Research

Validity and reliability of Eustachian Tube Dysfunction Questionnaire (ETDQ-7) adaptation in Bahasa Indonesia

Ratna Dwi Restuti, Ayu Astria Sriyana, Harim Priyono, Rangga Rayendra Saleh, Widayat Alviandi
Department of Otorhinolaryngology Head and Neck Surgery,
Faculty of Medicine Universitas Indonesia/Dr. Cipto Mangunkusumo Hospital, Jakarta

ABSTRACT

Background: Eustachian tube dysfunction occurred in 0.9% of world population. An instrument called Eustachian Tube Dysfunction Questionnaire (ETDQ-7) in English language was developed as a scoring system to evaluate patients' problems for the past month with 100% sensitivity and specificity value ($p<0.001$). This questionnaire is proven useful internationally to evaluate patients' complaints, the disorder course, and to determine the therapeutic outcome. However, Indonesian version of ETDQ-7 had not been adapted yet. **Purpose:** To evaluate the validity and reliability of ETDQ-7 adapted to *bahasa* Indonesia. **Method:** This was a descriptive cross-sectional study on 31 adult subjects whose primary language were Indonesian. Subjects were required to fill the questionnaire that went through cross-cultural adaptation. The data was analyzed using Spearman coefficient correlation for validity and Cronbach-α score for reliability. **Result:** Showed that each ETDQ-7 question were significantly correlated to the total score of ETDQ-7 ($p<0.05$) with r value ranging from 0.568-0.790, and Cronbach-α value was 0.801. **Conclusion:** ETDQ-7 adapted to *bahasa* Indonesia was a valid and reliable questionnaire to determine the disorder progression in patients with Eustachian tube dysfunction whose primary language are Indonesian.

Keywords: ETDQ-7, validity, reliability, *bahasa* Indonesia

ABSTRAK

Latar belakang: *Disfungsi tuba Eustachius terjadi pada 0.9% populasi dunia. Sebuah kuesioner* Eustachian Tube Dysfunction Questionnaire (ETDQ-7) *dalam bahasa Inggris dibuat sebagai sebuah sistem skoring untuk mengevaluasi keluhan pasien dalam satu bulan terakhir dengan nilai sensitivitas dan spesifisitas 100% (p<0,001). Kuesioner ini terbukti bermanfaat di luar negeri karena mampu menilai keluhan pasien, perjalanan penyakit, dan keberhasilan terapi pada pasien, sehingga diperlukan kuesioner* ETDQ-7 *dengan versi adaptasi bahasa Indonesia.* ***Tujuan:*** *Untuk mengevaluasi validitas dan reliabilitas kuesioner* ETDQ-7 *adaptasi bahasa Indonesia.* ***Metode:*** *Studi potong lintang deskriptif pada 31 subjek dewasa yang berbicara dengan bahasa Indonesia, melalui pengisian kuesioner yang telah melalui adaptasi lintas bahasa. Data penelitian diolah menggunakan S*pearman coefficient correlation *untuk menilai validitas dan* Cronbach-α *untuk menilai reliabilitas.* ***Hasil:*** *Didapatkan bahwa tiap butir pertanyaan* ETDQ-7 *berkorelasi secara bermakna dengan skor total dari* ETDQ-7 *(p<0,05), dengan rentang nilai r 0,568-0,790 dan nilai* Cronbach-α *untuk total skor* ETDA-7 *adalah 0,801.* ***Kesimpulan:*** ETDQ-7 *adaptasi bahasa Indonesia merupakan kuesioner yang valid dan dapat diandalkan untuk menilai perkembangan penyakit pada pasien disfungsi* tuba Eustachius *dalam Bahasa Indonesia.*

Kata kunci: ETDQ-7*, validitas, reliabilitas, bahasa Indonesia*

Correspondence address: Ratna Dwi Restuti, Department of Otorhinolaryngology–Head and Neck Surgery, Faculty of Medicine, Universitas Indonesia/Cipto Mangunkusumo Hospital. Jl. Diponegoro No. 71, Jakarta 10430, Indonesia. Email: ratna.drest@gmail.com

INTRODUCTION

Eustachian tube dysfunction (ETD) occurred in almost 1% of world population.[1] This disorder is divided into obstructive ETD (OETD) and patulous ETD (PETD). Obstructive ETD is a condition where Eustachian tube opening or patency is narrowed, while PETD is a condition where the Eustachian tube is dilated. Up until now, there is no standard diagnostic procedure nor instrument to evaluate ETD, so that the management is heavily relied on patients' complaints, physical examination and supporting examination such as CT scan or MRI which are limited to tertiary healthcare.[2,3] Furthermore, Eustachian tube dysfunction may lead to a future chronic condition if not treated immediately.[4]

In 2012, Eustachian Tube Dysfunction Questionnaire (ETDQ-7) was developed by Edward D. McCoul, Vijay K. Anand and Paul J. Christos from Weill Cornell Medical College, New York. This was a 7 points questionnaire which evaluated ETD patients' problems for the past month. If the score reached 14.5 or more, then patient was diagnosed with ETD.[5] The McCoul et al.[5] study stated that the sensitivity and specificity of this questionnaire was 100% ($p<0.001$). Another study by Teixeira et al.[6] also found that the sensitivity of this study was 70% and specificity was 100% (AUC [the Area Under Curve] 0.89).[6]

Throughout the years, this questionnaire had been translated and adapted to various language including Dutch[7,] Brazilian Portuguese[8], Hebrew[9], Turkish[10], European Portuguese[11] with great validity and reliability score. The use of ETDQ-7 questionnaire international has been proven useful to evaluate ETD patients' subjective complaints, course disease, and therapeutic outcome.[2] Therefore, this questionnaire should also be adapted to *bahasa* Indonesia and tested for its validity and reliability.

METHOD

This was a descriptive cross-sectional study conducted at Department of Otorhinolaryngology-Head and Neck Surgery, Cipto Mangunkusumo National Hospital. Our study had received approval from the Ethics Committee Faculty of Medicine Universitas Indonesia (KET-1196/UN2.F1/ETIK/PPM.00.02/2020).The study used 31 subjects whose primary language were Indonesian to fill out the questionnaire form.[12] Tympanometry was performed on the subjects to evaluate ETD. Patient with Tympanogram type B, type C, or type A with abnormal ETF1 (Eustachian Tube Function 1) test with Valsava and Toyenbee maneuver were included. Patients who were not cooperative and had cognitive function loss were excluded from this study. Those who had ear problems that could not be evaluated with tympanometry such as chronic suppurative otitis media (CSOM) and tympanic membrane perforation were also excluded from this study.

To start the study, a permit application letter was sent to McCoul et al. as the original creator of ETDQ-7. A committee consisted of researchers and FKUI-RSCM consultants who were experienced in validity and reliability studies was formed. The original questionnaire was then translated by two certified bilingual translator who did not know each other, and the result was evaluated by the committee. The more appropriate translation whose meaning came closest to the original questionnaire was chosen. The result was tested on a group of monolingual population using interview method. Words that were controversial or confusing according to the subjects were re-discussed to find a better synonymous word with a closer meaning to the original questionnaire. A backward translation of the questionnaire was then performed and it was re-assessed by the committee. After discussion, the questionnaire was translated back to *bahasa* Indonesia by two certified

bilingual translators. The Questionnaire was then being evaluated. The questions that had the most similar meaning to the original questionnaire were chosen to be Indonesian adaptation version of ETDQ-7 (as seen in Appendix 1). The questionnaire was tested to 31 subjects who filled the form individually accompanied by the researcher.

The data gathered were examined using SPSS IBM 22.0. The Spearman coefficient correlation was used to evaluate the validity, and the Cronbach-α was used to evaluate the reliability of ETDQ-7.

RESULT

This study required a minimum of 30 subjects, and 31 had joined. The demographic characteristics of the subjects were presented in Table 1. They underwent tympanometry and/or sonotubometry to validate the ETD diagnosis. They proceeded to fill the forms individually accompanied by the researcher.

Table 1. Demographic characteristics of study subjects

Variable	Amount (%)
Gender	
Male	15 (48.4)
Female	16 (51.6)
Age group	
18-25 years old	10 (32.3)
25-50 years old	13 (41.9)
50-75 years old	8 (25.8)
Latest education	
Elementary	1 (3.2)
Primary High	3 (9.7)
Secondary High	17 (54.8)
Diploma & Bachelor	10 (32.3)
Job	
Not working	11 (35.5)
Entrepreneur	5 (16.1)
Employee	10 (32.3)
Civil servant	2 (6.5)
Others (student, security officer)	3 (9.7)
Smoking	
Yes	5 (16.1)
No	26 (83.9)
Co-morbidity	
Yes	12 (38.7)
No	19 (61.3)

Five of 31 subjects in this study stated that they smoked cigaratte daily, and 12 out of 31 had comorbids such as hyperthyroid, thyroid cancer, adenoid hyperthrophy, allergy, vasomotor rhinitis, meningitis, and head tumor.

Validity of ETDQ-7 adapted to *bahasa* Indonesia

To evaluate the validity of a questionnaire, coefficient correlation study is usually used. However, due to the nature of this questionnaire with ordinal variables and not normally distributed data, this study used Spearman coefficient correlation to determine the *r* score between each questions to the total score of the questionnaire. A significance of $p<0.05$ showed that the question tested was valid.

Table 2. Validity test of ETDQ-7 adapted *bahasa* Indonesia using Spearman correlation coefficient

Questions	*r*	Sig.
Q1	0.700 (**)	0.000
Q2	0.632 (**)	0.000
Q3	0.609 (**)	0.000
Q4	0.633 (**)	0.000
Q5	0.790 (**)	0.000
Q6	0.568 (**)	0.001
Q7	0.644 (**)	0.000

Table 2 showed that each question in the ETDQ-7 questionnaire had a significant positive correlation to the total score of the ETDQ-7 questionnaire as all of them had significance of $p<0.05$. All the questions had a positive correlation with r score ranging from 0.568 to 0.790.

Reliability of ETDQ-7 adapated *bahasa* Indonesia

The reliability test of ETDQ-7 *bahasa* Indonesia was done internally by analyzing the consistency of each question on instrument using Cronbach-α. The study categorized as reliable if α score is a minimum of 0.70.

Table 3. Reliability Test of ETDQ-7 adapted Bahasa Indonesia using Cronbach-α

Scale	Cronbach-α
Total	0.801

Table 3 showed that the Cronbach-α of ETDQ-7 total score was above 0.70. Hence, this was a reliable questionnaire to be an examination instrument. The study also examined the Cronbach-α if item/question deleted with result in Table 4.

Table 4 showed that if there was a single item in the questionnaire deleted, the Cronbach-α would decline. This result prove that all the question (Q1-Q7) should be included to increase the reliability of the questionnaire up to 0.801 as mention in Table 3.

Table 4. Reliability test of ETDQ-7 adapted in *bahasa* Indonesia with Cronbach-α "if item deleted"

Questions	Cronbach-α "if item deleted"
Q1	0.751
Q2	0.773
Q3	0.770
Q4	0.768
Q5	0.795
Q6	0.801
Q7	0.767
	Cronbach-α = 0.801

DISCUSSION

This study used 31 subjects with ETD, 51% of them were female. The study of Alshehri et al.[13] in Jeddah, found that females were at a greater risk of developing ETD than males (p=0.01).[13] Other study by Vila et al.[14] found that females above 20 years were at a greater risk of developing ETD/otitis media effusion (OME)/tympanic membrane retraction than males (OR 2.18; CI 95% p<0.0001). There was no clear explanation concerning this phenomenon, but it might be due to the differences in the social lifestyles of men and women in Saudi.[13,14]

In this study, 16.1% of subjects with ETD were smokers. Based on the study of Altahi et al.15, smoking subjects showed a nearly doubled risk for having ETD (OR 1.83; CI 95%: 1.01-3.48). This result was different with our study, which might be due to the disparity in the population size of Altahi's study and ours (consisted of 693 subjects and only 31 subjects in our study).

A tympanometric examination was performed to all study subjects. Type B tympanogram were found in 6 subjects in both ears, type C were found in 4 subjects in the right ear, and 8 subjects in left ear, and 13 subjects were type A with abnormal ETF1 test. These showed subjects with ETD could have type A tympanogram. This result was in accordance with the study of Parsel et al.[16] which found that typically ETD patients had type A tympanogram (p<0.001), whether they were symptomatic (91%) or asymptomatic (99%).

Our study focused on the validity and reliability of the adapted and translated version of ETDQ-7 to *bahasa* Indonesia. This questionnaire had been previously adapted to many languages, including Dutch. According to the study of Van Roeyen et al.[7], the Area Under Curve (AUC) of the translated questionnaire was 95% but it could not differentiate the difference between obstructive and patulous ETD (AUC 41.8%).[7] Another study in Brazilian Portuguese by Gallardo et al.[8] found that the sensitivity and specificity of the adapted this questionnaire were 95% and 97% respectively. Many countries adapted this questionnaire by using sensitivity and specificity to evaluate validity, unlike Ozgur et al.[10] and Menezes et al.[11] who only used independent sample t-test. But most of them used Cronbach-α to evaluate the reliability such as in this study.[10,11]

The usage of ETDQ-7 questionnaire in Indonesia might not be primarily for the purpose to establish the diagnosis of ETD, because other ear problems might lead to the same symptoms as ETD. However, this questionnaire might be useful to evaluate the disorder course and progression. Therefore, our study did not include any control group and hence could not be tested for its sensitivity and specificity. The main target of this study's validity test was to describe direction and strength of a relationship; therefore, it was decided that the coefficient correlation was the best-chosen method to evaluate the validity of ETDQ-7 adapted to *bahasa* Indonesia.

A questionnaire is valid if the items formed a single entity.[17] Hence, to test the validity of this study, Spearman coefficient correlation was used with significant correlation result (p<0.05) on all questions in this questionnaire. The *r* correlation on each question might vary with 0.568 (moderate positive correlation) as the lowest on question number 6, and 0.790 as the highest on question number 5, which fell on the strong positive correlation.[18]

Reliability of a questionnaire might be assessed using internal and external consistency procedure. External consistency procedures that might be chosen are test-retest reliability, intra-observer reliability or inter-observer reliability. Meanwhile, internal consistency procedures that can be chosen are inter-item reliability, split-half reliability and Cronbach-α reliability.[12] We decided to use Cronbach-α internal consistency procedure

test in our study because it could portray the consistency of results across items and correlation between items within a test, which was needed to test the reliability on a set of questions.

According to Priyatno,[19] α value less than 0.6 was not good, while 0.7 was acceptable and 0.8 was showing good reliability. However, according was Riwidikdo,[20] if α score exceed 0.7, the questionnaire was concluded as reliable. This study found that Cronbach-α questionnaire total score was 0.801, which showed a better result than the studies of Ozgur et al.[10] and Van Roeyen et al.[7] with a 0.714 and 0.795 α value respectively. This result showed that ETDQ-7 adapted to *bahasa* Indonesia had good internal consistency.

This study showed that the ETDQ-7 adapted to *bahasa* Indonesia was a valid and reliable questionnaire to evaluate the symptoms of Eustachian tube dysfunction in patients with monolingual Indonesian language.

CONFLICT OF INTEREST

Authors declare no conflict of interest in this study.

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Appendix 1
ETDQ-7 versi adaptasi Bahasa Indonesia

Dalam 1 bulan terakhir, seberapa bermasalahkah hal-hal berikut bagi Anda?	**Tidak Bermasalah**		**Bermasalah Sedang**			**Sangat Bermasalah**	
1. Bagian dalam telinga terasa seperti ditekan	1	2	3	4	5	6	7
2. Rasa sakit di dalam telinga	1	2	3	4	5	6	7
3. Telinga anda terasa tersumbat atau seperti ketika berada gunung/ terbang di pesawat terbang.	1	2	3	4	5	6	7
4. Keluhan rasa tidak nyaman di dalam telinga yang terasa pada saat ini serupa dengan yang dialami saat anda sedang influenza (batuk dan pilek) atau flu	1	2	3	4	5	6	7
5. suara kerisik (“Krek”) atau letupan (“Blep”) di dalam telinga	1	2	3	4	5	6	7
6. Telinga berdengung	1	2	3	4	5	6	7
7. Pendengaran Anda terasa seperti diredam (tertutup)	1	2	3	4	5	6	7