AN EXPLORATORY FACTOR ANALYSIS OF THE MALAY TRANSLATED VERSION OF THE INDEX OF DENTAL ANXIETY AND FEAR QUESTIONNAIRE (IDAF-4C+)
ANXIETY AND FEAR MODULE AMONG SECONDARY SCHOOL CHILDREN IN NEGERI SEMBILAN

Izyan Hazwani Baharuddin$^{1,2}$, Wan Nor Arifin$^1$, & Kueh Yee-Cheng$^2$

$^1$Unit of Biostatistics and Research Methodology
School of Medical Sciences
Health Campus, Universiti Sains Malaysia

$^2$Faculty of Dentistry
Universiti Teknologi MARA
izyanhazwani88@gmail.com, wnarifin@gmail.com & yckueh@usm.my

Normastura Abd Rahman
Dental Public Health Unit
School of Dental Sciences
Health Campus, Universiti Sains Malaysia
normastura@usm.my

ABSTRACT

Background: IDAF-4C+ Anxiety and Fear Module is the latest questionnaire developed to measure dental anxiety and fear. Originally in English, this 8-item questionnaire is equipped with strong theoretical underpinnings which assess the emotional, behavioural, cognitive and psychological components of fear reaction. However, due cultural, language and age difference between validated Australian population and intended Negeri Sembilan population, the validity and reliability of this questionnaire needs to be established before it can be used in a local setting. The purpose of this study was to validate the Malay version of the IDAF-4C questionnaire among secondary school children in Negeri Sembilan before it can be used among local population. Methods: A cross-sectional study was conducted on 246 secondary school children aged 16 years old in Rembau, Negeri Sembilan by proportionate cluster random sampling technique with class used as a cluster. The questionnaire was translated into Malay language by a team consists of translator, medical, dental and language expert and pre-tested before being finalized. Questionnaire consists of eight items in the form of Likert scale of 1 to 5. Participation in this research required parents’ implied consent as well as participants’ assent. Data were analyzed using SPSS version 22.0. Validity was determined by exploratory factor analysis (EFA) while reliability was determined by Cronbach’s alpha. Results: 184 answered questionnaires were returned with the response rate calculated as 74.8% where most of the students were from rural area (75%), female (62.5%), and Malay (91.8%). This study yielded a single-factor structure that demonstrated high factor loading on all eight items ranging from 0.732 to 0.853 and good internal consistency (Cronbach’s alpha=0.929). Conclusions: The Malay translated version of IDAF-4C+ questionnaire anxiety and fear module is valid and reliable to measure dental anxiety and fear among secondary school children in Negeri Sembilan with all eight items were remained.

Keyword: IDAF-4C, dental anxiety and fear, exploratory factor analysis, secondary school children
1. Introduction

Oral health means more than a good teeth. It means “a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing” (World Health Organization, 2012). Many services have been provided by the Oral Health Division under Ministry of Health Malaysia to ensure good oral health among Malaysian. The services cover the Primary Oral Healthcare, Specialist Oral Healthcare and Community Oral Healthcare. Around 2196 dental facilities have been developed with the number of dental unit of 3690 as of year 2011 (Oral Health Division, 2012b). However, despite services and facilities provided, oral diseases such as dental caries (Esa & Razak, 2001; Jasmin & Jaafar, 2011; Oo, Naing, Mani, & Ismail, 2011) and periodontal disease (Abdul-Kadir, 1994; Alsanabani, Ismail, Ismail, Alyamani, & Oo, 2012; Mohd-Dom, Aljunid, Manaf, Muttalib, & Asari, 2012; Rahimah, 1994) are still a major concern among Malaysian.

2. Non-utilization of Dental Facilities

The non-utilization of the dental facilities could lead to the above mentioned oral health problems. Annual report by Oral Health Division (2012a) has revealed that only 17.1% of the primary oral healthcare is utilizes by the adults, 2.1% by the elderly and 2.7% by the antenatal mothers as compared to primary and secondary school children which are 40.6% and 26.6% respectively. Umer and Umer (2011) had reported that 47% of the adults had not visited the dentist for more than 2 years while 6% had pay no visit at all. Among factor that leads to the non-utilization of this dental facilities was dental anxiety and fear which contributed up to 8.6% as reported by Jaafar, Jalalluddin, Razak, and Esa (1992).

3. Dental Fear and Anxiety

Dental fear and anxiety is defined by “an abnormal fear or dreadful feeling of visiting the dentist for preventive care or therapy and unwarranted anxiety over dental procedures” (dental anxiety, n.d). Fear itself was described as an emotional response syndrome that comprised of several components (Marks, 1987 as cited by Armfield, 2010) and most likely linked to the biological imperative of the ‘fight or flight’ response to the threatening stimuli or situations. It does not necessarily have to be extreme and it can range from uneasy feeling to circumscribed terror or panic (Armfield, 2010). The emotion of fear is comprised of few components which are emotional, behavioral, cognitive and physiological components or response system (Armfield, 2010). Anxiety on the other hand is a temporary dread or worry feeling resulted from the exposure to the fear stimulus (Armfield, Spencer, & Stewart, 2006).

Study on the relationship between dental anxiety and dental caries experience in antenatal mothers revealed that participants with higher level of dental anxiety displayed poorer oral health status compared to those with moderate and lower level of dental anxiety (Esa, Savithri, Humphris, & Freeman, 2010). About similar findings was demonstrated by Klingberg (1995) in his study about dental fear and management problems in children. Moore, Birn, Kirkegaard, Brødsgaard, and Scheutz (1993) in their study on the prevalence and characteristics of dental anxiety in Danish adult
had reported that those with extreme dental anxiety had significantly avoid dental service and hesitated in making dental appointment.

4. Measuring Dental Fear and Anxiety

Many questionnaires have been developed to measure dental anxiety and fear (Armfield, 2010; Schuurs & Hoogstraten, 1993). Among the latest developed questionnaire is Index of Dental Anxiety and Fear Scale (IDAF-4C+) in 2010 (Armfield, 2010) which was developed to address the lacking found in the previously developed questionnaire. This questionnaire was designed for adults and consists of three independent modules namely anxiety and fear module (IDAF-4C), phobia module (IDAF-P) and stimulus module (IDAF-S). The anxiety and fear module is the core module which taking into account the multidimensional nature of anxiety and fear that covers the emotional, behavioral, physiological, and cognitive parts of the fear emotion. This module consists of eight-item questions with two questions belong to each fear domain. This module has proven to be both valid and reliable and had been translated into Spanish (Carrillo-Diaz, Crego, Armfield, & Romero, 2012), German (Tönnies, Mehrstedt, & Fritzsche, 2014) and French (Quennevile, 2013) language.

5. Objective

This study aimed to adapt the IDAF-4C module into Malay language so that it can be used for secondary school children, by focusing specifically on the issues of reliability and validity of the measure.

6. Methodology

6.1 Sampling method and Procedures

Cluster random sampling was applied. The classes are the primary sampling unit while students inside the classes as the secondary sampling unit. There are a total of 10 schools in Rembau with 40% in urban area and 60% rural area as according to the list given by the Ministry of Education. Five schools in Rembau were selected by simple random sampling, stratified by school category. One school was excluded as it was already involved during face validity phase. Classes were selected through simple random sampling as well. Number of cluster selected was proportionate to the school size. Cluster size was estimated by dividing total number of Form 4 students in Rembau district to total number of Form 4 classes, resulting the size of a cluster as 26.

A total of 246 questionnaires were distributed among 16-year-old secondary school children in Rembau, Negeri Sembilan. All 16 years old school children were included in the study while those illiterate and non-Malaysian were excluded from the study. As this was a self-administered questionnaire, the questionnaire was given to the school counselor to be distributed.

6.2 Vulnerability of the Subject

Parents or guardian implied consent as well as the participants’ assent to take part in this study was required since study subjects are below 18 years old. Implied consent was deemed appropriate as the identities of the participants’ were completely anonymous and there was minimal risk involved in this study.

6.3 Sample size determination
For exploratory factor analysis (EFA), the minimum suggested by Stevens (2002) was five subjects per variable. Cluster effect was set at 1.5 while the non-response rate at 20%. Given the IDAF-4C module has only 8 items, the sample size required was 72 samples.

For internal consistency by Cronbach’s alpha, calculation was made using sample size calculator obtained from StatsToDo.com (Chang, n.d). 1-β was set at 0.8, α at 0.05, expected Cronbach’s alpha at 0.8 and lowest expected Cronbach’s Alpha at 0.7. Cluster effect was set at 1.5 while the non-response rate at 20%. Sample size required was 202. Data collection for internal consistency was collected together with EFA.

6.4 Translation Process

Translation and adaptation process was adapted from World Health Organization (2014) for the Management of Substance Abuse. The questionnaire was forward translated from English into Malay by the researcher who has background in the translation works. The translated version was then reviewed and commented by two panels (medical and dental expert). The corrected Malay version was then translated back into English by an independent language expert who had no knowledge on the original English version. A meeting was then conducted among all personnel involved that served as an expert panel reviewed which also covered the content validity part. Upon agreement, the questionnaire was pre-tested among 10 students from one of the school in the study location for face validity. Results from the face validation were then reviewed and necessary modification was made. Modified questionnaire was sent for reviewed by another Malay language expert who is a secondary school teacher and another face validity was conducted. As no modification was necessary, the final version was achieved and the questionnaire was ready to be distributed.

6.5 Measures

Participant’s agreement was rated in the form of Likert scale ranging from “tidak setuju (disagree)” (scored as 1) to “sangat setuju (strongly agree)” (scored as 5). The total score was calculated by averaging responses to the scale’s items. The appropriate cut-point was suggested to be between 2.5 to 3.5 with higher total scores indicated a higher level of dental anxiety and fear.

6.6 Statistical Analysis

All analysis was performed by using IBM SPSS version 22.

Exploratory factor analysis (EFA) with principal axis factoring was used to identify the IDAF-4C module structure. Factors extraction was based on Eigenvalues more than 1 and scree plot. Items were remained based on communalities more than 0.3 and factor loading more than 0.5.

Cronbach’s alpha was used to determine the reliability by internal consistency.

7. Finding & Discussion

7.1 Profiles of the Respondents

184 questionnaires were returned with response rate 74.8%. Most of them were from rural area (75%), female (62.5%), Malay (91.8%). Average score obtained was 3.6 which indicate dental fear and anxiety.
Response rate for this study was high and had exceeded the recommended 60% by Fincham (2008). It had to be admitted that in this study, the sample ratio between urban and rural area had not achieved the initial target - 40% urban, 60% rural. This was due to the missing of the answered questionnaire by one of the school located in urban area. As a result, most respondents were Malay since Chinese and Indian tend to go to school located in urban area. However, from the researcher point of view, this situation was still acceptable as populations in Rembau used the same spoken dialect, they have been exposed to the same curriculum, and their activities are centralized at town, resulting in a homogenous population.

7.2 Exploratory Factor Analysis

Exploratory factor analysis yielded a single factor with an Eigenvalues of 5.35 that accounted for 66.8% of variance. This factor represents fear as a whole. Factor loadings showed good strength which ranged from 0.732 to 0.849. Good strength of factor loading indicated a valid and good convergent validity (Cronbach & Meehl, 1955) and the strength of the particular item to be in that factor (Stevens, 2009). Communalities ranged from 0.535 to 0.727. Conclusion from this EFA analysis is only one factor of dental fear can be extracted. The items were homogenous and each of the items measured the same as the rest of items in the scale. All items were remained in the model as no deletion was required. Results are shown in Table 1.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item</th>
<th>Factor Loading</th>
<th>Communitly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>Q1A</td>
<td>0.732</td>
<td>0.535</td>
</tr>
<tr>
<td></td>
<td>Q1B</td>
<td>0.746</td>
<td>0.557</td>
</tr>
<tr>
<td></td>
<td>Q1C</td>
<td>0.849</td>
<td>0.720</td>
</tr>
<tr>
<td></td>
<td>Q1D</td>
<td>0.744</td>
<td>0.554</td>
</tr>
<tr>
<td></td>
<td>Q1E</td>
<td>0.853</td>
<td>0.727</td>
</tr>
<tr>
<td></td>
<td>Q1F</td>
<td>0.848</td>
<td>0.719</td>
</tr>
<tr>
<td></td>
<td>Q1G</td>
<td>0.763</td>
<td>0.582</td>
</tr>
<tr>
<td></td>
<td>Q1H</td>
<td>0.762</td>
<td>0.581</td>
</tr>
</tbody>
</table>

Kaiser-Meyer-Olkin was 0.908, Bartlett’s test of sphericity was significant (p-value <0.001). Principal axis factoring was applied.

Result obtained from this EFA however differ from the original version developed by Armfield (2010) and French version (Quennevile, 2013). In English version, the study involved entire Australian population and was conducted using stratified random sampling. The final respondents were 1083 with 72% response rate. The factor obtained were four namely behavioral, emotional, physiological and cognitive. Promax rotation was used. The factor loading from the initial 16 items ranged from 0.69 to 0.91. However, in his study, there were 16 questions initially in which after performing the EFA, only eight items were selected to be used in the final scale. After the selection of the final eight items, EFA was not re-run to confirm the final construct of the items, in which explained the reason to the different number of factors obtained in the later studies. Another possible explanation is Malaysian school children might not respond to the measure in a manner consistent with the validated Australian population. Literature for German version was not accessible while for the French version, details about the research could not be confirmed as the literature was not in English.
However, current finding was supported by the Spanish version of the questionnaire (Carrillo-Diaz, Crego, Armfield, & Romero, 2012). This research which was conducted among 322 students attending psychology courses at Rey Juan Carlos University yield only a single-factor structure with factor loading ranged from 0.77 to 0.92. This study also concluded that the items were homogenous and each of the items measured the same as the rest of items in the scale.

7.3 Reliability by Internal Consistency (Cronbach's alpha)

Internal consistency from Cronbach’s alpha showed good scale reliability for the latent factor measured. Cronbach’s alpha for Fear was 0.929 which indicated a good reliability based on recommendation by Cronbach and Meehl (1955). High reliability was also demonstrated in the Spanish version where the Cronbach’s alpha was 0.94 (Carrillo-Diaz, Crego, Armfield, & Romero, 2012) and the original version where the Cronbach’s alpha was 0.91 (Armfield, 2010).

7.4 Limitations of the Study

Several limitations were noted during the entire process of this study. First, most of the respondents involved were Malay and the sampling proportion for urban area was not achieved. These conditions would affect the generalizability of the current study findings. Second, method of the questionnaire administration itself might be the source of bias. As the researcher had no direct contact with the respondents involved and was not presence when the questionnaire was distributed, response bias could happen.

8. Conclusion and Future Recommendation

In conclusion, based on exploratory factor analysis (EFA) results, dental anxiety and fear module (IDAF-4C) consisted of only one factor that measure fear as a whole. Construct validity of the questionnaire in the EFA phase were proven valid and reliable to be used among secondary school children in Negeri Sembilan.

It is recommended that a cross validation to be conducted among students from other district or state to establish external validity and make this questionnaire more widely use. To make this questionnaire more functional, it is suggested that a study to establish Malaysian population norms of dental fear based on this questionnaire to be conducted.

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References


