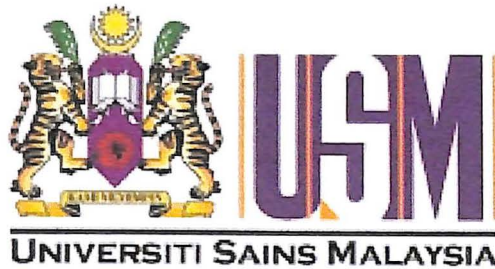


UNIVERSITI SAINS MALAYSIA



**COMPARISON OF VOCAL SYMPTOMS
BETWEEN
TEACHERS AND NON-TEACHERS**

by

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**Dissertation submitted in partial fulfillment of the
requirements for the degree of
Bachelor of Health Sciences (Hons)
(Speech Pathology)**

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SIJIL AKUAN / CERTIFICATE

Diperakui bahawa disertasi yang bertajuk Perbandingan Gejala Suara Dalam Kalangan Guru dan Bukan Guru merupakan hasil kerja dan penyelidikan yang asli daripada Hafizah Rusdi (87433) bermula pada Julai 2008 hingga April 2009 di bawah penyeliaan saya. Disertasi ini merupakan sebahagian daripada syarat untuk penganugerahan Ijazah Sarjana Muda Kesihatan (Patologi Pertuturan). Segala hasil penyelidikan dan data yang diperoleh adalah hak milik Universiti Sains Malaysia.

This is to certify that the dissertation entitled Comparison of Vocal Symptoms between Teachers and Non-teachers is the bona fide record of research work done by Hafizah Rusdi (87433) during the period of July 2008 to May 2009 under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Speech Pathology). Every research work and collection of data belongs to Universiti Sains Malaysia.



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ABSTRACT

The present study aims to investigate the characteristics of vocal symptoms among teachers in comparison with non-teachers. Specifically, the objectives are to compare the differences in overall and each vocal symptom between teachers and non-teachers.

This is a comparative cross-sectional study that involved 165 participants who were recruited through convenience sampling from the selected primary and secondary schools in Kota Bharu, Kelantan. The participants were divided into two groups i.e., teachers group (99 teachers) and non-teachers group (66 non-teaching staffs). Data collection involved administration of specifically-developed vocal symptom questionnaire to measure the frequency of vocal symptoms experienced by participants in each group. The values of the questionnaires were compared between the teachers group and non-teachers group to investigate whether there were differences between the two groups.

The results indicated that there were significant differences between frequency of overall vocal symptoms and frequency of each vocal symptom between teachers group and non-teachers group. Teachers group was found more than twice to experience vocal symptoms compared to non-teachers group. Similarly, teachers group were more frequently experiencing each vocal symptom than non-teachers group.

The findings from the present study showed that teachers are indeed experiencing more frequent vocal symptoms compared to non-teachers. This is probably due to the nature of their profession that put higher occupational demand on the voice usage which in expose

them to high risk of developing vocal symptoms. The findings from the present study may provide information on the nature of vocal symptoms among teachers in Malaysia. This information may help to facilitate the development of early screening, prevention and intervention programs that have been practiced in several other countries such as United States of America and Australia. These programs may prevent the development of voice disorders among teachers which in turn will reduce the implication of voice disorders on teachers' job performance, students' academic performance and government's financial.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Vocal symptoms are symptoms that affect the voice quality reported by the individuals. One of the factors often associated with the development of vocal symptoms is long duration of voice usage. Due to the nature of their profession that put higher occupational demand on the voice usage, teachers are at risk in developing vocal symptoms that could lead to voice disorders. It is expected that teachers are experiencing higher vocal symptoms compared to other groups of people that use less voice in their job functioning. Therefore, the present study aims to investigate the characteristics of vocal symptoms among teachers in comparison with non-teachers.

1.2 Voice disorders

Voice disorders present when quality, pitch or loudness of voice differ significantly from others of same age, gender, cultural background, and geographic location, thereby drawing attention to the speaker (Coyle, Weinrich, & Stemple, 2001). Voice disorders may result from laryngeal pathologies (e.g., cancer, contact ulcer, nodules, swelling, polyps), laryngeal trauma (e.g., injury or burning at laryngeal area, consequences of certain surgical procedures), neurologic pathologies (e.g., paralysis of the vocal folds, bilateral upper motor neuron lesion, cerebellar or basal ganglia lesion, amyotrophic lateral sclerosis, multiple sclerosis) and behavioral patterns (e.g., speaking at higher pitch range) (Hedge, 2001).

1.2.1 Voice disorders among teachers

As a professional voice users, voice is one of the most important tools in the teaching profession and the need for voice performance and vocal endurance has been found to be important (Simberg, Laine, Sala, & Rönnemaa, 2000; Rantala, Vilkmán, & Bloigu, 2002).

Ironically, given the importance of a good voice to teachers, they have also been consistently specified as a group of people with higher risk to develop voice disorders (Smith, Kirchner, Dove, Gray, & Heras 1997; Smith, Lemke, Taylor, Kirchner, & Hoffman, 1998; Timmermans et al., 2002; Titze, Lemke, & Montequin, 1997).

Voice disorders experienced by teachers may lead to problems for teachers, students, government and community (Wingate, Brown, Shrivastav, Davenport, Sapienza, 2007). Professionally, teachers may exhibit reduced productivity, reduced work quality, increased absenteeism, restriction of daily activity and social function, reduction in quality of life and may even consider switching their career (Ma & Yiu, 2001; Wilson, Daery, Millar, & Mackenzie, 2002 as cited in Wingate et al., 2007; Smith et al., 1997; Yiu, 2002). In terms of personal effects, teachers may experience serious personal, emotional, and economic consequences due to voice disorders (Mattiske, Oates, & Greenwood, 1998; Roy, Merrill, Thibeault, Gray, & Smith, 2004). Voice disorders also can lead to extensive period of sick leave, vocal rehabilitation through speech-language pathology management and surgical intervention, which involved great financial cost to be endured by government (Mattiske et al., 1998). Consequently, the government may see increased absenteeism, increased employee turnover, and increased cost for substitute teachers, medical treatment, and teachers' compensation claims (Hoffman-Ruddy, Sapienza, Crandell, Ingram, & Lehman, 2001; Wingate et al., 2007).

1.2.2 Prevalence studies on voice disorders among teachers

Previous studies have shown that teachers are one of the most common groups experiencing voice disorders. Russell, Oates and Greenwood (1998) investigated the prevalence of self-reported voice disorders in teachers using a mail survey among simple randomized 1168 school teachers in South Australia. Result of the surveys showed that 16% teachers reported voice disorders on the day of answering the questionnaire, 20% reported having voice disorders during current teaching year, and 19% reported voice disorders at sometimes (i.e., every 6 months or more frequent) during their career.

A review of previous studies by Williams (2003) indicated that from 772 school teachers, the prevalence of vocal pathology based on objectively diagnosis of vocal cord pathology was 4.4%. A study among 810 female primary and secondary school teachers revealed that 21% of the teachers experienced voice disorders related to vocal fold pathology (Urrutikoetxea, Ispizua, Matellanes, & Urretikoetxea, 1995 as cited in Russell et al. 1998).

A number of studies have investigated the proportion of teachers in populations seeking treatment for voice disorders from otolaryngologist. A study by Herrington-Hall, Stemple, McHone, and NiemiLee (1988) involved 1262 patients seen by otolaryngologys found that teachers were included in ten most frequently occurring professionals in the total group of patients i.e. 6.56% of the total patients. A replication study conducted by Coyle at al. (2001) involved 1158 patients seen by participating otolaryngologist. The finding from this study indicated that teachers were still grouped in ten most frequently occurring professionals in the total group of patients i.e. 7.81% of the total patients. Similarly, Smith et al. (1997) reported that teachers represent the highest occupational group seen in two

university hospital voice clinics, comprising 16.4% of diagnosed patients with a voice disorders.

Teachers also have been found to experience higher rate of voice disorders compared to the non-teachers. Roy et al. (2004) administered a telephone interview using voice disorders questionnaire towards 1243 teachers and 1288 non-teachers. They found that the prevalence of reporting a current voice disorders was significantly greater in teachers compared with non-teachers population (11% vs. 6.2%). In addition, they also found that teachers were more likely to have consulted a physician or speech-language pathologist regarding a voice disorders compared with general population (14.3% vs. 5.5%). Smith et al. (1997) used a self-reported questionnaire to compare the frequency of voice disorders between teachers (n=242) and individuals employed in other occupation (n=178). The result showed that teachers were more likely to report having voice disorders compared to adults in other professions (15% vs. 6%). Similarly, Smith et al. (1998) conducted another similar study among 554 school teachers and 220 employed adults. Again, the result showed that teachers were more likely to define themselves as having voice disorders than the general population (32% vs. 1%).

1.3 Vocal symptoms

Symptom refers to the individual's subjective complaint; real or imagined (Aronson, 1990). Thus, vocal symptoms refer to the voice complaints reported by the respondents or patients. Generally, vocal symptoms start slowly and gradually over time from sporadic to permanent lesions (Tavares & Martins, 2006). Vocal symptoms can be categorized into voice-related symptoms or phonatory symptoms (i.e., hoarseness, tired voice, low speaking voice, high-notes difficulty, weak voice, low-notes difficulty, breathy, voice spasm and

high speaking voice, voice change after use, difficulty projecting voice) and physical discomfort or laryngopharyngeal symptoms (i.e., tiring, effortful, scratchy, ache, uncomfortable, chronic throat dryness or soreness, bitter or acid taste, frequent throat clearing) (Roy et al., 2004; Smith et al., 1998; Smith et al., 1997).

1.3.1 Methods in assessing vocal symptoms

Based on the literature, the method in assessing vocal symptoms was using self-reported questionnaire. According to Russell et al. (1998) self-report questionnaire is a useful method for establishing the extent to which the teachers suffer from vocal dysfunction and this approach may lead to more practical estimates of the extent of the impact of voice disorders in teachers and also the organization. Furthermore, questionnaire is cost-effective and more objective, certainly more so than interviews (Milne, 1999). Deary, Wilson, Carding, and MacKenzie (2003) also suggested that questionnaire offer valuable outcome measures (i.e., reveal behaviour and feelings which have been experienced in real situations, generalization to a larger population).

Self-reported questionnaire includes validated instruments such as Voice Symptoms Scale (VoiSS) (Deary et al., 2003) and Voice Handicap Index (VHI) (Jacobson, Johnson, Grywalski, Silbergleit, Jacobson, Benninger, & Newman, 1997). However, most of previous studies have developed their own questionnaire in order to measure the occurrence of vocal symptoms among teachers (i.e., Smith et al, 1997; Smith et al., 1998; Smith et al., 1998; Simberg et al., 2000; Roy et al., 2004; Roy et al., 2004; Sala, Laine, Simberg, Pentti, & Suonpää, 2001; Sliwinska-Kowalska et al., 2006; Tavares & Martins, 2007; Simberg, Sala, Vehmas, & Laine, 2005; Russell et al., 1998).

1.3.2 Vocal symptoms among teachers

There are various vocal symptoms experienced by teachers such as hoarseness, voice becomes strained or tires, low speaking voice, effortful speech, difficulty in being heard, voice breaks, difficulty projecting voice, chronic throat dryness and soreness, frequent throat clearing and loss of voice (Smith et al., 1997; Smith et al., 1998; Simberg, Sala, & Rönnemaa, 2004; Roy et al., 2004; Simberg et al., 2005). Tavares and Martins (2006) conducted a study among teachers with sporadic symptoms (Group I) and teachers with frequent vocal symptoms (Group II). They employed questionnaires to assess the vocal symptoms. Results showed that vocal symptoms were reported by teachers of both groups. The most frequent vocal symptoms were hoarseness (Group I, 15% vs. Group II, 33%), sore throat (21% vs. 29%), difficulty with high sounds (11% vs. 29%), voice fatigue (17% vs. 25%), and vocal projection difficulty (15% vs. 25%).

Simberg et al. (2005) investigated the frequency of occurrence of vocal symptoms among teachers. The result showed that 29% of the teachers reported that vocal symptoms occurred at least once a week or daily. Of these, 9% reported having one symptom in a week or daily while the other 20% reported to have two or more vocal symptoms in a week or daily. While 5% of teachers reported four symptoms or more occurred in a day or in a week. Meanwhile, in a study by Roy et al., (2004), 93.7% teachers reported high number of vocal symptoms i.e., 42.3% with five or more symptoms, 10.8% with four symptoms, 12.1% with three symptoms, 3.3% with two symptoms and 15.1% with one symptom.

1.3.3 Risk factor for vocal symptoms in teachers

There are several factors associated with the development of vocal symptoms among teachers i.e., individual-related and work-related factors (Vilkman, 2000). Individual-related factors include weak voice, poor voicing technique, poor voice habits, talkative personality, vocally loading hobbies, poor life habits, poor general condition and having respiratory disease (Vilkman, 2000). Work-related factors include vocal loading, background noise, poor room acoustic, long speaking distance, air quality, dryness, dust, poor working posture, stress, inadequate equipment and inadequate treatment of early signs (Vilkman, 2000).

However, the specified risk to develop voice disorders among teachers probably due to work-related factors especially high demand in vocal usage within daily working activity (Roy et al., 2004). Additionally, in order to sustain the attention of their students, teachers ought to speak over high background noise levels and naturally they increase their loudness, which causes an increase in the mean of fundamental frequency and hyperfunctional vocal behavior (Bovo, Galceran, Petruccelli, & Hatzopolus, 2007).

In addition, the occurrence of vocal symptoms is twice likely in female teachers as compared to their male peers (Smith et al., 1998; Herrington-Hall, 1988). These differences could be related to biological factors as the lower amount of hyaluronic acid in the lamina propria of female vocal folds (Hammond, Gray, Butler, Zhou, & Hammond, 1998 as cited in Bovo et al., 2007). Additionally, females put higher volitional voice use compared to males and naturally have higher frequency of vocal fold vibration in females (Bovo et al., 2007). According to Vilkman (2000), female elementary school teacher uses about

1,000,000 vocal fold vibrations (fundamental frequency 250Hz), that is double the amount of mucosal collisions used by the males.

Smith et al. (1998) evaluated the risk of vocal symptoms associated with course-work. They found that the risk increased in physical education and elementary education teachers. Teachers who taught Biology and Chemistry also associated with higher risk of having vocal symptoms. However, the number of years teaching a specific course did not significantly influence the risk of reporting vocal symptoms.

1.3.4 Vocal symptoms in teachers compared to non-teachers population

Previously discussed studies provide support that teachers are indeed experiencing higher rate of voice disorders most probably due to high demands on their professional voice usage. Therefore, it is expected that normal teachers in general (i.e., those who have not developed voice disorders) also may experience atypical voice characteristics compared to other people who do not require high demand of voice usage in their job functioning. For the purpose of teaching, teachers often speak loudly for long period and sometimes need to project the voice against noisy classroom without having much time for vocal fold tissues to rest and recover (Roy et al., 2004). Because of that, teachers are significantly more likely to report having specific vocal symptoms and voice-related physical discomfort compared to the individuals employed in other occupations (Smith et al., 1997).

Various studies have provided support to the connotation that teachers are indeed experiencing higher incidence of vocal symptoms compared to the general population. For example, a study as by Smith et al. (1997) that compared self-reported vocal symptoms in

242 teachers and 178 employed adults, as the comparison group, found that teachers were more than twice likely to report experiencing vocal symptoms compared to the comparison group (i.e., 47.5% compared to 21.3%). Similarly, in another study by Smith et al. (1998) also found that teachers showed higher vocal symptoms compared to non-teachers population. The findings from this study showed that teachers had significantly higher average number of physical discomfort symptoms (i.e., scratchy, rough, tiring, effortful, ache and uncomfortable) than the non-teachers group (0.7 vs. 0.2).

A study was conducted by Sala et al. (2001) among 262 care center teachers and 108 nurses specifically to measure the prevalence of voice disorders among day care centre teachers compared to nurses. The study found that the frequency of vocal symptoms among day care center teachers were significantly higher than the nurses for five symptoms (i.e., throat clearing, voice tires easily, hoarseness, voice breaks, difficulty in being heard). In a study to compare the occurrence of voice disorders using vocal symptoms questionnaire among 339 teachers and 207 clerical officers, as the comparison group, indicated that a significant higher proportion of teachers reported experiencing vocal symptoms since beginning work than did clerical officers (47% vs. 16%) (Marks, 1985 as cited in Mattiske et al., 1998).

Apart from experiencing higher occurrence of vocal symptoms in average, previous studies also have reported that several vocal symptoms were found to be more frequently experienced by teachers compared to the non-teachers population. For example, Smith et al., (1997) found that the most common vocal symptom experienced among teachers compared to the non-teachers was hoarseness. The study showed that teachers were more than twice to report hoarseness compared to non-teachers (47.5% vs. 21.3%). The second

most common vocal symptoms among teachers group was difficulty with high note singing (34.6% vs. 16.9%), followed by tired voice (19.5% vs. 9.0%), weak voice (11.6% vs. 4.5%), and effortful voice (10.4% vs. 3.9%). Another study by Smith et al. (1998) found that six vocal symptoms were more reported by the teachers group compared to the non-teachers group. The symptoms were tired voice (18.1% vs. 10.5%), greater difficulty speaking in a lower voice than normal (15.5% vs. 12.3%), a weak voice (10.7% vs. 4.6%), effortful voice (9.8% vs. 3.2%), high speaking voice (5.2% vs. 2.3%) and voice spasm (3.4% vs. 2.3%).

A study by Sala et al. (2001) measured seven vocal symptoms (i.e., throat clearing, voice tires easily, hoarseness, sore throat, voice breaks, difficulty in being heard) and the frequency of occurrence (i.e., one or two symptoms weekly) between day care centre teachers and nurses. The results indicated that the most frequent symptom was throat clearing in both group (40% vs. 28%). The second most often reported symptoms were voice tiredness (31% vs. 11%) and hoarseness (26% vs. 10%) and the third was pain around the larynx (18% vs. 11%).

Roy et al. (2004) found that teachers were significantly more likely than non-teachers to experience effort to talk, difficulty projecting voice, a loss of singing range, trouble singing or speaking softly, discomfort while using voice, voice tires or changes after short use, hoarseness, monotone voice and bitter or acid taste. The study also measured the frequency of occurrence of vocal symptoms among teachers and non-teachers group. Finding from the study showed that teachers experienced a higher number of voice symptoms than non-

teachers i.e., 42.3% of teachers with five or more symptoms compared with 25.8% of non-teachers.

1.4 Rationales of the present study

Teachers are included in a group called professional voice users who need to use voice in their daily job functioning. Therefore, a good quality of voice is compulsory to ensure effective job performance. Ironically, due to the nature of their profession that put higher occupational demand on the voice usage, teachers are at risk in developing vocal symptoms that could lead to voice disorders, if compared to other people who have lesser vocal demand on their job functioning.

Previous studies are not conducted among teachers in Malaysia and based on the literature review, there is no study that investigated this matter among teachers in Malaysia. Therefore, a study on this matter is deemed appropriate to provide initial information regarding the nature of vocal symptoms among teachers in Malaysia. One method to assess the vocal symptoms is to obtain teachers self-perception on the vocal symptoms. Therefore, a purposefully developed questionnaire is used for data collection to obtain information on vocal symptoms among teachers. Additionally, a comparative study design with a comparison group is used to demonstrate that teachers are significantly experiencing more vocal symptoms.

The findings from this study may provide information on the nature of vocal symptoms among teachers in Malaysia. This information may help to facilitate the development of early screening, prevention and intervention programs that have been practiced in several

other countries such as United States of America and Australia. These programs may prevent the development of voice disorders among teachers which in turn will reduce the implication of voice disorders on teachers' job performance, students' academic performance and government's financial.

1.5 Research objectives

This study aims to investigate the characteristics of vocal symptoms among teachers compared to non-teachers. Specifically, the objectives of the present study are to:

1. Compare the overall frequency of vocal symptoms between teachers group and non-teachers group.
2. Compare the frequency of each vocal symptom between teachers group and non-teachers group.

1.6 Research hypothesis

1. There is a significant difference in total vocal symptoms score between teachers group and non-teachers group.
2. Teachers group will show higher total vocal symptoms score compared to the non-teachers group
3. There is a significant difference in each vocal symptom score between teachers group and non-teachers group
4. Each vocal symptom score will be higher in teachers group compared to the non-teachers group.

CHAPTER 2
RESEARCH METHODOLOGY

2.1 Introduction

This is a comparative cross-sectional study that involves teachers and non-teaching staffs in the selected primary and secondary schools in Kota Bharu, Kelantan. The participants were divided into two groups i.e., teachers group and non-teachers group (comparison group). Data collection involved administration of questionnaire to measure the frequency of vocal symptoms experienced by participants in each group. The values of the questionnaires were compared between the teachers group and non-teachers group to investigate whether there were differences between the two groups. The study design for the present study is as presented in Figure 1.

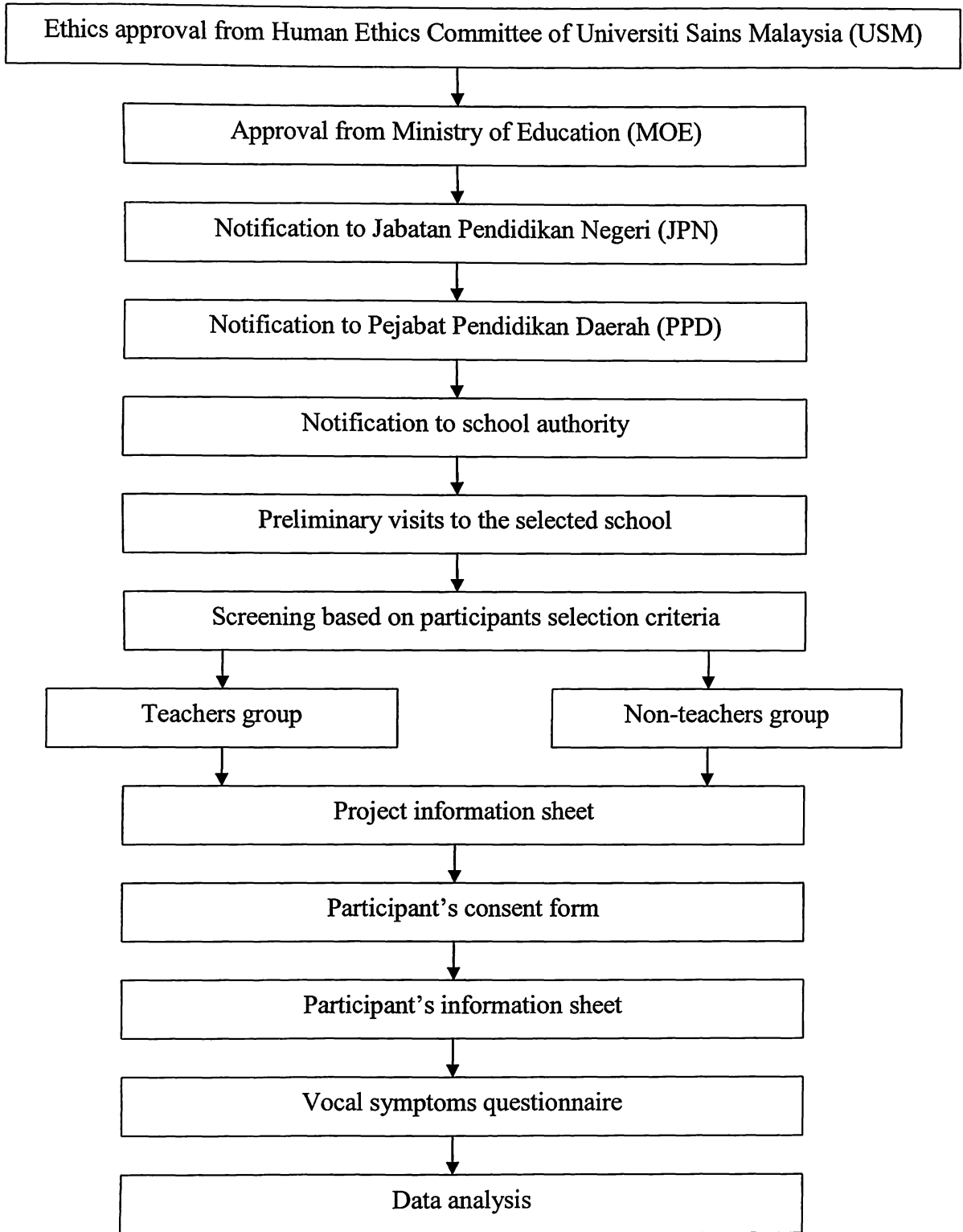


Figure 2.1 Study design