

ORIGINAL ARTICLE

PREVALENCE OF VOICE DISORDER AMONG PRIMARY SCHOOL TEACHERS IN BINTULU, SARAWAK

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ABSTRACT

Teachers face one of the highest demands of any professional group to use their voices at work. Thus, they are at higher risk of developing voice disorder than the general population. The consequences of voice disorder may have impact on teacher's social and professional life as well as their mental, physical and emotional state and their ability to communicate. Objectives of this study are to determine the prevalence of voice disorder and the relationship between voice disorder with associated risk factors such as teaching activities and lifestyle factors among primary school teachers in Bintulu, Sarawak. A cross sectional study was conducted based on random sample of 4 primary schools in Bintulu, Sarawak between January-March 2014. A total of 100 full-time primary school teachers were invited to participate in the study. Data were collected through a self-administered questionnaire addressing the prevalence of voice disorder and potential risk factors. Descriptive analysis and chi-square test was used to measure the relationship between voice disorder and associated risk factors. The response rate for this study was 78% (78/100). The study found that the prevalence of voice disorder among primary school teachers in Bintulu, Sarawak was 13%. Chi-square test results revealed that factors significantly associated with voice disorder ($p < 0.05$) were smoking ($p = 0.012$), consuming alcohol beverages ($p = 0.012$) for lifestyle factors while teaching session ($p = 0.049$) for teaching activities. A low prevalence of voice disorder exists among primary school teachers in Bintulu, Sarawak. Smoking, consuming alcohol beverages and teaching session has proven to be significantly associated causing voice disorder among them.

Keywords: Voice disorder, primary school teachers, teaching activities, lifestyle factors

INTRODUCTION

Teachers face one of the highest demands of any professional group to use their voices at work¹. Thus, they are at higher risk of developing voice disorders (VD) than the general population. According to Herrington-Hallet al.², teachers are ranked in the top 10 occupational groups for frequency attending speech therapy sessions to treat vocal dysfunction and they were found to be at higher risk of developing voice-related symptoms than other occupational groups^{3,4}.

The consequences of a VD in a teacher can be far more serious than a mere acoustic disturbance. It may have impact on the teacher's social and professional life as well as their mental, physical and emotional state and his ability to communicate as well. According to Smithet al.⁵, voice problems negatively affect job performances and about 20% of the teachers have been reported to miss workdays because of voice problems³. VD also leads to a lesser quality of teaching, an increased absenteeism and a major financial burden. As reported by Verdolini and Ramiq⁶, the cost of sick leave and treatment for voice problems among teachers in U.S was about \$2.5 billion annually. In addition, teachers feel limited in their current job performances and in their future job or career options because of their voice problems³. In short, VD can have negative impacts on teacher's job performance, quality of life and increase the economic burden of the society.

One of the difficulties the extent of a problem within the population is the way in which the problem is defined. In the area of voice, it is recognized that VD cannot be defined unequivocally. Some studies have attempted to define a VD in terms of symptomology but clear operational definitions were not provided^{7,8}. In this study, as defined by Aronson⁹ VD is the condition arising when the quality, pitch, loudness or flexibility of one's voice differs from that of others of similar age, sex and culture. This shows that there is no absolute criterion for formal or disordered voice.

According to the etiology of VD is a multidimensional¹⁰. These mean that, there many risk factors clearly play an important role in the development of VD among teachers. Reported by previous study, the risk factors included are teaching a large number of students, teaching special subjects, overwork, stressful environment and lack of teaching materials and equipment^{10,11,12}. Other risks include demographic factors such as gender and socioeconomic status¹³. In extend certain lifestyle factors such as smoking has also been reported to be associated with VD⁴.

Several studies on VD in teachers have been conducted in Western countries and several in Asian countries such as Hong Kong and Singapore, but the relevant data for teachers in Malaysia are limited. Thus, the current study was formulated to address the prevalence of VD

among teachers in Malaysia. The overall goal of this study was to define the prevalence of VD among primary school teachers in Bintulu, Sarawak and reveal the risk factors that contribute to VD.

METHODS

Study design and Study Procedures

A cross sectional study design was conducted among primary schools teachers in Bintulu, Sarawak between January to March 2014. Out of all primary schools in Bintulu, Sarawak, only 4 primary schools was selected upon approval from the school principals. The total size population was 320 samples, 100 samples were selected and 78 had agreed to participate in the study with response rate 78%. Self-constructed questionnaires which addressed the prevalence of VD and potential risk factors were distributed randomly among selected primary school teachers.

Ethical clearance

An approval letters had been sent to Ministry of Education and Sarawak Education Department to obtain approval conducting the study among the teachers. Also, prior to answer the questionnaire, the respondents are required to sign consent form upon their agreement to participate in the study. All collected data were dealt with great confidentiality.

Instrumentation

Questionnaire

A self-constructed questionnaire was developed consisting of the following 6 sections:

Section A: The demographic characteristic which asked about age, gender, and marital status.

Section B: The occurrence of VD in the past 12 months followed by symptoms suffered by the respondents. The occurrence of VD was assessed with the question "Have you suffered from VD in the past 12 months?" (Yes/No). Those who answered "Yes" were considered of having VD. The frequency of suffered from VD was also assessed with the question "How many times you have suffered from VD in the past 12 months?" (None/Once/More than once). Those who

answered "More than once" were considered of having VD frequently. The voice symptoms such as sore throat, coughing, swollen gland, lot of phlegm, blocked nose and throat infections was asked and to be answered "Yes" or "No".

Section C: This section focused on lifestyle factors which asked about smoking behavior, alcohol consumption and caffeinated beverages consumption. For smoking behavior, it was assessed with the question "Do you smoking?" (Yes/No), and "How long have you been smoking?" (None/1 year/More than 1 year). For alcohol consumption, the question was "Do you consume alcohol beverages?" (Yes/No) and "Have you consume alcohol beverages in the past 12 months?" (Yes/No). Finally, for caffeinated beverages consumption, the question was "Do you consumed caffeinated beverages?" (Yes/No).

Section D: This section focused on teaching activities which basically asked about teacher's tasks for example: (a) years of working, (b) duration of teaching per day, (c) number of students taught per class, (d) number of class taught per day, (e) subjects taught, (f) standard level taught, (g) student grade level taught, (h) teaching sessions and (i) teach tuition/extra class.

Section E: In this section, methods on handling VD was assessed by using several questions such as "Do you take medical leaves when suffered from VD?" (Yes/No), "Do you seek for treatment when suffered from VD?" (Yes/No), "What type of treatment do you seek for when suffered from VD?" (No treatment/Doctors/pharmacist prescription/home remedies) and "What kind of self-treatment do you take when suffered from VD?" (No treatment/more fluid intake/shout less/using microphone).

Section F: In this section, level on knowledge and awareness of voice care was assessed by using several questions such as "Have you received any information about VD is one of occupational hazards?" (Yes/No) and "Do you think that information about VD is one of occupational hazard shall be distributed among school teachers?" (Yes/No). For voice care, the questions were "Have you received any information about proper voice care?" (Yes/No) and "Do you think that information about proper voice care shall be distributed among school teachers?" (Yes/No).

Statistical Analysis

Statistical analysis was performed by using software SPSS 22.0 (Statistical Package for Social Science). Descriptive statistical analysis was used to obtain mean, median and standard deviation for all distribution variables included in the study. Since all the data obtained was a categorical data, hence chi-square test was used to determine the association and the level of significance adopted for this study was $p < 0.05$.

RESULTS

This study involved 78 primary schools teachers who had agreed to participate in this study with a response rate of 78%. From the total, 34 (43.6%) or majority of primary schools teachers aged between 40 years old and above and most of them were females which were 66 (84.6%). Among 78 of them, 22 (28.2%) were single, 55 (70.5%) of them were married, and 1 (1.3%) of them divorced as summarizes in Table 1.

Table 1 - Socio-demographic Distribution (N=78)

Socio-Demographic Characteristics		Frequency (n)	Percentage (%)
Age	20-29 years old	19	24.10
	30-39 years old	25	32.10
	40 years old and above	34	43.60
Gender	Male	12	15.40
	Female	66	84.60
Marital status	Single	22	28.20
	Married	55	70.50
	Divorced	1	1.30

Prevalence of Voice Disorder among Primary School Teachers

For the purpose of the study, the researcher considered VD to be anytime the voice does not work, perform of sound as it feel usually does, so that it infers with communication in the past 12 months. From the total respondents, 42 (53.8%) of them had suffered from VD in the past 12 months. In additional, 17 (21.8%) of them suffered from VD for once only in the past 12 months while 26

(33.3%) of them suffered from VD for more than once in the past 12 months. This shows that relationship of VD with primary school teachers was significant, which was 53% in this study as summarizes in Table 2. By calculating the prevalence, the total size of population for 4 primary schools was 320 and from the questionnaire analysis, it was found that 42 (53.8%) of the respondents had suffered from VD in the past 12 months. Hence, the prevalence of VD among primary school teachers in Bintulu, Sarawak is 13%.

Table 2 - Distribution of voice disorder among respondents (N=78)

Voice disorder		Frequency (n)	Percentage (%)
Suffered (past 12 months)	Yes	42	53.80
	No	36	46.20
Frequency	Once	17	21.80
	More than once	26	33.30

Voice Disorder Symptoms Distribution

Out of 78 respondents, 72 (92.3%) of them reported to have sore throat, 69 (88.5%) of them also reported having coughing while 41 (52.6%) of them claimed that they will had swollen gland when suffered from VD. Moreover, 50 (64.1%) of the respondents also complained of having a lot of phlegm while 62 (79.5%) of them stated that they

were having blocked nose and 45 (57.7%) of them claimed that they will also have throat infections when suffered from voice disorder as summarizes in Table 3. Overall, majority of the respondents having sore throat followed by coughing, blocked nose, lot of phlegm, throat infections and swollen gland when suffered from VD.

Table 3 - Distribution of voice disorder symptoms (N=78)

Voice symptoms		Frequency (n)	Percentage (%)
Sore throat	Yes	72	92.30
	No	6	7.70
Coughing	Yes	69	88.50
	No	9	11.50
Swollen gland	Yes	41	52.60
	No	37	47.40
Lot of phlegm	Yes	50	64.10
	No	27	34.60
Blocked nose	Yes	62	79.50
	No	16	20.50
Throat infections	Yes	45	57.70
	No	33	42.30

Association between Lifestyle Factors and Voice Disorder

From the Table 5, smoking has been found to be significantly associated with VD ($p = .012$ which $p < 0.05$) and also consuming alcohol had also found

to be significantly associated with VD ($p = .012$ which $p < 0.05$). Meanwhile, consuming caffeinated beverages has no significantly associated with VD ($p = .929$ which $p > 0.05$).

Table 4 - Association between lifestyle factors and voice disorder

Variables (n = 78)	Voice Disorder		χ^2	p-value
	Yes n(%)	No n(%)		
Smoking				
Yes	1 (50)	1 (50)	.912	.012
No	41 (53.9)	35 (46.1)		
Alcohol				
Yes	5 (55.6)	4 (44.4)	.913	.012
No	37 (53.6)	32 (46.4)		
Caffeinated Beverages				
Yes	26 (50)	26 (50)	.335	.929
No	16 (61.5)	10 (38.5)		

Association between Teaching Activities and Voice Disorder

From Table 5, it was found that only teaching sessions was significantly associated with VD ($p = .049$ which $p < 0.05$) while others variables such as

years of working, duration of teaching per day, number of students taught per class, number of class taught per day, subjects taught, standard level taught, student grade level taught and teach tuition/extra class was not significantly associated with VD ($P > 0.05$).

Table 5: Association between teaching activities and voice disorder

Variables (n = 78)	Voice Disorder		x ²	p-value
	Yes n(%)	No n(%)		
Years of working				
Less than 1 year	7 (63.6)	4 (36.4)	.247	2.800
2-4 years	11 (68.8)	5 (31.3)		
More than 5 years	24 (47.1)	27 (52.9)		
Duration of teaching (per day)				
2-4 hours	16	22	.043	4.110
More than 5 hours	26	14		
No. student taught (per class)				
20-30 students	25 (51.0)	24 (49.0)	.515	.423
More than 40 students	17 (58.6)	12 (41.4)		
No. class taught (per day)				
2-3 classes	27 (49.1)	28 (50.9)	.193	1.697
More than 4 classes	15 (65.20)	8 (34.8)		
Subjects taught				
Language studies	19 (46.3)	22 (53.7)	.335	3.393
Social studies	15 (57.7)	11 (42.3)		
Physical studies	2 (100)	0 (0)		
Others	6 (66.7)	3 (33.3)		
Standard Level				
Lower Primary	24 (51.1)	23 (48.9)	.544	.368
Upper Primary	18 (58.1)	13 (41.9)		
Student's grade level				
Good	13 (61.9)	8 (38.1)	.628	.929
Average	25 (52.1)	23 (47.9)		
Poor	4 (44.4)	5 (55.6)		
Extra class/tuition				
Yes	23 (60.5)	15 (39.5)	.249	1.331
No	19 (47.5)	21 (52.5)		
Teaching sessions				
Morning	15 (55.6)	12 (44.4)	.826	.049
Evening	27 (52.9)	24 (47.10)		

*significant at p-value < 0.05

The association of VD with other risk factors such as age, gender, marital status and hobbies were not statistically significant ($p > 0.05$).

In this study, method on handling VD was also asked among the respondents. Majority of them does not take medical leaves (87.2%). Also, majority of them does not seek for treatment (60.3%). The most preferred type of treatment the teachers seek for was pharmacist prescription (29.5%) followed by doctor/specialist (19.2%) and home remedies (3.8%) while the rest do not seek for treatment. For self-treatment, the teachers

mostly preferred to consume more fluid (70.5%) followed by shout less (2.6%).

Teachers were also inquired about their knowledge and awareness on VD and voice care. It appeared only 16.7% of the teachers who had received information about VD are one of occupational hazard and only 19.2% of teachers who had received information about proper voice care. This stated that there is low level of knowledge and awareness on VD and voice care among primary school teachers. However, 88.5% of them believed that the information about VD shall be distributed

among them and 93.6% of them also believed that the information about proper voice care shall be distributed. The most common method preferred by them to distribute the information was to include in their training (39.7%) followed by brochures (26.9%) and media (21.8%) such as television or radio for VD while same goes with information on proper voice care where the teachers preferred to be distributed in teachers training (33.3%), brochures (32.1%) and media (20.5%) which is television or radio.

DISCUSSION

The “voice is an increasingly important tool at work”. A clear voice is a prerequisite for a success in communication. According to Jones et al.¹⁴, approximately one third of the labor force relies on voice as their primary work tool. In teacher's work, the voice assumes an outstanding importance, influencing their relationship with both of their students and partners. Therefore, teachers have been identified as being specifically at increased risk of developing an occupational VD because of the demands put on their voices^{15,13}.

In this study, as defined by Aronson⁹, VD was defined as “any time the voice does not work, perform, or sound as it normally should, so that it interferes with communication”. Some studies have attempted to define a VD in terms of symptomology but clear operational definitions were not provided^{7,8}. For example, Verdolini and Ramig⁶ defined VD as “a condition of sufficient concern for the bearer to report it, register functional disruption because of it and/or seek treatment because of it”, while Stemple¹⁶ provides three possible definitions, each with its own criteria. One definition describes the speaker's voice differing from the voices of others within their culture, age, range, etc. The second states that a VD may be present when deviant characteristics of voice draw attention to the speaker. The third definition by Stemple¹⁶ describes both physical and functional aspects of voice, suggesting that a VD may be present when there are problems with the structure, the function or both of the laryngeal mechanism. This shows that there is no absolute criterion for formal or disordered voice.

According to Sliwinska-Kowalska and Niebudek-Bogusz¹⁷, VD in teachers has been the subject of several studies due to their high prevalence. However, based on the findings, it was found that the prevalence of VD among primary school teachers in Bintulu, Sarawak was too low. This

figure was relatively small when compared with those reported in the literature. The factors behind this wide variation are multiple. This may be due to variety of methodology used and the total size of population used to conduct the study. As reported by Vilkman¹¹ and Jardim et al.¹⁸, the type of population studied the methodology of the study and the operational definition of voice health problem or disorder can explain this wide variation. In studies where the data was collected through questionnaires similar to the one used in this study, the prevalence ranged from 12%-26%^{3,19,20}. As part of the survey used by Russell et al.²¹, one teacher was asked to report voice problem during careers until the day of the survey and the response rate was 75%. In this study, approximately 53.8% of the respondents reported that they had suffered from VD in the past 12 months and 33.3% reported that they suffered from VD more than once in past 12 months.

Out of 78 respondents, 72 (92.3%) of them reported to have sore throat, 69 (88.5%) of them also reported having coughing while 41 (52.6%) of them claimed that they will have swollen gland when suffered from VD. Moreover, 50 (64.1%) of the respondents also complained of having a lot of phlegm while 62 (79.5%) of them stated that they were having blocked nose and 45 (57.7%) of them claimed that they will also have throat infections when suffered from VD. As reported from several authors, the most common symptoms include tiredness or effort when speaking, throat clearing or persistent coughing, sensation of tightness or weight in the throat, voice breaks, breathlessness, when speaking, aphonic, soreness or burning in the throat, hoarseness.

This study had also revealed that smoking is significantly associated with VD and this was supported by Urrutikoetxea et al.²² where he concluded that smoking was associated with the presence of VD in teachers. As the number of cigarettes smoked by teachers increased, so did the occurrence of vocal pathology²². Other than that, acid reflux, tobacco smoking and alcohol use have also been reported to increase the risk of getting VD²³. However, in the study of Sheng et al.²⁴ showed that smoking, alcohol and caffeine were not found to have any apparent relationship with the frequency of VD which can support this study where taking caffeinated beverages has not significantly associated with VD. This result was consistent with Roy et al.²⁵ school teachers at Iowa and Utah. It may be because teachers were less likely to have used tobacco products and drink alcohol than the general population²⁵.

For teaching activities, years of service as a teacher, hours of teaching and grade level taught have been often regarded as contributing factors to VD²⁶. However, in this study, these factors were not showed to be significantly associated to VD. Based on her surveys, Marks²⁷ reported that more experienced teachers were more likely to have a history of VD. On the other hand, although Sapiret al.¹⁹ did not specifically investigated the causes of vocal symptoms in teachers, they found that years of teaching and hours of teaching did not correlate with the symptoms described. Safarti²⁶ and Unger and Bastian²⁸ suggested that teachers working with specific grade levels or subjects areas can be particularly susceptible to VD.

For age, in this study, it was found out not to be significantly associated with VD which same as reported by Sapiret al.¹⁹. While Sapiret al.¹⁹ found that age did not correlate with vocal symptoms; Smith and Gray³ concluded that the number of vocal symptoms reported increased with age. Next, VD is more commonly reporter among women^{25,4}. In this study, female teachers also reported the most of having VD (54.5%) compare to male teachers (50%) and however, the finding was not significantly associated with VD. Gender differences in the prevalence of VD had also been studied by few researchers and majority of the studies revealed that females were more likely to report VD than male^{27,29,1}. As for marital status, in this study it was found not to be significantly associated with VD however, it has been found to be contributed to voice disorder especially the role of household and family extension of voice use¹⁰.

Method on handling VD was also asked among the respondents. Majority of them does not take medical leaves (87.2%). Also, majority of them does not seek for treatment (60.3%). These findings can be supported with several authors that have reported that teachers do not readily seek treatment despite reporting voice problems^{19,30}. This reluctance to seek professional help suggest that teachers view on VD as an occupational hazard and may not be aware of help available to reduce or eliminate these problems. The most preferred type of treatment the teachers seek for was pharmacist prescription (29.5%) followed by doctor/specialist (19.2%) and home remedies (3.8%) while the rest do not seek for treatment. From the findings, it can be supported with data Sapir et al.¹⁹ and Mark²⁷ suggested that less than 1% of teachers who report VD seek help from a voice specialist. For self-treatment, the teachers mostly preferred to consume more fluid (70.5%) followed by shout less (2.6%).

Some teachers may not aware about VD is one of their occupational hazards and not able to have a proper care²¹. This has been proven in this study where there a very low number of teachers who knows about VD is one of their occupational hazards (83.3%) and not able to have a proper care (80.8%). As proven by Callas⁷, Bohme³¹ and Cooper³², limited knowledge of the principles of voice care and a lack of training in effective use of the speaking voice and voice projection are thought to contribute to VD. Researchers had also found that there is low significant of teachers had received any kind of information regarding on VD³³. This may due to teachers tend to consider dysphonia as an inevitable occupational hazard and probably have little awareness that it may be prevented or at least relieved^{34, 21}.

Small, inadequately selected populations, lack of clear criteria for the presence of VD, reliance on subjective and perceptive data (without the support of instrumental data) and minimal use of comparison groups have limited the extent to which conclusions can be reached from the previous prevalence studies. Future studies investigating the prevalence of VD among teachers need to consider larger samples of randomly select subjects with appropriate operational definitions of vocal dysfunction. In addition, inclusion of more instrumental measurements and use of comparison groups will provide more convincing results to strengthen the argument that VD are a concern among the teaching population.

CONCLUSION

From the findings, it was found that smoking and consuming alcohol beverages in terms of lifestyle factors has significantly associated with VD also only teaching sessions in terms of teaching activities has significantly associated with VD. The most common VD symptoms reported are sore throat followed by coughing, blocked nose, lot of phlegm, throat infections and swollen gland.

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COMPETING INTERESTS

There is no conflict of interest.

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