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Test-retest reliability and responsiveness of a Malay tinnitus questionnaire

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ABSTRACT

Introduction: Tinnitus is a common complaint among patients with ear diseases and can be serious if not treated. Recently, a Malay tinnitus questionnaire, known as the “Borang Evaluasi Soal selidik Tinnitus” (BEST) had been developed and preliminarily validated among Malay-speaking population. The aims of the present study were to determine the test-retest reliability and responsiveness of the BEST questionnaire.

Method: Forty-six Malay adults (aged 23-74 years) with tinnitus were enrolled. They were instructed to fill in the BEST questionnaire accordingly. After one week, 21 of them were asked to fill in the questionnaire again. The other 25 subjects underwent tinnitus intervention for three months and following this; the BEST was administered to them again.

Results: In the test-retest reliability task, the intraclass correlation values obtained were acceptably high (0.70-0.90). After the intervention, significant differences in the BEST result were found in the mind domain, main domain and composite score ($p < 0.05$) with moderate effect sizes (0.61-0.70).

Conclusion: The test-retest reliability of the BEST was found to be good. It also showed good responsiveness to intervention. The clinical usefulness of the BEST in assessing patients with tinnitus was further supported by the present study.

KEY WORDS:

Tinnitus, questionnaire, reliability, responsiveness, effect size

INTRODUCTION

The prevalence of tinnitus among adults can be as high as 25.3%.¹ To avoid the negative impacts of tinnitus, thorough assessments and treatments by relevant clinical professionals are required. As such, validated tinnitus questionnaires have been widely used to quantify the effect of tinnitus on the patients' life. Recently, a Malay tinnitus questionnaire, known as the “Borang Evaluasi Soal selidik Tinnitus” (BEST) had been developed and validated among Malay-speaking population.² It is a self-reported questionnaire that utilises a 5-point Likert scale and has 25 items categorised under “3M” domains (mind, main and mental). Its content validity and

overall internal consistency (reliability) were reported to be excellent.² More research is required to further explore the usefulness of the BEST questionnaire. The aim of the present study, therefore, was to determine the external (test-retest) reliability and responsiveness of the BEST questionnaire (i.e., its ability in detecting changes after a specific treatment is given).

MATERIALS AND METHODS

In the present study that employed a repeated measures design, 46 eligible subjects were selected randomly among patients of Tinnitus Clinic, Hospital Universiti Sains Malaysia (Hospital USM). All of them reported tinnitus (at least in one ear) and had no dizziness, neurological or psychiatric disorders. After undergoing the standard otological and audiological tests, the participants were required to fill in the BEST questionnaire accordingly.

Of 46 subjects, 21 (aged 23-74 years) were involved in determining the test-retest reliability of the BEST questionnaire. The 25-item BEST questionnaire that utilised a five-point Likert scale was developed to cover the relevant and important aspects related to tinnitus.² The mind domain of BEST questionnaire consists of seven items and covers the emotional impacts of tinnitus. The main domain is comprised of 14 items that deal with the effects of tinnitus on the main daily life activities. The mental domain of the BEST questionnaire has four items that cover the extreme consequences of tinnitus.

The subjects were instructed to complete the BEST questionnaire again about one week after its first administration. Within this period, no intervention was given to the subjects. The responsiveness of the BEST questionnaire was determined in the other 25 subjects (aged 23-74 years). After completing the questionnaire, the intervention commenced. In the present study, the conventional intervention method offered by the Tinnitus Clinic, Hospital USM (i.e., educational counselling and sound therapy) was given to each participant for three months. In the counselling session, they were given information on the fundamental aspects of tinnitus and relevant coping strategies. They then underwent sound therapy that employed broadband (“white”) noise with the partial masking method.³ They were required to listen to the prescribed noise stimulus using a dedicated MP3 player for at least two hours daily. After the

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Table I: Responsiveness of Borang Evaluasi Soal selidik Tinnitus (BEST) among tinnitus patients (n = 25)

Measurement	Pre-intervention score Mean (SD)	Post-intervention score Mean (SD)	P value	Effect size (d)
BEST Domain				
Mind (%)	37.0 (21.0)	22.8 (19.5)	0.009*	0.70
Main (%)	28.7 (23.6)	16.9 (13.9)	0.010*	0.61
Mental (%)	20.0 (13.6)	16.1 (13.8)	0.227	0.29
Composite (%)	29.6 (19.7)	18.5 (14.3)	0.009*	0.65

*Statistically significant at $p < 0.05$

three-month period, they were required to fill in the BEST questionnaire again. The pre- and post-intervention results were then compared and analysed. All procedures performed were approved by Human Ethics Committee of USM (USM/KK/PPP/JEPeM [258.3.(7)]).

Since the data were found to be normally distributed ($p > 0.05$ in Kolmogorov-Smirnov test), the test-retest reliability of the BEST was assessed using intraclass correlation (ICC) with a two-way mixed effects and absolute agreement type. The responsiveness of the BEST questionnaire was determined using paired t-test and effect size (with pooled standard deviation). The p values of less than 0.05 were considered statistically significant. All data analyses were carried out with the SPSS software version 20 (SPSS Inc, Chicago, IL).

RESULTS

In the test-retest reliability task, of 21 subjects (mean age of 54.5 ± 12.5 years), 10 were men, and 11 were women. Overall, the ICC values obtained were acceptably high. Specifically, the ICC values were 0.73, 0.90, and 0.70 for mind, main and mental domains, respectively. For the composite score, the ICC was 0.88.

To determine the responsiveness of the BEST questionnaire, 25 adults (12 men and 13 women) with a mean age of 52.0 ± 13.2 years were enrolled. As revealed in Table I, significant differences in the score were found in the mind and main domains, as well as in the composite score ($p < 0.05$) with moderate effect sizes (0.61-0.70). In the mental domain, no significant difference in the score was found between the sessions ($p = 0.277$) and the effect size was small ($d = 0.29$).

DISCUSSION

The external reliability of the BEST was determined by assessing its test-retest stability. Clinically, having an instrument with good test-retest reliability is crucial so that consistent results are obtained when repeated over time. In general, ICC of 0.70 and higher are indicative of good test-retest reliability.⁴ As revealed, the ICC values were within the acceptable range (0.70-0.90) indicating good test-retest reliability of the BEST questionnaire. Good stability of tinnitus questionnaires when utilised over time were also demonstrated in the previous studies.⁵⁻⁷

The ability of the BEST questionnaire to detect the treatment progress was then determined. For measuring the responsiveness of an assessment tool, the effect size should be

reported.⁸ An effect size of ≥ 0.80 is considered as large, 0.50-0.79 as moderate, 0.20-0.49 as small, and 0.00-0.19 as very small.⁹ In the present study, moderate effect sizes were noted in the mind domain, main domain and composite score of the BEST questionnaire. This indicates that the BEST questionnaire has good responsiveness and can document the treatment progress. Nevertheless, if the duration of treatment were longer, perhaps bigger effect sizes would be obtained for the BEST questionnaire. In line with this, significant improvements in the tinnitus severity have been reported in long treatment durations (> 1 year) than in short treatment periods (< 6 months).⁹ It is worth noting the pre- and post-intervention scores were not statistically different in the mental domain of the BEST questionnaire. These findings might be related to the nature of treatment given (broadband noise masking). On the other hand, if a structured psychological treatment is given (e.g. cognitive behavioural therapy), bigger effect sizes (better improvements) might be seen in the mental domain of the BEST questionnaire.

In conclusion, the external reliability and responsiveness of the BEST questionnaire have been proven to be good. Herein, the BEST can be used reliably to document the treatment progress of patients with tinnitus for research and clinical purposes. Nevertheless, future bigger scale studies are encouraged to further verify the present study findings.

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