

## Assessment of Anxiety Symptoms among Tinnitus Patient using Subjective Measure: Case Study

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**ABSTRACT:** Tinnitus is one of common symptoms that mainly affect the elderly. It may cause psychological and emotional distress such as depression and anxiety that is out of proportion to the magnitude of illness. Through a study of 12 tinnitus subjects; subjective measurement was performed to assess the psychological symptoms among them. Subjective measurements used are Malay version of Beck Anxiety Inventory (BAI) and BorangEvaluasiSoal-selidik Tinnitus (BEST). The results show there is significant correlation between BAI-Malay and BEST at  $p < 0.05$  (0.017). This results suggested that the worse tinnitus complaint, the greater the likelihood of the individual to have more anxious personality.

**Keywords:** tinnitus, psychological symptoms, BAI, BEST

### Introduction

Tinnitus is a symptom and not a disease or disorders. They are various term and definition for this symptom but according to the definition by Jastreboff in 1995, tinnitus is “the perception of sound that results exclusively from activity within the nervous system without any corresponding mechanical, vibratory activity within the cochlea, and not related to external stimulation of any kind” (Jastreboff, 1995).

Majority of previous studies showed the incidence of tinnitus in adults at about 10-15%, with higher incidence at higher ages, toward the sixth or seventh decade of life (Henry *et al.*, 2005). Women were more likely to report emotional reactions to their tinnitus than men (Dineen, et al.,1997; Hallberg & Erlandsson, 1993; Meikle and Griest, 1989); and the rate of personality disturbance was greater in male than female (Erlandsson, 2000)

Impact of tinnitus can be varied on its sufferer and it correlated with their duration and chronicity. About 80% of the people with chronic tinnitus complained mildly and they did not look for any treatment and the other 20% showed some significant conditions (Davis and Refaie, 2000; Jastreboff and Hazell, 1998). Some patient were unconscious on their tinnitus, whereas others suffered from reduced concentration, sleep disturbance, anxiety, depression or despair (Tyler and Bakers, 1983). The link between sound and emotion may be the basis for psychological distress in some tinnitus patients (Hallam *et al.*, 1984; Jastreboff et al., 1996).

Tinnitus is subjective phenomena, which are most reliably measured by self-report. Standardised scale can be helpful in quantifying the associated psychological reactions (Farrar *et al.*, 2000; Newman and Sandridge, 2004). In this study, we used two validated outcome measures, which were the Beck Anxiety Inventory (BAI) and Borang Evaluasi Soal-Selidik Tinnitus (BEST).

The Beck Anxiety Inventory (BAI), created by Aaron T. Beck, MD, and colleagues, is a 21-item self-report questionnaire that measures the severity of an anxiety in adults and adolescents. It is also good as a diagnostic aid to evaluate a baseline anxiety and post management measure as it progresses.

The understanding of symptom is compulsory because patient complaint of tinnitus increases daily and yet the management for the symptom is still questionable. This study will provide a clear understanding of tinnitus origin or pathway associated to psychological status of tinnitus patients. This study aimed to determine the level of

psychological impacts specifically on anxiety symptoms among tinnitus patients. The outcome of this study will provide better understanding and relationship on severity of tinnitus with psychological impacts.

## Materials and Methods

### Research Design

A cross-sectional study using questionnaires was designed. Summary of this study is shown in Figure 1.

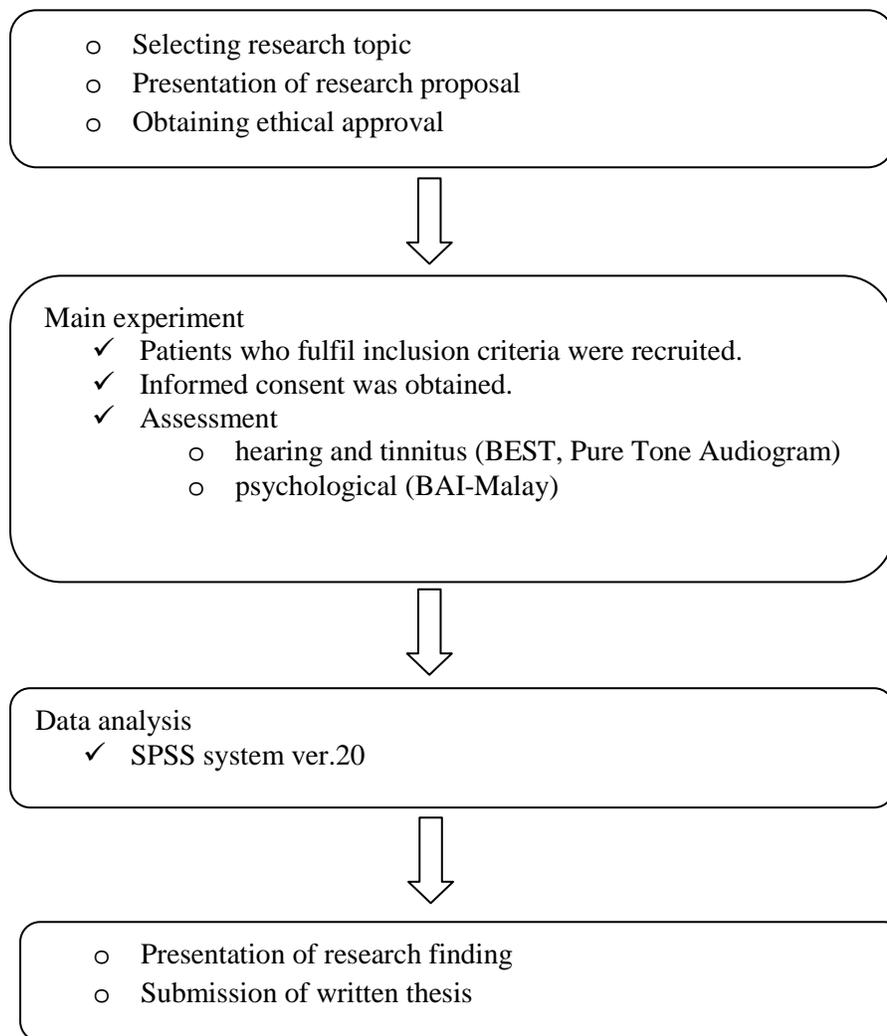


Figure 1: Flow chart of research

#### Inclusion Criteria

- Individuals who complaint of tinnitus.
- Individuals aged between 18 to 65 years.

#### Exclusion Criteria

- Individuals who have health problem that restricted them to participate in this study.

#### *Sample Size*

This study focused on tinnitus patients in Otorhynolaryngology (ORL) clinic, Hospital Universiti Sains Malaysia, Kelantan (HUSM). Based on formula  $n_0 = Z^2pq/e^2$ , the sample size was determined (Mialoulis and Michener, 1976).  $n_0$  is the sample size,  $Z^2$  is the confidence level,  $e$  is the level of precision,  $p$  is the estimated proportion on the attribute that is present in the population and  $q$  is  $1-p$ . Calculated sample size for this study was 34 people. However, due to study limitation, only 12 tinnitus subjects were recruited.

#### *Equipments*

- Otoscope
- Questionnaires
  - 1- BorangEvaluasiSoal-selidik Tinnitus (BEST)
  - 2- Beck Anxiety Inventory-Malay version (BAI)
- Audiometer

#### *Measurement Instruments*

##### a) Beck Anxiety Inventory-Malay (BAI-Malay)

The authors of the original version of this questionnaire are 21 questions that were used to measure symptom of anxiety, by Aaron T. Beck, MD. Internal consistency was (Cronbach's alpha) 0.92 to .94 for adults and test-retest (one-week interval) reliability was 0.75. The BAI reliability, convergent and discriminate validity for both 14-18 years inpatient and outpatients were satisfactory.

The questions were answered based on the numbers, from '0' (not at all) to '3' (severely) and the range of scores from 0 to 63 points. The interpretation for the score of 0-7 as a "minimal" level of anxiety, 8-15 as "mild", 16-25 as "moderate", and 26-63 as "severe".

b) BorangEvaluasiKaji-Selidik Tinnitus (BEST)

The BEST questionnaire was proposed by Jenny Lau Yue Jun, 2010 in assessing patient's self-perceived handicap. It is applicable in our population to address the majority of tinnitus problem. The 25 items of BEST were divided into 3 subscales; a emotional subscales formed from first 7 items, functional response subscales formed from item 8-21, and catastrophic response formed from the last 4 items. The cronbach's alpha value of 0.88 was obtained, indicating good internal consistency and test reliability. The questions are answered based on scale ranging from '0' (never) to '4' (all the time). Therefore, the range of scores can be from 0 to 100 points. A total score of 0-20 is interpreted as a "slight" level of tinnitus, 21-40 as "mild", 41-60 as "moderate", 61-80 as "severe", and 81-100 as "catastrophic".

***Data Collection Procedures***

Patients who complained of tinnitus and met the inclusion criteria were recruited in the study. An informed consent was obtained from each participant prior to data collection. The participants were approached individually. They were informed on the purpose of study and confidentiality. They were given explanation on the rationale and the measurement procedures involved in the data collection. In answering the questionnaires, the participant were encouraged to recall back their memory about the tinnitus and the ways it affected their daily life. Besides, they were interviewed by the researcher regarding the history of tinnitus.

Difficulties that occurred during the interview were to make few respondents to understand the question especially for BDI-Malay. Lengthy explanation to understand the language and the questions were needed with the help of the authors. Respondents were generally very responsive to the interviews.

### ***Statistical Analysis***

The Statistical Package for Social Science (SPSS) version 20 was used to analyse the data in this study. Univariate and multivariate analysis was used to explore each variable in a data set, separately. Spearman's Rank Correlation is a technique used to test the direction and strength of the relationship between 2 variables.

## **Results**

### ***Demographic Data***

A total of 12 subjects from diverse background mean age of 41.84 years with the minimum age are 29 years old. Among the subjects, about 75% were males. This was followed by female at 35%.

### ***Statistical Analysis Results***

This section presents findings for two types of analysis, *i.e.* univariate analysis and bivariate analysis.

### ***Univariate analysis***

The result of univariate analyses for all questionnaires is shown in Figure 2 and Figure 3. Figure 2 shows results based on BEST questionnaire answered by tinnitus subjects. Six subjects categorised as moderate tinnitus, followed by four subjects (mild tinnitus) and two subjects (slight tinnitus). Figure 3 shows the results based on BAI-Malay questionnaire answered by tinnitus subjects. Eight subjects categorised as minimal anxiety level and another four subjects were classified as mild anxiety.

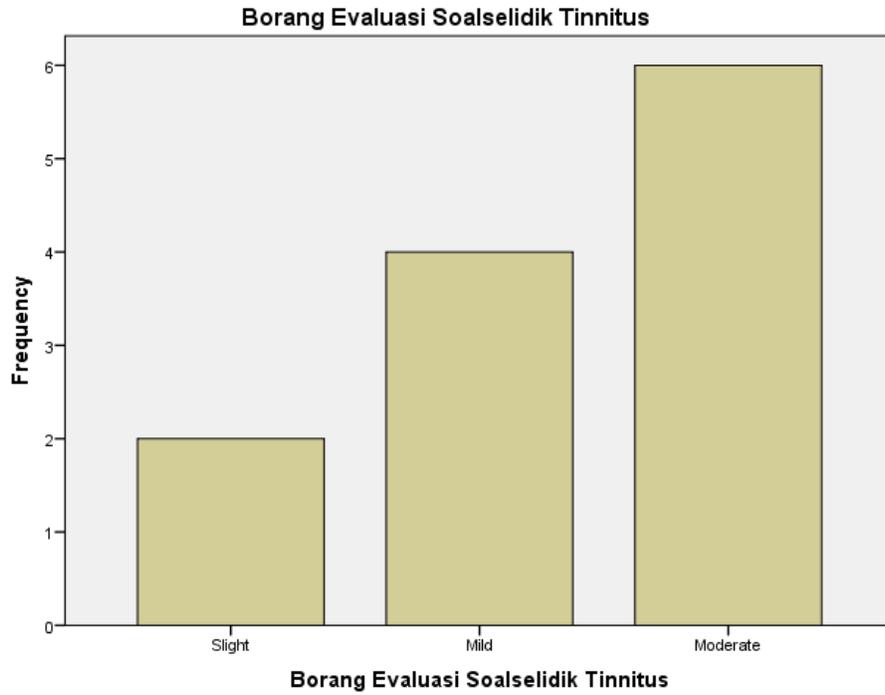


Figure 2: Results based on BEST questionnaire

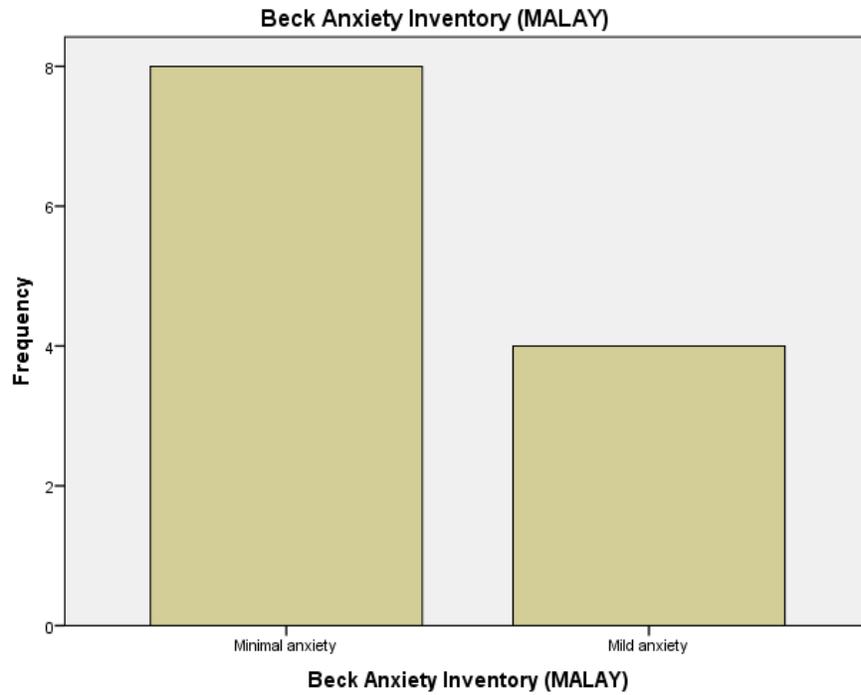


Figure 3: Results based on BAI-Malay questionnaire

### ***Bivariate analysis***

Bivariate analysis was conducted using cross tabulation based on the following characteristics: a) correlated variable; and b) non-parametric data. The data were then analysed in regard to subscales of the three questionnaires.

### ***Correlation between subscales of BorangEvaluasiKaji-selidik Tinnitus (BEST) and Beck Anxiety Inventory-Malay (BAI-Malay) using Spearman's correlation***

The correlation for the BorangEvaluasiKaji-Selidik Tinnitus (BEST) and Beck Anxiety Inventory-Malay (BAI-Malay) using Spearman's correlation. The Beck Anxiety Inventory-Malay (BAI-Malay) appears to be significantly correlated with the BorangEvaluasiKaji-Selidik Tinnitus (BEST), which  $p < 0.05$  (0.017)

### **Discussion**

Nowadays, there is an increasing and shifting of attention on the role of cognitive and psychological factors among tinnitus. Psychological treatments of tinnitus have received a great deal of interest in audiological research, especially since medical treatments have been largely ineffective. Population-based studies have reported that the prevalence of tinnitus increases during young adulthood and middle age, plateaus between 65 and 74 years of age, and then gradually declines.

In this study, male sufferers were more abundant than female. This is discordant with that of Coles *et al.* (1981), who reported a small but significant trend of higher tinnitus prevalence in females, at least below the age 40 years, but is more or less consistent with the findings of Meikle and Griest (1987). BAI-Malay appears to be significantly correlated with BEST at  $p < 0.05$  (0.017). This indicates that tinnitus subjects in HUSM are likely to be anxiety when they suffered the tinnitus problems.

The primary finding was a significant association between BEST and BAI-Malay. This results suggested that the worse tinnitus complaint, the greater the likelihood for the individual to have a more anxious personality. Clinical depression and anxiety are

potential impact for patients who are most affected by tinnitus (Dobie, 2003; Halford and Anderson, 1991; Kirsch *et al.*, 1989).

## **Conclusion**

This study attempted to provide relationship between psychological impacts among tinnitus patients. The outcomes of this study provided better understanding and relationship on severity of tinnitus with psychological impacts, therefore allow for better management of tinnitus patient in future. In summary, the result of this study suggested that a significant number of patients with tinnitus will suffer psychological problems and anxiety as one of the main psychological problem.

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