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**Voice care knowledge, attitude and behavior: Parents' perspective**

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**ABSTRACT**

Childhood dysphonia has received little attention for prevention and treatments. Yet, the prevalence figures and the negative impacts on child's social, psychological and functional aspects indicate the needs for voice care promotion to this population. A cross-sectional survey on voice care knowledge, attitude and behavior towards parents in children in Hong Kong was carried out. 506 parents with children aged 5 to 12 years old were recruited from two primary schools. They were required to complete a questionnaire ascertained their voice care knowledge, attitude and behavior with children between January and March 2009. Results revealed that the voice care level of parents was generally low. Although they have in general positive attitude towards voice care, their voice care practice on children was unsatisfactory. Certain barriers against the implementation of vocal hygiene with children were reported by parents. The lack of understanding of vocal hygiene and the ways of execution of vocal hygiene were reported to be most significant barriers. The findings urged the need for voice care program to parents. Results also give health-care workers to prioritize the focus of a preventive voice care program according to the consumer's needs.

**Key words:** childhood dysphonia; vocal hygiene; perception on voice care

## **INTRODUCTION**

The prevalence rate of childhood dysphonia in school-aged children ranges between 5% and 23% (Carding, Roulstone, Northstone & ALSPAC Study Team, 2006; Powell, Filter & Williams, 1989). Vocal abuse and misuse are the main causes of childhood dysphonia (Gray, Smith & Schneider, 1996; Hirschberg et al., 1995). In Hirschberg et al.'s study, there are more than 41% of childhood dysphonic caseloads originated from vocal misuse and abuse in their voice clinic.

However, childhood dysphonia has been received little attention for prevention and treatments (Andrews, 1986). Unfortunately, childhood dysphonia can lead to significant impacts on the child's quality of life in social, psychological and functional aspects (Connor et al., 2008). In the study by Connor and colleagues, ten children in each age group: toddlers, young children, school-aged children and adolescents were interviewed. Over 75% of school-aged children and adolescents felt that their dysphonic voice restricted their participation in social events. Most young children were annoyed and embarrassed that their voice was always running out of air and they were always asked to speak with a softer voice. In addition to the social and functional impacts on the dysphonic children, more emotional problems such as annoyance, sadness and frustration about the voice were more frequently reported in dysphonic children than normal voice children. Moreover, numbers of studies have shown that dysphonic children were perceived as less favorable in the personality and appearance than normal voice children. Listeners such as peers (Lass, Ruscello, Stout & Hoffman, 1991b), adolescents (Lass, Ruscello, Bradshaw & Blankenship, 1991a) and adults (Ruscello, Lass & Podbesek, 1988) perceived dysphonic children as less intelligent (Lass et al., 1991a), less pleasant (Ruscello et al., 1988), less kind (Lass et al., 1991a) and less clean (Lass et al., 1991a; Lass et al., 1991b).

The high prevalence rate of voice problems in children and the corresponding functional impacts necessitates the provision of preventive voice care programs for this population. Vocal hygiene program has been considered as an effective voice treatment as well as preventive measures not only for adults but also children (Andrews, 1991; Holmberg, Hillman, Hammarberg, Södersten, & Doyle, 2001; Roy et al., 2001). However, prevalence figures indicate the need for preventive programs but they provide very little information on the content and format of the program.

The literature has documented several studies investigating the issues of voice care. However, most studies were limited in investigating the levels of voice care knowledge (Broaddus-Lawrence, Treole, McCabe, Allen & Toppin, 2000; Duffy & Hazlett, 2004; Fletcher, Drinnan & Carding, 2007; Zeine & Waltar, 2002). They overlooked the participants' levels of attitude and behavior towards voice care, and the association among voice care knowledge, attitude and behavior. Since human behavioral pattern is a complex action, according to the theory of planned behavior (Conner & Sparks, 1996), an individual's belief and pre-existing knowledge can influence the his/her behaviors. Therefore, a holistic investigation of the voice care knowledge, attitude and behaviors towards parents in children is warranted to plan for a comprehensive voice care program.

To date, there has been no systematic study that investigates the voice care knowledge, attitude and behavior of parents. All the limited voice care studies only focus on vocally demanding users such as singers (Broaddus-Lawrence et al., 2000), teachers (Duffy et al., 2004) and actors (Zeine et al., 2002). Ascertaining the pre-existing level of voice care knowledge, attitude and behaviors of parents is critical for two reasons. First, parenting is the major channel to formulate children's identities and values, and for knowledge input (Bee & Boyd, 2006). The level of voice care knowledge of parents might determine the quality and quantity of voice care knowledge input for their children.

Unlike adults, children are often unaware of the characteristics of their own vocal behaviors and less capable in identifying the appropriateness of vocal behaviors (Andrew, 1991). Therefore, parents play an important role in monitoring and eliminating their child's vocal misuse and abusive behaviors. They are also crucial in promoting preventive education to children by teaching their child to identify and eliminate the unfavorable vocal behaviors. Second, Rayner (1970) studied the relationship of dental health practice of mothers to their children. It indicated that children's health behaviors and practices were directly influenced and determined by parents' attitude and their practices. Thus, ascertaining parents' voice care attitude and behavior might give inspiration of their children's voice care practice and may help health care workers spotting out children with high risk of possessing childhood dysphonia.

The present study aims to, first, study the existing level of voice care knowledge, attitude and behaviors towards parents in children; second, identify the barriers against implementation of voice care by parents; third, study the correlation among parents' voice care knowledge, attitude and practice. With the understanding of the existing knowledge and attitude among parents, it helps health-care workers to prioritize the focus of a preventive voice care program according to the consumer's needs. For example, it helps planning and refining the topics of the voice care promotion for the pediatric population and to rectify parents' common voice care misconceptions. The investigation also helps understand the attitudes and the related barriers of parents in exercising the voice care practice to their children, which in turn increases support and guidance to parents. Lastly, it guides the development of a comprehensive voice care strategies to smoothen the execution of vocal hygiene of parents.

Since parenting effect is particularly prominent in early and middle childhood development, children aged 5 to 12 years is considered to have the strongest attachment bonding to parents (Bee & Boyd, 2006). Thus parents with children aged 5 to 12 years

old would be the target population. In the present study, voice care knowledge is defined as identification of vocal misuse and abusive behaviors as well as vocally healthy habits; attitude is defined as parents' perceptions in exercising vocal hygiene with their children. Three main areas of attitude were evaluated: first, parents' perception of the importance of vocal hygiene such as the necessity and effectiveness of vocal hygiene to their children; second, their perceived role when exercising vocal hygiene on their children; and third, their willingness in exercising vocal hygiene on their children. Lastly, behavior refers to how parents exercise vocal hygiene on their children in the ways of implementation and the frequency of actual use of vocal hygiene.

## **METHODS**

### **The development of the Voice Care Knowledge, Attitude and Behavior questionnaire (Voice care-KAB)**

Since there was no standardized questionnaire available for ascertaining the voice care knowledge, attitude and behavior among parents, a self-administered questionnaire was designed. All the possible items were selected by reviewing previous voice care literature. All items were consulted by 10 parents and five practicing speech therapists who were specialized in voice over 4 years of experience. These 15 subjects were asked to comment on the coverage, content validity and comprehensibility of the questionnaire. These 10 parents were also asked to list out the barriers they encounter when implementing vocal hygiene with their children.

The refined questionnaire consisted of three sections ascertaining 1). knowledge on voice care and prevention (24 items with discrete response); 2). attitude towards voice care in children (11 items with five-point Likert scale) and 3). behaviors towards voice care in children (5 items with five-point Likert scale and 1 item with multiple-response).

#### **Part 1: Voice care knowledge**

A total of 24 factors were selected for this section. Eight vocal abusive factors and eight healthy vocal habits were chosen with literature supports. Eight neutral factors (e.g. staying overweight) were added to the questionnaire in order to decrease the respondents' random chance of guessing the correct answers. Appendix A lists the voice care factors and corresponding evidence from the literature.

#### **Part 2: Attitude**

A total of 11 statements were selected and all revealed the parents' attitude towards executing vocal hygiene to their children. Each statement accompanied a 5-point



Likert scale (1=strongly disagree, 5=strongly agree) to reveal the parents' attitude strength. Three items (Q4, Q6 & Q11) were negatively worded to eliminate the tendency of respondents choosing answers in one end of the scale (Aday & Cornelius, 2006).

### **Part 3: Behavior**

A total of six statements were selected. Five statements with 5-point Likert scale (1= never, 5=always) were included to investigate parents' behavioral pattern and ways of implementing voice care. One multiple-response item was included to reveal the barriers against the implementation of vocal hygiene by parents.

### **Participants and Procedures**

Participants were recruited through the two local primary schools in Hong Kong. A total of 697 questionnaires were delivered to the designated schools. The questionnaires were brought by children for parents at home. Written consent forms specifying the details of the study and the voluntary nature of the study were given to participants prior to the study. Participants who were unable to comprehend written Chinese were excluded from the study.

The control group was set up to serve the baseline for the comparison of the voice care knowledge and attitude of parents. Voice care professionals were targeted. 35 questionnaires were sent by emails to the practicing speech therapists.

To measure test retest reliability of the questionnaire, 48 randomly selected parents were asked to complete the questionnaire after two weeks of the first distribution.

### **Data analysis and statistical analysis**

Spearman's ranked correlation test was used to study the test-retest reliability. Cronbach's coefficient alpha (Oppenheim, 1996) was used to evaluate the internal consistency of the questionnaire.

*Scoring system for Voice Care-KAB questionnaire.* Each part of the questionnaire consisted of a Section Score. Thus, three session scores were resulted in the following manner:

- A. Part 1-voice care knowledge: 24 statements were included. The correct and incorrect responses were converted into a score +1 and 0 respectively (maximum score: 24). The higher score referred to the better voice care knowledge.
- B. Part 2-voice care attitude: 11 statements were included. 5-point likert scale (e.g. 1 = strongly disagree, 5 = strongly agree) was used to score each item (Maximum score: 55).
- C. Part 3-voice care behavior: 6 statements were included. 5-point likert scale (e.g. 1 = never, 5 = always) was used to score each item (maximum score: 25). Whereas a multiple-response item did not carry mark.

The higher scores reflected the better knowledge or more positive attitude.

Negatively worded items (attitude part: Q4, Q6 & Q11) were scored reversely. Since data were nominal and ordinal, Spearman's rank correlation test was used to study the correlation between voice care knowledge and behavior; attitude and behavior; and knowledge and behavior (SPSS Inc., 2003).

## **RESULTS**

A total of 697 questionnaires delivered and 540 questionnaires were collected. The response rate was 77.5%. Of 540 filled questionnaires, 34 questionnaires were discarded due to missing data. A total of 506 usable questionnaires were analyzed. In the control group, 35 questionnaires were sent and 30 questionnaires were collected and analyzed. The response rate was 85.7%.

The test-retest reliabilities of voice care KAB questionnaire in each part were 0.95, 0.976 and 0.98 respectively ( $p < 0.001$ ). The Cronbach's coefficient alpha of the whole questionnaire was 0.81 which was with an acceptable level (DeVellis, 2003).

### **Participant background characteristics**

In parents' group, all of the subjects (100.0%) were from Hong Kong. 54.2% participants lived in New Territories, 42.8% in Kowloon and 3.0% in Hong Kong Island. 74% of the participants were female and 26% were male. Ages of 31 to 40 and 41 to 50 occupied the majority of the population (54.8% and 37.3% respectively). 58% of the participants had received secondary education and 28% had received the university or above level of education. For the monthly household income, half of the participants were in the range of HKD 10,001 to 30,000 (51.1%). Their children were distributed evenly from ages of 5 to 12. There were 15 participants who had voice problems or exposed to vocal hygiene before. 72.1% parents had considered implementing vocal hygiene with their children. Detailed demographic information of parents was presented in table 1.

Table 1. Frequency distributions of parents according to selected characteristics.

<b>Variables</b>	<b>No.</b>	<b>%</b>
<b>Gender</b>		
Male	128	26.0
Female	364	74.0
<b>Age</b>		
< 20	3	0.6
21 - 30	16	3.3
31 - 40	269	54.8
41 - 50	183	37.3
51 - 60	18	3.7
> 60	2	0.4
<b>District</b>		
New territories	270	54.2
Kowloon	213	42.8
Hong Kong Island	15	3.0
<b>Education</b>		
< Primary	23	4.7
Secondary	286	58.0
High School	38	7.7
University or above	140	28.4
Nil	6	1.2
<b>Monthly Household Income (\$)</b>		
< 5,000	13	2.9
5001 - 10000	112	24.6
10,001 - 20,000	121	26.5
20,001 - 30,000	58	12.7
30,001 - 40,000	60	13.2
40,001 - 50,000	22	4.8
> 50,000	70	15.4
<b>Age of children (years old)</b>		
5 - 6	70	14.1
6 - 7	58	11.7
7 - 8	63	12.7
8 - 9	62	12.5
9 - 10	101	20.3
10 - 11	96	19.3
11 - 12	47	9.5
<b>Having voice problems</b>		
Yes	8	1.6
No	487	97.8
Yes, but recovered	3	0.6
<b>Received vocal hygiene</b>		
Yes	2	0.4
No	496	99.6

Level of parents' voice care knowledge

Table 2 lists the frequency of responses on items of voice care knowledge by parents and clinicians. The parents' level on voice care knowledge was with a mean of 16.8 (95% confidence level, 16.6 to 17.0). The mean score of the control group was 21.8 (95% confidence level, 21.3 to 22.3). Less than 50% of the respondents answered correctly in factor 4 (speaking with a low pitch), 10 (proper posture), 13 (breathing with nose instead of mouth), 15 (throat clearing), 20 (whispering). Few respondents recognized proper posture (17.0%) and breathing with nose instead of mouth (27.7%) help protect voice. Less than one third of respondents identified speaking with a low pitch (32.2%) and whispering (32.8%) could harm voice. 58.7% of respondents misunderstood throat clearing help protect voice whereas only 23.1% of respondents identified that throat clearing could harm voice. Moreover, only two thirds of the respondents knew that staying happy (factor 6) and avoid talking in a noisy place (factor 8) help protect voice.

Table 2. Frequency distribution of parents and clinicians on items of voice care knowledge.

Item	Parents n = 506		Clinician (control) n = 30			
	Positive		Neutral		Negative	
Positive items	Parents	Clinician	Parents	Clinician	Parents	Clinician
3. Drinking plenty of water	<b>480 (94.9%)</b>	<b>29 (96.7%)</b>	24 (4.7%)	0 (0%)	2 (0.4%)	1 (3.3%)
6. Staying happy	<b>341 (67.4%)</b>	<b>26 (86.7%)</b>	160 (31.6%)	4 (13.3%)	5 (1.0%)	0 (0%)
8. Avoiding talking in loud places	<b>343 (67.8%)</b>	<b>27 (90.0%)</b>	51 (10.1%)	0 (0%)	112 (22.1%)	3 (10.0%)
10. Proper sitting posture	<b>86 (17.0%)</b>	<b>20 (66.7%)</b>	410 (81.0%)	10 (33.3%)	10 (2.0%)	0 (0%)
13. Breathing with nose instead of mouth	<b>140 (27.7%)</b>	<b>20 (66.7%)</b>	256 (50.6%)	8 (26.7%)	110 (21.7%)	2 (6.7%)
19. Slowing down speech rate	<b>333 (65.8%)</b>	<b>30 (100%)</b>	168 (33.2%)	0 (0%)	5 (1.0%)	0 (0%)
21. Reducing talking when	<b>476 (94.1%)</b>	<b>30 (100%)</b>	22 (4.3%)	0 (0%)	8 (1.6%)	0 (0%)

laryngitis						
23. Having appropriate pauses in sentences	<b>348 (68.8%)</b>	<b>30 (100%)</b>	149 (29.4%)	0 (0%)	9 (1.8%)	0 (0%)

Item	Positive		Neutral		Negative	
	Parents	Clinician	Parents	Clinician	Parents	Clinician
<b>Neutral items</b>						
2. Overweight	3 (0.6%)	0 (0%)	<b>445 (87.9%)</b>	<b>79 (94.0%)</b>	58 (11.5%)	5 (6.0%)
5. Intake panadol	7 (1.4%)	1 (1.2%)	<b>363 (71.7%)</b>	<b>27 (90.0%)</b>	136 (26.9%)	3 (10.0%)
7. Swimming	155 (30.6%)	6 (20.0)	<b>347 (68.6 %)</b>	<b>24 (80.0%)</b>	4 (0.8%)	3 (3.6%)
11. Underweight	2 (0.4%)	0 (0%)	<b>467 (92.3%)</b>	<b>29 (96.7%)</b>	37 (7.3%)	1 (3.3%)
14. Watching TV	2 (0.4%)	0 (0%)	<b>450 (88.9 %)</b>	<b>30 (100%)</b>	54 (10.7%)	0 (0%)
16. Placing green plants at home	64 (12.6%)	1 (3.3%)	<b>441 (87.2%)</b>	<b>29 (96.7%)</b>	1 (0.2%)	0 (0%)
18. Doing outdoor activities	205 (40.5%)	11 (36.7%)	<b>298 (58.9%)</b>	<b>19 (63.3%)</b>	3 (0.6%)	0(0%)
22. Picky eating	3 (0.6%)	1 (3.3%)	<b>363 (71.7%)</b>	<b>25 (83.3%)</b>	140 (27.7%)	4 (13.3%)
<b>Item</b>	<b>Positive</b>		<b>Neutral</b>		<b>Negative</b>	
<b>Negative items</b>	<b>Parents</b>	<b>Clinician</b>	<b>Parents</b>	<b>Clinician</b>	<b>Parents</b>	<b>Clinician</b>
1. Coughing	8 (1.6%)	0 (0%)	39 (7.7%)	0 (0%)	<b>459 (90.7%)</b>	<b>84 (100%)</b>
4. Speaking with a low pitch	147 (29.1%)	1 (3.3%)	191 (37.7%)	1 (3.3%)	<b>168(33.2%)</b>	<b>28 (93.3%)</b>
9. Crying/ laughing loudly	20 (4.0%)	0 (0%)	45 (8.9%)	1 (3.3%)	<b>441 (87.2%)</b>	<b>29 (96.7%)</b>
12. Eating deep fried food	1 (0.2%)	1 (3.3%)	6 (1.2%)	1 (3.3%)	<b>499 (98.6%)</b>	<b>28 (93.3%)</b>
15. Throat clearing	297 (58.7%)	1 (3.3%)	92 (18.2%)	0 (0%)	<b>117 (23.1%)</b>	<b>29 (96.7%)</b>
17. Screaming	3 (0.6%)	0 (0%)	6 (1.2%)	0 (0%)	<b>497 (98.2%)</b>	<b>30 (100%)</b>
20. Whispering	78 (15.4%)	2 (6.7%)	262 (51.8%)	0 (0%)	<b>166 (32.8%)</b>	<b>28 (93.3%)</b>
24. Prolonged talking	8 (1.6%)	0 (0%)	26 (5.1%)	0 (0%)	<b>472 (93.3%)</b>	<b>30 (100%)</b>

Note: The order of items were rearranged to ease the readability

Level of the voice care attitude towards parents in children

The total mean score of parents was 4.02 (95% confidence level, 3.99 to 4.05) and the mean score of control group was 4.07(95% confidence level, 3.95 to 4.18). The mean of each part of parents was distributed as follow: part 1- the importance of vocal hygiene = 4.03, part 2- their role in voice care = 4.09 and part 3- their willingness towards voice care implementation = 3.90 (please refer to table 3 for details).

Table 3. Means and standard deviation of parents and clinicians on attitudes towards implementation of vocal hygiene.

	Parents (n = 506)		Clinician (n = 30)	
	Mean	SD	Mean	SD
Part 1				
Q1	4.19	0.69	4.43	0.50
Q2	4.22	0.64	4.43	0.50
Q3	4.06	0.69	4.10	0.80
Q4	3.68	0.97	4.13	0.78
Subtotal mean:	Parents = 4.04		Clinician = 4.28	
Part 2				
Q5	4.23	0.62	4.30	0.65
Q6	3.65	0.90	4.03	0.77
Q7	4.18	0.62	4.20	0.55
Q8	4.32	0.65	4.20	0.48
Subtotal mean:	Parents = 4.09		Clinician = 4.18	
Part 3				
Q9	4.37	0.57	4.27	0.79
Q10	4.14	0.57	4.17	0.53
Q11	3.19	0.86	2.47	0.63
Subtotal mean:	Parents = 3.90		Clinician = 3.63	
Total mean scores:		Parents = 4.02		Clinician = 4.07

Likert Scale 1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Level of voice care behavior of parents in children

The total mean score was 2.86 (95% confidence level, 2.80 to 2.92). Two statements were significantly below the mean score which were question 3 (I get used to search the voice care information; mean = 1.96) and question 5 (I get used to bring my child to voice care program; mean = 1.43) (please refer to table 4 for details).

Table 4. Mean, mode, median and standard deviation of parents' voice care behaviors.

n = 506	Mean	SD
Q1	3.21	1.08
Q2	3.71	0.99
Q3	1.96	0.89
Q4	3.97	0.98
Q5	1.43	0.66
Total mean score = 2.86		

Note: 1 = never, 2 = seldom, 3 = sometimes 4 = 5 = always

Voice care barriers of parents

Of 506 parents, 451 responded to the barriers when implementing vocal hygiene. Factor 2 (I do not know how to implement vocal hygiene) and 7 (I do not know what vocal hygiene includes) were predominant with 37.7% and 29.0% respectively (please refer to table 5 for details).

Table 5. Frequency distribution of barriers of parents to implement vocal hygiene.

N = 451	Total number of counts = 785	Percentage of counts
<b>Factors</b>		
1. I do not think vocal hygiene can effectively prevent and treat childhood dysphonia		55 (7.0%)
2. I do not know how to implement vocal hygiene		296 (37.7%)
3. My child is not willing to follow my vocal hygiene instructions		80 (10.2%)
4. I think my child's voice problem(s) can recover spontaneously without treatment		66 (8.4%)
5. I seldom spend time with my child		26 (3.3%)
6. There is lack of support from my family		22 (2.8%)
7. I do not know what vocal hygiene includes		228 (29.0%)
8. Others		12 (1.5%)



### The association of KAB

There was a strong positive relationship between attitude and behavior (Spearman's  $\rho = 0.85$ ,  $p < 0.001$ ). However, the correlation between knowledge and attitude (Spearman's  $\rho = 0.10$ ,  $p = 0.03$ ) and also between knowledge and behavior (Spearman's  $\rho = 0.12$ ,  $p = 0.01$ ) did not reach the significant level.

## **DISCUSSION**

The present study aimed to, first, study the existing levels of voice care knowledge, attitude and behavior of parents with children; second, understand the barriers against implementation of vocal hygiene by parents; and third, study the correlation among voice care knowledge, attitude and behavior.

### Level of voice care knowledge of parents

The level of voice care knowledge of parents was significantly lower than the level of the clinicians (with the mean score 16.8 & 21.38 respectively). It was noted that parents were in general weak in identifying both vocally healthy factors as well as abusive factors. Eight common vocally healthy factors were chosen in this study. However, less than two thirds of the parents answered correctly in six vocally healthy factors (for example, staying happy, avoiding talking in noisy places, maintaining proper sitting posture, breathing with nose instead of mouth, slowing down speech rate and having appropriate pauses in sentences). In particular, only a few parents realized that maintaining a proper sitting posture (17.0%) and breathing with nose instead of mouth (27.7%) can help protect voice. At the same time, parents also showed limited knowledge for vocal abusive and misuse behaviors. Results indicated that they could only identify part of the abusive behaviors such as coughing, shouting, screaming, crying and laughing loudly and prolonged talking. However, less than a third of parents

recognized that throat clearing, whispering and speaking with a low pitch can also harm voice. An interesting finding showed that half of the parents mistook throat clearing help protect voice. The incapacity of the identification of vocally healthy and abusive behaviors could be resulted from the lack of rationales of each voice care item for parents.

The low level of voice care knowledge level was in line with the findings of Zeine et al's (2002) study. The voice care level of actors were compared to the vocally untrained control group. Results indicated that the voice care knowledge of actors was not significantly higher than the control group. It suggested that the actors and control group demonstrate the inadequate knowledge of the voice use and voice care.

The common voice care misconceptions of parents were also similar to Fletcher et al's (2007) study. They compared the voice care knowledge levels of vocally healthy group and dysphonic group with the voice specialists. Result indicated that whispering and throat clearing had the least agreement among three groups. The specialists rated whispering and throat clearing cause negative effect on voice. Yet, vocally healthy group and dysphonic group disagreed with it. Dysphonic group also mistook throat clearing as having a positive effect on voice.

The inadequate voice care knowledge of parents in identifying vocally healthy and abusive behaviors, and the voice care misconceptions necessitate the introduction of voice care knowledge to this population.

#### Level of voice care attitude towards parents

In general, parents showed a positive voice care attitude to their children. Over 70% of the parents had considered implementing vocal hygiene to their children. It was noted that parents' voice care attitude was even as good as the voice care attitude of voice care professionals (mean score of parents and clinicians: 4.02 & 4.07 respectively).

In general, parents had a positive attitude in all the three sub-parts of attitude evaluated in the questionnaire: the importance of vocal hygiene; their voice care role; and their willingness in exercising vocal hygiene to their children. In particular, parents commonly believed that voice care is important for children and it can prevent and protect their child's voice. They also agreed that they had the responsibilities to protect and prevent their child from voice disorders and they were willing to implement vocal hygiene.

However, an interesting finding was evident in question 11 (It is difficult for me/parents to implement vocal hygiene). Parents scored significantly more positive than the clinicians expected (mean score: 3.19 & 2.47 respectively). This interesting finding gave the insight that parents might overestimate the difficulties in implementation of vocal hygiene. Some voice care myths were found in parents (evident in Q4- Only dysphonic children need to learn how to protect their voice & Q6- It is not necessary to teach my child how to protect his/her voice if he/she does not have voice problem). Parents did not seem to agree the fact that children with normal voice need voice care. It revealed that they knew little about the purposes of vocal hygiene. For example, they did not know that vocal hygiene can also serve as preventive measures of childhood dysphonia (Andrew, 1991).

#### Level of voice care behavior of parents in children

Generally, parents executed vocal hygiene to their children infrequently (with the mean score 2.86). It was noted that parents had limited ways to implement vocal hygiene to their children. Their ways of implementation was mainly by telling their children how to care their voice and stopping their children from doing vocal abusive behaviors. However, the significantly low score of Q3 (I search for voice care information, with mean score 1.96) and Q5 (I bring my child to the voice care program, with the mean score 1.43) indicated that parents rarely enriched their voice care

knowledge and strategies by searching voice care information and by participating voice care programs.

The passive voice care information seeking behaviors may account for parents' low level of voice care knowledge. Moreover, when compared parents' voice care attitude to behavior, it was noted that there was a gap between parents' infrequent voice care behavior and their positive voice care attitude. It suggested that barriers may hinder parents from implementing voice care to their children (details of parents' voice care barriers would be discussed in the latter session).

Since this study lacked an in-depth investigation of the exact voice care execution behaviors of parents, for example, different ways of parents executing vocal hygiene to children and the actual ways of parents responding to their child's vocal abusive behaviors, a more refined questionnaire evaluating parents' voice care behaviors should be developed.

#### Voice care barriers of parents

Factor 2 (I do not know how to implement vocal hygiene) and factor 7 (I do not know what vocal hygiene usually includes) occupied nearly 70% of the total counts. Results revealed that the lack of understandings of the details of vocal hygiene (the principles and ways of execution) constituted the most significant barrier from parents to execute vocal hygiene. Other voice care barriers were noted in parents. Several parents were in lack of voice care strategies and in turn they encountered difficulties in asking their child to follow their instructions of vocal hygiene. A certain numbers of parents refused to implement vocal hygiene as they mistook childhood dysphonia can be recovered spontaneously without treatment. The lack of understanding of vocal hygiene and voice care strategies of parents to some extent, were similar to the results of Yiu's (2002) study. In his study, 122 teachers were surveyed to list the difficulties in caring

their voice. Results indicated that most of the teachers could only use limited and unspecific voice care strategies. They also lacked underlying rationales for choosing appropriate strategies to care their voice.

It was believed that the lack of understanding of the appropriate ways and strategies of the implementation of vocal hygiene, and the numbers of voice care misconceptions hinder parents' voice care behavior. Therefore, introduction of voice care strategies and appropriate ways to implement vocal hygiene should be included to eliminate the barriers encountered by parents.

#### Association between voice care knowledge, attitude and behavior

The significant correlation between parents' voice care attitude and their behavior (Spearman's  $\rho = 0.83$ ,  $p = 0.01$ ) helps adjust the focus of voice care program. It is recommended to put the emphasis on improving parents' voice care attitude as this may help improve parents' voice care behaviors on their children. Attitudes can be improved by stressing on the importance, effectiveness and necessities of vocal hygiene and explaining parents' role in implementing vocal hygiene. Although there was no significant correlation between voice care knowledge and behaviors or between voice care knowledge and attitude, introduction of voice care knowledge is still needed. Since the inadequate voice care knowledge and limited ways to execute vocal hygiene may hinder parents from implementing voice care practices with their children, the introduction of voice care knowledge and execution strategies will smoothen the execution of vocal hygiene, and to maximize the effectiveness of vocal hygiene by appropriately spotting and eliminating vocal abusive behaviors, and promoting vocal healthy behaviors.

### Limitations

In the present study, all the participants were recruited by two local schools, thus, data might be biased due to geographical factors (Aday & Cornelius, 2006). In light of this potential bias, recruitment of participants scattering from different districts in Hong Kong will be recommended. In addition, this study only investigated the voice care KAB of parents, its correlation and voice care barriers with children between 5-12 years old. It lacked the generalization ability to parents with children of different ages (e.g. adolescents and preschool children). Thus, further studies will be suggested to explore the level of voice care KAB of parents with children of different age groups for investigating the external validity of this study.

### Clinical implications

The present study investigated the levels of voice care knowledge, attitude and behaviors of parents. Results clearly indicated that parents demonstrated inadequate voice care knowledge and unsatisfactory voice care behavior. Results also revealed that parents were limited in using specific ways and voice cares strategies for implementation of vocal hygiene. all the above findings necessitate the promotion of voice care program to parents. The content of voice care program can consist of the principles of vocal hygiene and the introduction of vocally healthy behaviors, vocal abusive behaviors as well as the common voice care misconceptions. It is believed this can facilitate parents to identify their children's behavior and to eliminate their voice care misconceptions and myths. Additionally, the introduction of appropriate ways and demonstrations for parents to execute vocal hygiene should be emphasized to assist parents cooperate learnt theories to daily life situations. Lastly, strategies for execution of vocal hygiene (e.g. how to improve the compliance of parent's child to follow their instructions) can be stressed to ease parents' administration of vocal hygiene.

## **CONCLUSION**

This study developed a validated voice care knowledge, attitude and behavior (KAB) questionnaire in Chinese version. It was also the first study to investigate the voice care KAB of parents in Chinese population. It documented parents' existing levels of voice care knowledge, voice care attitudes and behaviors in children which provided the baselines for health care workers to prioritize the content and format of voice care program in future. Moreover, this study explored the most common barriers (e.g. the lack of understanding of the purpose and details of vocal hygiene, and various ways of execution of vocal hygiene) encountered by parents for the execution of vocal hygiene. This information helped the voice care workers to refine the focus of the programs and tailor some specific voice care strategies to overcome the difficulties encountered by parents.

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## Appendix A: Voice care factors, their assumptions and evidence support.

<b>Voice care factors</b>	<b>Effects on voice</b>	<b>Evidence from literature</b>
<b>1. Coughing</b>	Negative	Severe coughing leads to excessive collision of vocal folds which results in damages to the epithelium of the vocal folds (Hanson & Jiang, 2000).
<b>2. Being overweight</b>	Neutral	There was no evidence showing overweight carries effects on one's voice.
<b>3. Drinking plenty of water</b>	Positive	Water can moisturize the vocal folds and reduce the chances of increased stiffness and viscosity of vocal folds due to dehydration (Chan & Tayama, 2002; Solomon & DiMattia, 2000).
<b>4. Speaking with a low pitch</b>	Negative	Speaking with inappropriate voice leads to inappropriate movement of laryngeal muscles which increase the vocal efforts (Greene & Mathieson, 2001). And it is not recommended in voice care.
<b>5. Intake of Panadol</b>	Neutral	There was no evidence showing Panadol carries effects on one's voice.
<b>6. Staying happy</b>	Positive	Roy and Bless (2000) reported that emotional maladjustment and its behavioral consequences can cause functional dysphonia and vocal nodules. Therefore, stable emotion is recommended for in vocal hygiene treatment.
<b>7. Swimming</b>	Neutral	There was no evidence showing swimming carries effects on one's voice.
<b>8. Avoiding talking in noisy places</b>	Positive	Ternstrom, Soderten and Bohman (2002) showed that participants tended to speak with loudly in noisy environment. The high intensity talking leads to vocal fatigue (Yiu & Chan, 2003). It is recommended not to speak loudly in noisy environment.
<b>9. Crying/ laughing loudly</b>	Negative	Yiu and Chan (2003) found that high-intensity or prolonged talking leads to vocal fatigue.

<b>10. Having good sitting posture</b>	Positive	Proper posture yields better phonation and projection of voice. (Tham, Gildersleve, Sanders, Mapleson & Vaughan, 1992; Vintturi et al., 2001). Thus, having good posture is recommended for voice care.
<b>11. Underweight</b>	Neutral	There was no evidence showing underweight carries effects on one's voice.
<b>12. Eating deep fried food</b>	Negative	Kereiakes (1996) stated that deep fried food and oily food cause irritation of vocal folds. It is recommended to avoid eating deep fried foods for voice care.
<b>13. Breathing with nose instead of mouth</b>	Positive	Oral breathing dehydrates the airway and vocal folds which increases vocal effort whereas nasal breathing humidifies the inspired air and reduces chances of drying vocal folds mucosa (Sicasankar & Fisher, 2002).
<b>14. Watching TV</b>	Neutral	There was no evidence showing watching TV carries effects on one's voice.
<b>15. Throat clearing</b>	Negative	Throat clearing disturbs the epithelium of vocal folds and posterior glottic wall. Excessive throat clearing can cause mechanical trauma to vocal folds (Hanson & Jiang, 2000).
<b>16. Placing green plants at home</b>	Neutral	There was no generally accepted assumption.
<b>17. Screaming</b>	Negative	Hanson and Jiang (2000) reported screaming increases collision forces and tension in the vocal folds due to hyperadduction. This led to laryngeal edema and damage to the epithelium of the vocal folds.
<b>18. Doing outdoor activities</b>	Neutral	There was no evidence showing doing outdoor activities directly benefit to one's voice.
<b>19. Slowing down speech rate</b>	Positive	Yiu and Chan (2003) reported that slowing down speech rate helps preserve vocal function and reduce chances of vocal fatigue.
<b>20. Whispering</b>	Negative	Rubin, Praneetvatakul, Gherson, Moyer and Sataloff (2006) reported that whispering

		constricts and suppresses the larynx which causes more disturbing to vocal folds than normal speech.
<b>21. Reducing talking when laryngitis</b>	Positive	Boone and McFarlane (1988) stated that talking involves the collision of vocal folds which cause more damages to the swelling tissues of vocal folds.
<b>22. Picky eating</b>	Neutral	There was no generally accepted assumption.
<b>23. Having appropriate pauses in sentences</b>	Positive	Yiu and Chan (2003) reported that vocal rest help conserve voice function and quality, and prevent vocal fatigue.
<b>24. Prolonged talking</b>	Negative	Scherer et al. (1991) reported that during 60 minutes of loud talking, the quality, loudness and pitch of voice of participants were significantly affected.

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## Appendix B: The voice care KAB questionnaire.

**同意書**  
**護理學童聲線的研究**

這是一項關於護理學童聲線的學術研究，旨在探討家長對聲線護理的認識、聲線護理的想法及有關護理學童聲線的行動。

你需要完成一份有關聲帶護理的問卷，需時約十分鐘。在完成問卷的過程中，部分問題可能涉及閣下的價值取向。是次研究並不為閣下提供個人利益，但所搜集的數據研究將有助了解家長對聲帶護理的認識，態度及實行情況。數據研究為日後與家長推廣有關聲帶護理的活動提供了寶貴的資料。此參與純屬自願性質，所收集的資料只作研究用途，個人資料將絕對保密。如你對是項研究有任何問題，請隨即提出。

如日後你對是項研究有任何查詢，請與研究員巫麗雅聯絡 9720 2922。如你想知道更多有關研究參與者的權益，請聯絡香港大學非臨床研究操守委員會 (2241-5267)。

如你明白以上內容，並願意參與是項研究，請在下方簽署。

家長姓名： \_\_\_\_\_

學童姓名： \_\_\_\_\_

班別： \_\_\_\_\_

學號： \_\_\_\_\_

香港大學  
言語及聽覺科學部  
學童聲線護理問卷調查

你有沒有考慮要護理子女的聲線？

有                      沒有（原因：\_\_\_\_\_）

**第一部份：聲線護理的認識**

以下有二十四項因素，它們可能是 1. 有助保護聲線的、2. 與保護聲線沒有直接關係的 或 3. 會損害聲線的。請你表達你對每一項因素的看法，並在適當的空格劃上“√”。

因素	與保護聲線		
	有助保護聲線	沒有直接關係	會損害聲線
1. 咳嗽	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 身體過重	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. 多飲水	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. 用低沉的音調說話	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. 吃止痛藥	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. 保持心境開朗	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. 游泳	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. 避免在嘈雜的地方交談	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. 大哭／大笑	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. 坐姿正確	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. 體重過輕	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. 吃煎炸食物	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. 以鼻代口呼吸	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. 長時間看電視	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. 清喉嚨	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



因素	與保護聲線		
	有助保護聲線	沒有直接關係	會損害聲線
16. 在家中擺放綠色植物	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. 尖叫	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. 多做戶外運動	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. 減慢說話速度	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. 以氣音不出聲說話	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
21. 喉嚨痛時減少說話	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. 偏食	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. 說話時，在句與句之間 有適當的停頓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. 長時間說話	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 第二部份：護理子女聲線的看法及意見

以下題目是有關你對護理子女聲線的看法及意見，請圈出你認為適當的數字（“1”代表“非常不同意”、“5”代表“非常同意”）。

#### 聲線護理的重要性

我認為：	非常 不同意	不同意	中立	同意	非常 同意
1. 學童聲線護理是十分重要的。	1	2	3	4	5
2. 聲線護理能有效保護孩子的聲線。	1	2	3	4	5
3. 聲線護理能有效治療孩子的聲線問題。	1	2	3	4	5
4. 只有患有聲線問題的孩子才需要學習怎樣護理聲線。	1	2	3	4	5

## 家長在護理子女聲線所扮演的角色

作為家長，我認為：	非常 不同意	不同意	中立	同意	非常 同意
5. 如發現子女有聲線問題，必須立刻尋求治療。	1	2	3	4	5
6. 倘若子女沒有聲線問題，便無須教導他們怎樣護理聲線。	1	2	3	4	5
7. 我有責任去預防我的子女患上聲線問題。	1	2	3	4	5
8. 倘若我的子女患上聲線問題，我有責任去改善他／她的聲線問題。	1	2	3	4	5

## 實行聲線護理的自願性

作為家長：	非常 不同意	不同意	中立	同意	非常 同意
9. 我不贊成子女做出損害聲線的行為。	1	2	3	4	5
10. 我希望幫助我的子女認識更多有關聲線護理的知識。	1	2	3	4	5
11. 我認為護理子女聲線是十分困難的。	1	2	3	4	5

## 第三部份：護理子女聲線的實行

以下的題目是有關你對子女實行聲線護理的情況，請圈上數目字。

（“1”代表“從不”、“5”代表“經常”）

	從不	很少	間中	有時	經常
1. 我有告訴我的子女怎樣去護理聲線。	1	2	3	4	5
2. 我不讓我的子女做損害聲線的行為。	1	2	3	4	5
3. 我有搜集聲線護理的資料。	1	2	3	4	5
4. 當我看見我的子女做損害聲線的行為時，我會指出並阻止他／她。	1	2	3	4	5
5. 我有攜帶我的子女參加聲線護理的講座。	1	2	3	4	5

以下哪些因素有礙你教導子女怎樣護理聲線，請在適當的空格內劃上“✓”

(可選多過一項答案)。

- |  |  |
|--|--|
| <input type="checkbox"/> <sub>1</sub> 我不認為聲線護理能有效地預防或治療子女的聲線問題 | <input type="checkbox"/> <sub>2</sub> 我不懂得用什麼方法教導我的子女護理聲線            |
| <input type="checkbox"/> <sub>3</sub> 我的子女不願意服從我給他們的聲線護理的指示    | <input type="checkbox"/> <sub>4</sub> 我認為聲線問題能自行康復，因此沒有必要教導我的子女去護理聲線 |
| <input type="checkbox"/> <sub>5</sub> 我與子女見面的時間很少              | <input type="checkbox"/> <sub>6</sub> 其他家庭成員支持不足／家人反對                |
| <input type="checkbox"/> <sub>7</sub> 我不清楚什麼是聲線護理              |  |
| <input type="checkbox"/> <sub>8</sub> 其他(請列明)：_____            |  |

請回答以下有關你個人資料的問題。你的個人資料會作保密，只作於學術研究上。

1. 性別：<sub>1</sub> 男            <sub>2</sub> 女
2. 年齡：
 

<input type="checkbox"/> <sub>1</sub> 20歲以下	<input type="checkbox"/> <sub>2</sub> 21-30歲	<input type="checkbox"/> <sub>3</sub> 31-40歲	<input type="checkbox"/> <sub>4</sub> 41-50歲
<input type="checkbox"/> <sub>5</sub> 51-60歲	<input type="checkbox"/> <sub>6</sub> 61歲或以上		
3. 居住地區：\_\_\_\_\_區
4. 職業：\_\_\_\_\_
5. 你的教育程度：
 

<input type="checkbox"/> <sub>1</sub> 小學或以下	<input type="checkbox"/> <sub>2</sub> 中學	<input type="checkbox"/> <sub>3</sub> 預科	<input type="checkbox"/> <sub>4</sub> 大專、大學或以上	<input type="checkbox"/> <sub>5</sub> 不適用
---	--	--	--	---
6. 家庭總收入(每月)：
 

<input type="checkbox"/> <sub>1</sub> \$5,000 或以下	<input type="checkbox"/> <sub>2</sub> \$5,001-10,000	<input type="checkbox"/> <sub>3</sub> \$10,001-20,000	<input type="checkbox"/> <sub>4</sub> \$20,001-30,000
<input type="checkbox"/> <sub>5</sub> \$30,001-40,000	<input type="checkbox"/> <sub>6</sub> \$40,001-50,000	<input type="checkbox"/> <sub>7</sub> \$50,000 或以上	
7. 聯絡電話：\_\_\_\_\_
8. 你與學童的關係：\_\_\_\_\_
9. 學童姓名／性別：\_\_\_\_\_ <sub>1</sub> 男            <sub>2</sub> 女
10. 學童年齡：\_\_\_\_\_
11. 你現時有沒有聲線問題？ <sub>1</sub> 有            <sub>2</sub> 沒有            <sub>3</sub> 曾經有，但已康復
12. 你有沒有接受過關於聲線護理的治療？ <sub>1</sub> 有            <sub>2</sub> 沒有
13. 你的子女現時有沒有聲線問題？ <sub>1</sub> 有            <sub>2</sub> 沒有            <sub>3</sub> 曾經有，但已康復
14. 你的子女有沒有接受過關於聲線護理的治療？ <sub>1</sub> 有            <sub>2</sub> 沒有

問卷已完成，多謝你寶貴的時間。