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Parental knowledge, attitudes, and practices about vocal hygiene for their children in Chengdu, a city from China

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Abstract

This study aimed to investigate the knowledge, attitudes, and practices of parents towards vocal hygiene for their children and explore the barriers against implementation of vocal hygiene in Chengdu, a city from mainland China.

An online questionnaire on knowledge, attitudes, and practice was available for parents to complete between March 1 and March 31, 2017. The questionnaire included 5 sections, general demographics; knowledge; attitudes; practices and barriers; and expectation. Scores were calculated for each category of knowledge, attitudes, and practices; and were compared using nonparametric Mann–Whitney *U* tests between the parents with and without a history of voice disorders. The internal consistency was assessed by Cronbach alpha coefficient. The correlations between vocal hygiene knowledge, attitude, and practice were analyzed using Spearman correlation test.

The questionnaire was completed by 1075 parents. There were certain misconceptions in vocal hygiene knowledge among parents, and the parents had higher level knowledge of positive factors than negative factors about vocal hygiene. Attitudes towards vocal hygiene were positive. Practices of vocal hygiene were poor. The most common barriers to implementation of vocal hygiene practices were related to lack of awareness and knowledge for this topic.

The level of parental vocal hygiene knowledge, practice, and barriers suggest that carry out vocal hygiene programs extremely urgent for school-aged children and their parents.

Abbreviation: SD = standard deviation.

Keywords: attitudes, dysphonia, knowledge, practices, vocal hygiene

1. Introduction

The prevalence of pediatric voice disorders is increasing, with research indicating occurrence that range from 6% to 31%.[1–3] Voice disorders may negatively impact on children's general health, their communication effectiveness, social and educational development, and voice-related quality of life.[4–6] Therefore, it is important to prevent the occurrence of voice disorders in children. Previous studies have found that good knowledge is useful for decreasing the prevalence of voice disorders in adults.[7–9] However, little attention has been paid to prevention of voice disorders in the pediatric population. Unlike adults, most young children may not be able to self-monitor and regulate appropriate vocal behaviors. Parents play an important role in educating and facilitating vocal hygiene practices for their children. Therefore, it would be important to, ascertain the knowledge, attitudes, and practices of parents regarding vocal hygiene.

There are many questionnaires designed to measure parents' knowledge, attitudes, and practices for a variety of conditions in children, including asthma,[10] early childhood feeding,[11] acute otitis media,[12] and oral health in children.[13] Only 1 study, by Mo and colleagues, has assessed the level of awareness of vocal hygiene among parents of children.[14] This study was conducted in Hong Kong, where traditional Chinese is used for literacy and Cantonese Chinese is commonly used for daily communication. This study found that the level of vocal hygiene knowledge was low, the attitudes towards vocal hygiene in children were positive and the practices were occasionally.[14] To date, there has been no research regarding parents' knowledge, attitudes, and practices on vocal hygiene in mainland China. The present study aims to replicate this study in mainland China, where socioeconomic and cultural differences are likely to create differences in health awareness and practices.[15,16] Therefore, the present study aimed to, first, investigate the knowledge, attitudes, and practices of parents in vocal hygiene; second, explore the barriers against implementation of vocal hygiene; and third, investigate the correlation among parental vocal hygiene knowledge, attitude, and practice.

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2. Methods

2.1. Design and ethical approval

This was a cross-sectional study. Data was collected via an online survey website (https://www.wjx.cn/). All parents who had children aged 2 to 14 years old were able to participate. The study was approved by the institutional review board of Sichuan University (approval number: 201789) and all participants signed the electronic version of the consent form. In this study, we used a questionnaire to assess the parental knowledge, attitudes, and practices regarding vocal hygiene of their children in Chengdu, China. The questionnaire was based on the 1 devised by Mo et al in their Hong Kong-based study in traditional Chinese.[14] It was modified to a simplified Chinese version, which is used predominantly for written materials in Mainland China. The final version consisted 5 sections comprising of 63 items (see Supplemental Digital Content, http://links.lww.com/MD/C930): Section I (General demographics): This section documented parents' gender, age, occupation, highest education level achieved, and income level; their children's gender and age; and both their parents' and children's self-reported history of voice disorders and voice therapy (13 items).

Section II (Knowledge): Parents were asked whether they have considered teaching with their children about vocal hygiene knowledge (1 item), followed by their opinion on the impacts of a range of factors on vocal health (24 items). Parents could choose from 1 of 3 options: "Positive", "Negative", or "Don't know/Not sure" as their response to indicate their impression of the factors effects on vocal health. The factors presented consisted of equal numbers in the categories of "Positive", "Negative", and "Neutral" for their impacts on voice. Each correct answer scored 1 mark, and each incorrect answer had no mark. The possible maximum score for the knowledge section was 24. A higher score indicates better vocal hygiene knowledge.

Section III (Attitudes): Parents were asked what age range and education level was appropriate for the implementation of vocal hygiene in children (1 item). Parents were then asked for their agreement on statements about vocal hygiene for children (10 items), the answers were scored on a 5-point Likert scale with 1 = "Strongly disagree", 2 = "Disagree",3 = "Neutral",4 = "Agree", and 5 = "Strongly agree".

Lastly, parents were asked to rate their perceived importance of 6 items related to the importance of speech and communication abilities in children; the answers were scored on a 5 point Likert scale with 1 = "Strongly unimportant", 2 = "Unimportant", 3 = "Neutral", 4 = "Important", and 5 = "Strongly important". The possible maximum score for the attitude section was 50. A higher score indicates more positive attitude towards vocal hygiene.

Section IV (Practices and Barriers): Parents were asked to rate their frequency of various vocal hygiene practices (5 items) on a 5-point Likert rating scale with 1 = "Never", 2 = "Seldom", 3 = "Occasionally", 4 = "Sometimes", and 5 = "Often". The possible maximum score for the practice section was 25. A higher score suggests more engaged in vocal hygiene practice. They were also asked to choose from a range of barriers that they thought could hinder the implementation of vocal hygiene in their children which applied to them, with the option of writing down their own open responses (1 item, multiple selections allowed).

Section V (Expectation): Parents were asked whether they would be interested in attending vocal hygiene seminars (1 item, multiple selections allowed) and what information they would expect from the seminars (1 item, multiple selections allowed).

2.2. Participants

A total of 1294 parents with children aged between 2 to 14 years participated in the study. All participants were residents from Chengdu, a large metropolitan city in China. The participants were divided into 2 groups: parents with a history of voice disorders and parents without a history of voice disorders according to self-reported. The electronic questionnaire was available from the 1 to March 31, 2017.

2.3. Analysis of data

Data were analyzed using SPSS software version 22.0 (SPSS Inc., Chicago, IL). Questions that required responses on a Likert scale were recorded as a mean score with a standard deviation (SD); while questions that required the selection of provided options were recorded as frequencies and percentages of all participants who chose the options. The scores for the categories of knowledge, attitudes, and practices were compared using nonparametric Mann–Whitney *U* tests between the parents with and without voice disorder history. The internal consistency was assessed by Cronbach alpha coefficient. The correlations between vocal hygiene knowledge, attitude and practice were analyzed using Spearman correlation test. A $P < .05$ was considered statistically significant.

3. Results

3.1. Participant characteristics

In total, 1294 questionnaires were collected, of which 1075 (83.1%) questionnaires were completed validly for analyses. Table 1 shows the parents' demographic information and history of self-reported voice disorders. The majority of the participants were mothers (82.6%) in the age group of 31 to 40 years (67.2%) who lived in metropolitan city areas (79.5%). More than half of the parents (56.6%) completed undergraduate or above level of education. Four hundred sixty-two participants reported a history of voice disorders, of whom 89 (8.3%) received voice therapy. All 630 (57%) parents in the group without a history of self-reported voice disorders reported that they were satisfied with their own voice.

The vast majority of parents had only 1 child (n = 1058, 98.4%). Of their children, 53.4% (574/1092) were male, and 46.6% (501/1092) were female; their average age was 7.4 years (SD = 3.2), with 13.2% (142/1092) under 6 years of age, and 10.5% (113/1092) under 4 years of age. Almost half (509/1092, 46.6%) of the children had a current or past parent-reported voice disorder. However, only 4.95% (49/1092) received voice therapy.

3.2. Reliability

The sections had good internal consistency (Cronbach's alpha) ranging from 0.61 to 0.85 (attitudes for vocal hygiene = 0.61; attitudes for speech and communication ability = 0.85; practices = 0.78).

3.3. Parents' level of vocal hygiene knowledge

Results from section II of the questionnaire are presented in Table 2. This section assessed the level of vocal hygiene knowledge of parents. All items were identified correctly with

Table 1

Demographic characteristics and history of voice disorders in the parents (n = 1075).

Variables	Numbers of participants	Percentage, %
Parental status		
Father	187	17.4
Mother	888	82.6
Age group		
≤20	4	0.4
21–30	107	10.0
31–40	722	67.2
41–50	233	21.7
51–60	9	0.8
Education		
Junior high school	66	6.1
High school	100	9.3
Vocational school	14	1.3
Three-year college	286	26.6
Undergraduate	528	49.1
Postgraduate	81	7.5
Occupation		
Civil servants	33	3.1
State-owned enterprise staff	376	35.0
Factory worker	37	3.4
Farmer	17	1.6
Military	5	0.5
Office worker	206	19.2
Entrepreneur	72	6.7
Freelance	275	25.6
Unemployed	54	5.0
Annual Income (RMB, ¥)		
≤30,000	128	11.9
30,000–60,000	148	13.8
60,000–100,000	242	22.5
100,000–150,000	183	17.0
150,000–2,000,000	163	15.2
2,000,000–5,000,000	164	15.3
≥5,000,000	47	4.4
Living environment		
City	855	79.5
Urban	131	12.2
Rural	89	8.3

at least 50% accuracy by all participants in positive factors. The item that was identified with the highest level of accuracy was "Drinking plenty of water" (94.3%), and the items identified with the lowest accuracy was "Good posture" (54.0%). Parents identified positive factors with more accuracy than negative factors. Most parents correctly identified that "Prolonged talking" (91.8%), "Screaming" (91.3%) and "Eating deep fried foods" (88.2%) were harmful for voice, however, very few parents were aware of harmful factors such as "Throat clearing" (16.9%), "Whispering" (16.1%) and "Speaking with a low-pitched voice" (3.4%); The mean level of vocal hygiene knowledge was 14.94 (SD = 2.43, score ranged from8 to 22).

Parents without a history of voice disorders displayed better knowledge of vocal hygiene than those who did, however, this difference between the 2 groups was not significant across all 3 categories of vocal hygiene knowledge assessed ($P > .05$). A total of 750 (69.8%) parents indicated a desire to discuss vocal hygiene knowledge with their children, and there was no significant difference between parents with and without history of voice disorders ($F = 0.34$, $P > .05$).

3.4. Parents' attitudes towards vocal hygiene

Section III of the questionnaire began by asking parents the most appropriate ages for vocal hygiene education for their children. Four hundred seventy parents (43.7%) chose the 3 to 6 years' stage, 297 parents (27.6%) chose the 0 to 3 years' stage, 243 parents (22.6%) chose the 6 to 12 years' stage, while only 65 parents (6.0%) chose the older than 12 years' stage. There were no significant differences in choosing these different stages between the parents with and without history of voice disorders in their attitude towards ideal vocal hygiene education age ($P > .05$).

Table 3 shows that the overall parental attitudes towards vocal hygiene were positive in all parents. The group of parents without history of voice disorders scored more positively than the parents with voice disorder, but no significant differences were found between 2 groups ($P > .05$).

Figure 1 shows the percentage of parents who agree with certain attitudes towards vocal hygiene. Parents commonly believed that vocal hygiene is important for children (agree = 44.6%, n = 479; strongly agree = 47.2%, n = 507), that it can prevent voice disorders (agree = 53.2%, n = 572; strongly agree = 37.2%, n = 400) and protect their child's voice (agree = 51.0%, n = 548; strongly agree = 26.8%, n = 288). Parents did not seem to believe that children with normal voice need voice care (strongly disagree = 21.0%, n = 226; disagree = 61.7%, n = 663). Additionally, 248 parents (23.1%) of parents strongly disagreed and 644 parents (59.9%) disagreed with the statement that said children with normal voice did not have to learn to protect their voice, indicating that these parents believe in prophylactic measures for children even when they did not present with voice problems; 597 parents agreed (55.5%) and 413 parents strongly agreed (38.4%) that once child/children develop voice disorders, he/she must receive voice therapy immediately. In general, parental attitudes towards vocal hygiene in their children were positive. The mean total attitude section score of parents was 37.26 (SD = 3.49).

Most parents affirmed that they have responsibility for maintaining their children's vocal health (agree = 52.7%, n = 566; strongly agree = 43.7%, n = 470). Most parents wanted to help their children learn more vocal hygiene knowledge (agree = 58.0%, n = 623; strongly agree = 38.7%, n = 416).

Section III also examined parents' attitudes towards a range of communication skills other than vocal health in their children, for example, speech and language (Table 4). Compared with other items, the item of "Effective use of voice" appeared to receive the least amount of parental attention based on its low mean score.

3.5. Parents' practices towards vocal hygiene

The mean total practice score was 13.78 (SD = 3.67), ranged from 5 to 25. Table 5 shows the frequency of practice of vocal hygiene in this study. The total mean score was 2.76, indicating a trend towards occasional practice of vocal hygiene in the parents and their children surveyed in this study. It was noted that 2 vocal hygiene practices scored below the mean, indicating even less frequency of practice compared to others. These were searching for vocal hygiene information (mean = 1.86) and attending vocal hygiene workshops (mean = 1.26).

A total of 100 (9.3%) parents report having never taught their children vocal hygiene knowledge in this study. Those who did reported doing so with varying degrees of frequency: 27.6%

Table 2

Frequency distribution and percentage of parent's vocal hygiene knowledge responses.

Vocal Hygiene Factors	Parents' Categorization of Factors		
Positive factors	**Positive**	**Don't know /Not sure**	**Negative**
3. Drink plenty of water	1014 (94.3%)	57 (5.3%)	4 (0.4%)
6. Being happy	923 (86.0%)	148 (13.8%)	2 (0.2%)
8. Avoid talking in noisy environment	831 (77.3%)	105 (9.8%)	139 (12.9%)
10. Good posture	*685 (63.7%)*	382 (35.5%)	8 (0.7%)
13. Using nose breathing instead of mouth breathing	*581 (54.0%)*	242 (22.5%)	252 (23.4%)
19. Slowing down speech rate	825 (76.7%)	239 (22.2%)	11 (1.0%)
21. Not talking with a sore throat	1000 (93.0%)	39 (3.6%)	36 (3.3%)
24. Taking appropriate pauses within sentences	841 (78.2%)	217 (20.2%)	17 (1.6%)
Negative factors	**Positive**	**Don't know /Not sure**	**Negative**
1. Coughing	57 (5.3%)	286 (26.6%)	732 (68.1%)
4. Speaking with a low pitch	916 (85.2%)	122 (11.3%)	*37 (3.4%)*
9. Crying/laughing loudly	82 (7.6%)	158 (14.7%)	835 (77.7%)
12. Eating deep fried foods	6 (0.6%)	121 (11.3%)	948 (88.2%)
15. Throat clearing	522 (48.6%)	371 (34.5%)	*182 (16.9%)*
17. Screaming	24 (2.2%)	70 (6.5%)	981 (91.3%)
20. Whispering	422 (39.3%)	480 (44.7%)	*173 (16.1%)*
23. Prolonged talking	18 (1.7%)	70 (6.5%)	987 (91.8%)
Neutral factors	**Positive**	**Don't know /Not sure**	**Negative**
2. Overweight	10 (0.9%)	591 (55.0%)	474 (44.1%)
5. Intake of anodyne	33 (3.1%)	579 (53.9%)	463 (43.1%)
7. Swimming	393 (36.6%)	619 (57.6%)	63 (5.9%)
11. Underweight	20 (1.9%)	805 (74.9%)	250 (23.3%)
14. Prolonged TV Watching	19 (1.8%)	741 (68.9%)	315 (29.3%)
16. Plants in the home	686 (63.8%)	379 (35.3%)	10 (0.9%)
18. Eating warm food	838 (78.0%)	145 (13.5%)	92 (8.6%)
22. Picky eating	17 (1.6%)	629 (58.5%)	429 (39.9%)

The order of items has been re-arranged and presented here according to the category of factors for case of reading; responses with an accuracy of lower than 50% are italicized and shaded; correct responses are bolded.

seldom (n=297), 28.6% occasionally (n=307), 23.5% sometimes (n=253), and 10.8% often (n=118). Almost half of the parents (45.4%, n=488) had never searched for vocal hygiene information. The most prevalent negative practice was parents having never attended vocal hygiene seminars with their child (79.8%, n=858). On the other hand, sizable proportions of parents prohibited their child/children's vocally abusive behaviors (always=37.9%, n=407; often=27.2%, n=292), as well as pointed out and stopped their children from acts that damage the voice (always=31.9%, n=343; often=39.3%, n=423) (Fig. 2).

3.6. Vocal hygiene barriers of parents

In the present study, the most-frequently encountered barrier was "I do not know how to implement vocal hygiene in my child/children" (n=801), followed by "I do not know what vocal hygiene is" (n=633) (shown in Fig. 3). In addition, 90.5% (n=

Table 3

Mean scores for individual items on vocal hygiene attitudes items.

	All Parents	Parents with history of voice disorders	Parents without history of voice disorders
Items	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
1. Vocal hygiene is very important for children	4.34 ± 0.79	4.32 ± 0.84	4.36 ± 0.75
2. Vocal hygiene can prevent voice disorders in children	4.25 ± 0.70	4.24 ± 0.72	4.26 ± 0.70
3. Vocal hygiene can rehabilitate voice disorders in children	4.00 ± 0.79	3.99 ± 0.79	4.01 ± 0.80
4. Only children who suffer from voice disorders need to learn how to protect their voice.	2.09 ± 0.90	2.09 ± 0.88	2.09 ± 0.92
5. Children without voice disorders who do not need to learn how to protect their voice	2.04 ± 0.86	2.03 ± 0.80	2.05 ± 0.91
6. When a child develops a voice disorders, he/she must receive treatment immediately	4.31 ± 0.64	4.30 ± 0.63	4.32 ± 0.64
7. I am responsible for preventing voice disorders in my children.	4.39 ± 0.62	4.37 ± 0.61	4.40 ± 0.63
8. It's very difficult to carry out vocal hygiene practices in children.	3.14 ± 0.98	3.12 ± 0.96	3.15 ± 1.01
9. If my children develop voice disorders, I am responsible for helping them improve.	4.37 ± 0.61	4.35 ± 0.61	4.39 ± 0.61
10. I wish to help my children better understand what vocal hygiene is.	4.33 ± 0.62	4.32 ± 0.61	4.35 ± 0.62

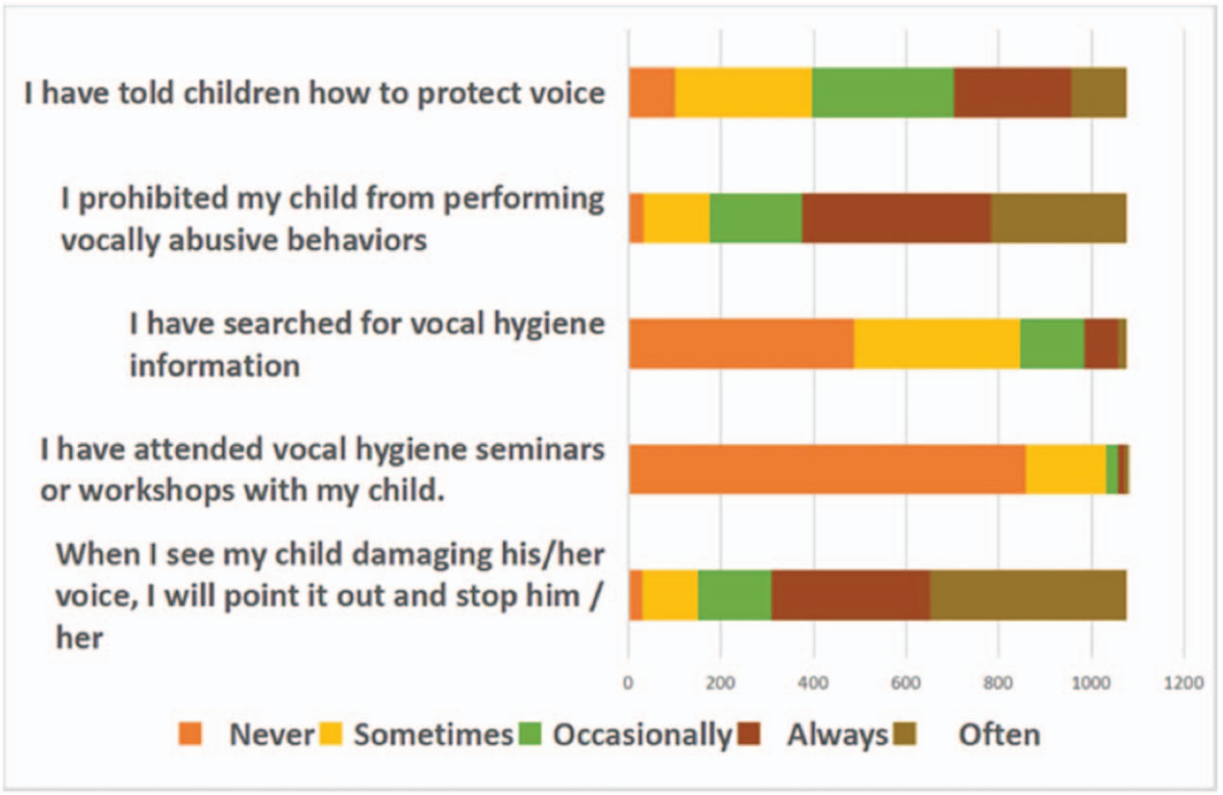

Figure 1. The distribution of parental attitudes towards vocal hygiene.

Table 4

Parent's attitude towards communication skills in children.

	All Parents	Parents with history of voice disorder	Parents without history of voice disorder
Items	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
1. Speech clarity	4.46 ± 0.64	4.46 ± 0.63	4.45 ± 0.64
2. Expressive language skills	4.67 ± 0.58	4.66 ± 0.58	4.68 ± 0.57
3. Effective use of voice	4.44 ± 0.63	4.42 ± 0.62	4.46 ± 0.64
4. Reading ability	4.68 ± 0.54	4.67 ± 0.56	4.70 ± 0.52
5. Social skills	4.66 ± 0.56	4.65 ± 0.57	4.67 ± 0.54
6. Writing ability	4.49 ± 0.61	4.48 ± 0.59	4.50 ± 0.63

SD = standard deviation.

Table 5

Mean scores for vocal hygiene practices items.

	All Parents	Parents with history of voice disorder	Parents without history of voice disorder
Items	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
1. I have taught my child/children to practice vocal hygiene.	2.99 ± 1.15	2.94 ± 1.14	3.03 ± 1.16
2. I prohibited my child/children from performing vocally abusive behaviors.	3.73 ± 1.09	3.66 ± 1.11	3.78 ± 1.08
3. I have searched for vocal hygiene information.	1.86 ± 0.99	1.82 ± 0.95	1.89 ± 1.03
4. I have attended vocal hygiene seminars or workshops with my child/children.	1.26 ± 0.61	1.26 ± 0.58	1.27 ± 0.63
5. When I see my child/children damaging his/her voice, I will point it out and stop him/her.	3.94 ± 1.11	3.90 ± 1.17	3.97 ± 1.07

SD = standard deviation.

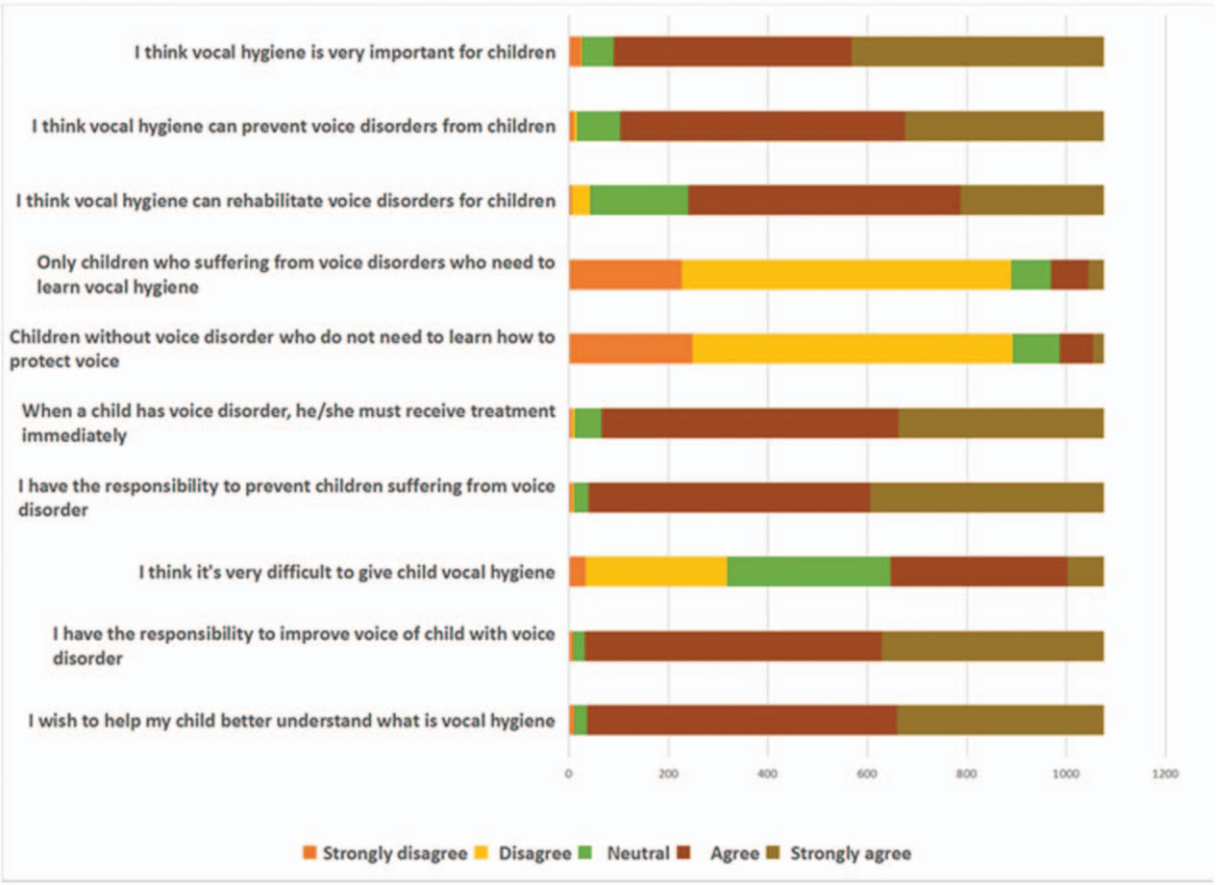

Figure 2. The distribution of parental practice towards vocal hygiene interest in attending vocal hygiene seminars.

973) of parents were interested in attending vocal hygiene seminars, and their interests were focused on prevention (81.9%), identification (80.0%), and the categorization of voice disorders (73.2%) (shown in Fig. 4).

3.7. Correlations between voice care knowledge, attitude, and practice

There was very weak correlation between knowledge and attitude (Spearman's rho = 0.07, $P < .05$), similarly between knowledge and practice (Spearman's rho = 0.09, $P < .01$). In addition, there was only weak correlation between attitude and practice (Spearman's rho = 0.10, $P < .01$).

4. Discussion

Knowledge, attitudes, and practices education seminars for professional voice users are well-established in some Western European countries, such as singers and teachers.[9,17] It has been found that even a minimal change in vocal hygiene behaviors could benefit for singers' singing skills[9] and reduce the size of vocal polyps,[17] as well as decrease the risk of teachers developing dysphonia.[18] However, the awareness and knowledge of public health issues in mainland China are at an early developing stage and is far from mature.[13] To our knowledge, this is the first investigation that studied the knowledge, attitudes and practices regarding the vocal hygiene of parents with children aged from 2 to 14 years living in mainland China.

4.1. Parents' knowledge on vocal hygiene

The mean score of parental vocal hygiene knowledge was 14.94, which suggested that the level of vocal hygiene knowledge among parents was only fair. Parents displayed good knowledge of positive factors for vocal hygiene, which has also been investigated scientifically and supported empirically.[19,20] However, there were certain misconceptions perceived by parents, only half of the parents recognized that "Good posture" (63.7%) and "Using nose breathing instead of mouth breathing" (54.0%) were helpful for vocal health. At the same time, parents showed limited knowledge of vocal misuse and vocally abusive behaviors. Results indicated that they could only identify correctly a portion of the abusive behaviors presented to them, such as "Speaking for a long time", "Screaming", and "Eating deep fried foods",[21] "Crying or laughing loudly" and "Coughing". Surprisingly, less than a quarter of the parents mistook less obviously vocally harmful behaviors, such as the "Throat clearing",[22,23] "Whispering"[24,25] and "Speaking with a low pitch" as protective instead. These results indicate that there are gaps in parental knowledge of vocal hygiene in mainland China currently that need to be considered when designing and delivering voice therapy to this population.[8]

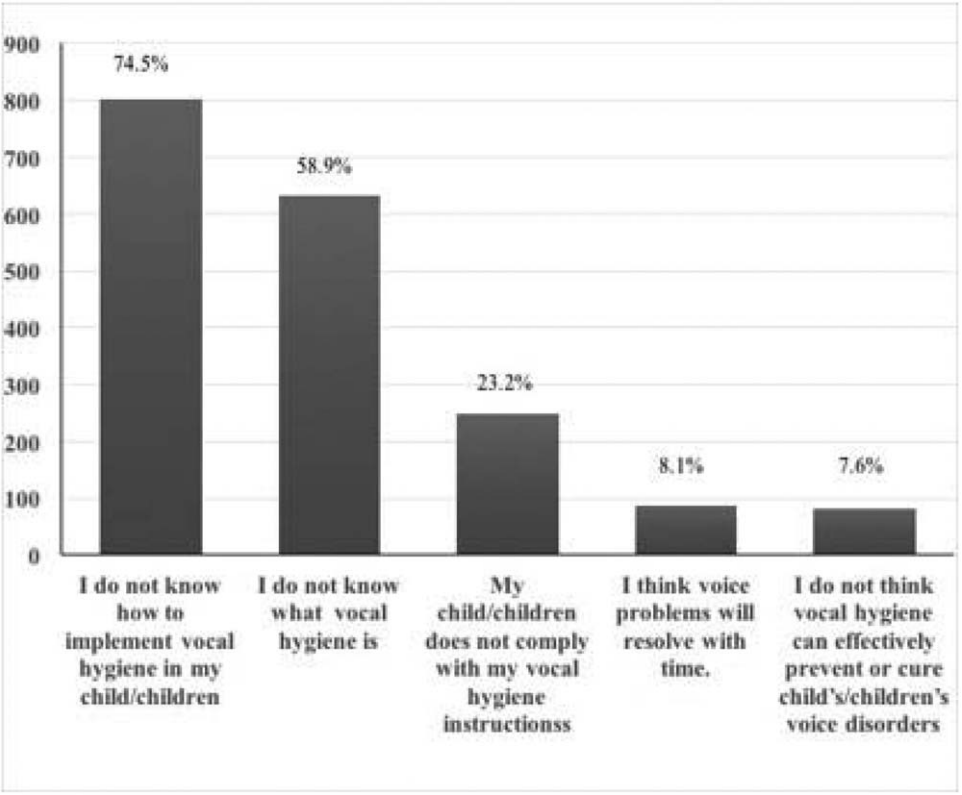

Figure 3. Frequency distribution of barriers experienced by parents regarding the implementation of vocal hygiene.

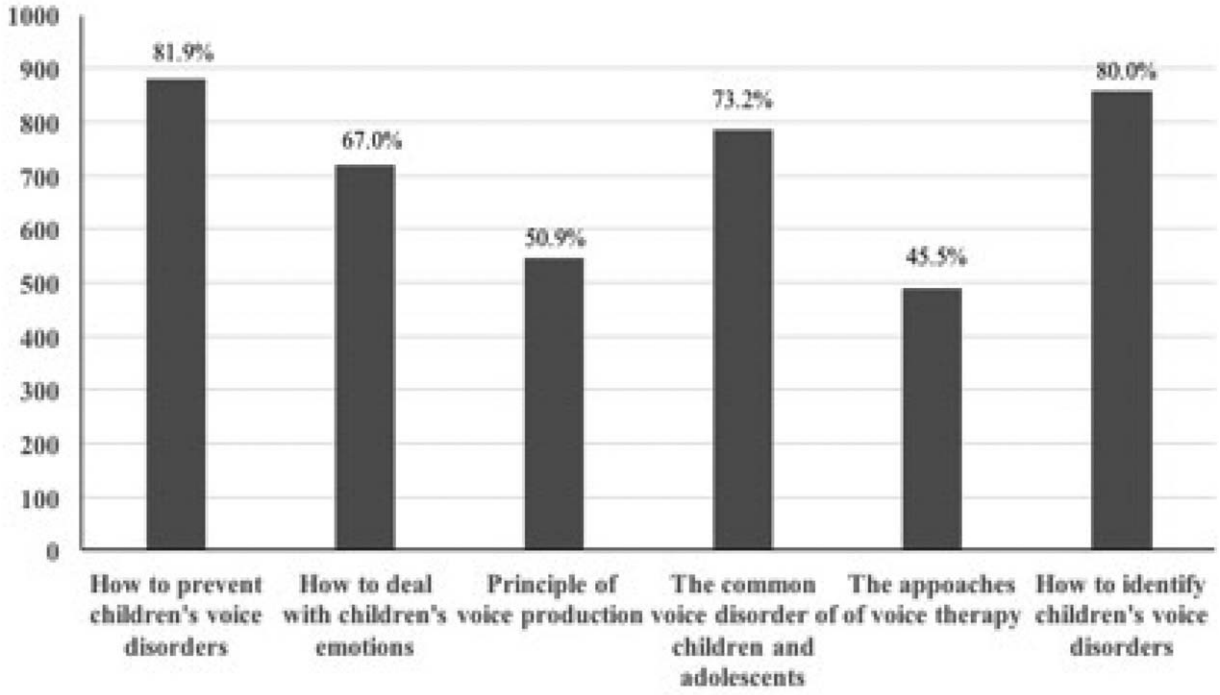

Figure 4. Frequency distribution of parents' interested topics in vocal hygiene seminars.

4.2. Parents' attitudes and practice on vocal hygiene

In the present study, parents, in general, showed positive attitudes towards vocal hygiene. Parents felt that vocal hygiene was very important for children, and parents believed that vocal hygiene had positive effects on preventing and protecting children's voice. Parents also agreed that they were responsible for the protection of their children's voice. In addition, 43.7% of parents felt that it was appropriate to begin vocal hygiene practice in early childhood during the 3 to 6 years old stages, which is consistent with the available epidemiological data on voice disorders in the pediatric population.[26,27] A revealing finding with regards to parents' attitudes towards vocal health was that they placed it was that parents rated communication skills such as speech and language to be of higher importance than effective voice use. This is concerning for the lack of awareness and knowledge of parents regarding vocal hygiene.

However, despite the positive attitude towards vocal hygiene, parents practiced vocal hygiene with children only occasionally, which is similar to the findings of Mo et al in Hong Kong,[14] on which this study was based. The results showed that parents are ill-equipped to implement vocal hygiene practices for their children. They were able to educate their children on positive vocal behaviors and discourage vocally abusive behaviors, but only within the scope of their available knowledge. Parents were not inclined to actively seek out new information to enrich their knowledge and help them implement vocal hygiene practices in their children. This may be due to the relative novelty of the concept of voice rehabilitation in mainland China. It is possible that there is limited publicly available information and lecture on vocal hygiene in children.

In this study, most of the parents surveyed wanted their children's voice to be healthier, with 90.5% of them willing to participate in future vocal hygiene seminars. In particular, parents were interested in information regarding the prevention, identification, and the categorization of voice disorders. This is consistent with the barriers to vocal hygiene practice identified, which were found to be related to lack of knowledge. In this study, 2 barriers "I do not know how to implement vocal hygiene in my child/children" and "I do not know what vocal hygiene" account for a high proportion in barriers items. To overcome these barriers, 1 useful solution is to make vocal hygiene education information easily accessible. Health-care workers and health-policy makers should plan strategically and make vocal hygiene programs widely accessible for parents. In addition, the number of vocal hygiene seminars or workshops should be increased to let more parents and children mater the knowledge of vocal hygiene.

4.3. Relationships between vocal hygiene knowledge, attitude, and practice

In this study, the relations between vocal hygiene knowledge, attitude, and practice suggest that the amount of knowledge does not necessarily imply one's attitude and practice. And parents with a more positive attitude are not more prone to practice voice hygiene with their children. These results may be related to lacking vocal hygiene education and pediatric voice therapy program in Chengdu. Therefore, the vocal hygiene education and pediatric voice therapy program should focus on both enriching one's vocal hygiene knowledge and promoting a positive attitude towards vocal hygiene.

4.4. Limitations

It should be noted that the sampling procedure was limited to only 1 of the more than 2500 counties in mainland China. Therefore, these results should not be treated as representative of the whole country. The questionnaire was completed online, which limited participants to those who had internet access. It must also be considered that those who choose to participate in a study on the novel topic of vocal hygiene are more likely to be parents who have experience of dysphonia themselves or through their children.

5. Conclusions

In conclusion, parents in Chengdu, mainland China had limited vocal hygiene knowledge, positive attitude for vocal hygiene, but the practice was unsatisfactory. These findings serve as guidelines for health-care workers and health-policy makers to make plan strategically and vocal hygiene programs for parents and their children.

Author contributions

Data curation: Dan Lu.
Methodology: Dai Pu, Estella P.-M. Ma.
Writing – original draft: Dan Lu.
Writing – review & editing: Edwin M.-L. Yiu, Hui Yang, Estella P.-M. Ma.

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