the adolescents recalling the number of times it was done had low kappa generally while questions that were in nominal scale had moderate to good kappa values.

There was no significant difference (in the mean difference of scores of questions) between the first and second administration of the Yoruba version of the questionnaire as shown in Table 4.

Discussion

The Yoruba version of this questionnaire is the first known, and based on the test findings, it appears to provide a useful tool for future research into CVD risk in Nigerian adolescents whose English is inadequate to answer the original questionnaire version. Availability of health measurements questionnaire in local language will facilitate quick and accurate assessment of lifestyle CVD/noncommunicable disease risk from rural adolescents in southwest Nigeria and other West African countries where Yoruba language is spoken.

Translation

The careful forward and back translation process provided a robust Yoruba version of the questionnaire, which adolescents found to be easy to understand and quicker to complete than the English version. The back translation was wordier than the original version, however the context and concept were in consonance with the original version.

Reliability

The Yoruba version higher reliability scores may be so because the adolescents understood the Yoruba version better and their responses were more consistent in the Yoruba version of the questionnaire being their mother tongue. This is in ageement with the findings of Odole and Akinpelu,[9,21] which found better reliability values in Yoruba, Igbo and Hausa versions of IKHOAM, an outcome measure developed in English for Nigerians. The lower stability of measure in smoking subscale might be due to the fact that rural Nigerian adolescents' smoking pattern is not established because they cannot afford to buy cigarette at will. Moderate reliability was observed in physical activity and CVD indicator subscales. Physical activity also is determined by several factors such as availability of recreational facilities both at school and home. Very good reliability was observed in the alcohol and nutrition subscales of the Yoruba version of the questionnaire. This may be because majority of the adolescents do not drink alcohol, thus they do not have to think about the number of drinks to write, in the response option. Nutrition of the adolescents is also dependent on their parents. This makes their response option quite stable. Smoking intention and likelihood show excellent kappa agreement.

Our findings in this study is similar to what have been observed in many adolescents questionnaires.[22,23] The test–retest reliability estimates of the Nigeria composite lifestyle CVD risk factors questionnaire is, in part, comparable with those of the Korean youth risk web based survey(KYRWBS) and United States YRBSS questionnaire. First, the reliability estimates were different across CVD risk factors subscales. Our study showed that the lifestyle risk factors which are more time- and situation-dependent, such as physical activity, had lower reliability estimates. Secondly, the indices which used specific time as a reference period had lower reliability estimates than the indices which used life time reference periods among Nigerian, Korean and American adolescents. This may be so because, remembering events during the specific time intervals requires more complex cognitive demands than remembering events experienced over a lifetime.[23] However, Korean and US studies showed more stability in smoking behaviour which is different from Nigerian adolescents. This may be also due to the fact that many responses in smoking had specific time reference.

Intra-language correlation

Intra-language correlation ranged from fair to good. The subscales that were good were CVD and alcohol subscales. Yoruba version of the questionnaire performs similarly to English version in smoking and physical activity subscales. CVD indicator subscale showed good intra language correlation, smoking subscale had fair intralanuage correlation, alcohol subscale had very good intralanguage correlation, physical activity had fair intra language correlation and nutrition had fair intra language correlation. Variable reliability findings are similar to those observed in the Korean youth risk behaviour web based survey.[23]

Conclusions

The Yoruba version of the questionnaire performs as well as the original English version and even better in some subscales. It also took a shorter time than the English version to administer.

Having a health measurement questionnaire available in a widely-spoken languages such as Yoruba, will assist researchers to assess and monitor adolescents' heart health in rural southwestern Nigeria and other West African countries whereYoruba language is spoken. The indices with very low reliable estimate need further validation to detrmine inclusion or exclusion in subsequent version of the questionnaire. We recommend that reliability studies of this questionnaire be conducted in urban areas among adolescents where poverty level is not high and lifestyle pattern could be monitored accurately.

Competing interests

All authors declare that they have no competing interests related to this work.

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