Knowledge of the Voice in the Teachers Population and their Ability to Refer Children with Voice Disorders to a Speech-Language Pathologist

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Abstract

Objective: The objectives of this study were to investigate (1) the knowledge of primary school teachers regarding voice and voice disorders, (2) the primary school teacher's ability to identify and refer a dysphonic child to a speech-language pathologist (SLP), and (3) potential contributing factors that might affect this ability.

Method and materials: Thirty-one teachers (30 women, one man) with a mean age of 33 years (range: 22-57 years; SD: 11.1 years) were included in this study. They filled out an online questionnaire, gathering demographic information, estimations of their knowledge regarding voice and voice disorders, and their ability to refer a dysphonic child to an SLP. Moreover, they completed an online quiz (maximum score: 9) with basic questions about the voice, vocal health and voice disorders.

Results: More than half (58.1%) of the teachers rated their knowledge as basic, 16.1% as adequate and 25.8% as good. One out of four (25.8%) reported to have received voice-related information during their education. A substantial part of the teachers (38.7%) gathered information through other channels, such as voice therapy. Almost all teachers (90%) reported to have no or little experience with dysphonic children. Half of them (51.6%) felt unsure about their ability to refer a dysphonic child to an SLP, and 54.8% were willing to attend extra voice workshops. A significant association was found between the estimated knowledge regarding voice (disorders) and attendance of voice therapy (p=0.020). On the one hand, the post hoc test showed that 57.1% of the teachers who attended voice therapy rated their knowledge as good and 14.3% as basic. On the other hand, 70.8% of the teachers who did not attend voice therapy rated their knowledge as basic and 16.7% as good. Moreover, a significant association was found between the years of teaching experience and the quiz total score (p=0.040). The post hoc test showed that 57.1% of the teachers with the least teaching experience (1 – 3 years) achieved a score between 4 and 6, whereas the teachers with more experience achieved a score between 7 and 9.

Conclusion: This study suggests that the voice-related knowledge of primary school teachers is limited. Consequently, teachers do not feel confident in referring a dysphonic child to an SLP. As teachers can be important sources in indirect assessment of pediatric dysphonia, they need to be well informed and extensively trained in using voice screening protocols. Interdisciplinary cooperation between SLPs and teachers should be optimized to provide the best available care and improve the children's' quality of life.

Keywords: children, voice disorders, teachers, knowledge, referral, speech-language pathologist

1. Introduction

Voice disorders are reported to occur in 6% to 11% of the children's population.[1,2] Especially boys and younger children seem prone to develop dysphonia.[2,3] Pediatric dysphonia is characterized by an atypical voice production due to organic, functional or neurologic causes. The disorder can lead to feelings of inferiority and to limited participation in educational or social activities. Furthermore, a child with a voice disorder can experience difficulties being heard or communicating inside and outside the classroom.[4]

Children with dysphonia are at risk to be perceived more negatively by their peers and educators.[4-9] Ma & Yu[5] reported the so called halo effect, which states that one's negative impressions about a disability can be generalized to other attributes not related to the disability. In speech sound disorders, for example, pitch and intelligibility appear to influence the educators' perceptions of the children's school performance.[10] Personality traits and attitudes of female adolescents with voice disorders were perceived more negatively by their teachers when compared to peers.[11] An inability to speak loudly or not volunteering to speak in class are factors that contribute to these perceptions.[10-11] Lallh & Rochet[6] demonstrated the tenacity of a negative attitude towards speakers with voice or resonance disorders. In their study, half of the lay listeners received information related to these disorders, whereas the other half read neutral information. In the end, the attitudes of both groups were similar regardless of the information they received prior to the attitude assessment. However, research showed that teachers can be trained in their perceptions of students with communication disorders.[11-12]

Such training opportunities are important as teachers can be considered reliable sources in indirect assessment of speech-language impairments.[3] Therefore, they need to be well informed about pediatric dysphonia and the impact on communication, participation and quality of life.[11] Early detection is necessary to facilitate the rehabilitation of dysphonic children, since they can experience feelings of inferiority.[4] In a Nepalese study, 149 primary school teachers screened their students using the adapted Teachers Speech and Language Referral Checklist. They estimated the prevalence of voice problems at 3.42%.[3] This percentage is lower than the one reported by Wilson and Carding et al.[1-2], which could imply that teachers do not have adequate knowledge to recognize a child with dysphonia.

Voice education in the teachers' population is scarce despite their important role in indirect assessment of pediatric dysphonia[3] and the higher risk for developing voice disorders themselves.[13-16] In a Flemish study, only 13.5% of school teachers reported to have received voice-related information during their educational program.[15] This finding is consistent with a study of Sadler[17], where only 10.11% stated they received information about speech-language impairments during their training. Approximately 88% considered their knowledge regarding speech-language impairments as limited to very limited. In addition, they reported to have (very) little confidence in their ability to cater for the educational needs of children with speech-language impairments. Eventually, the educators believed that children with a communication disorder should perform as well as other pupils or would catch up after a slow start.[17]

The above literature suggests a general low voice education and awareness in the teachers' population. In view of the important role that teachers might play in indirect assessment of pediatric dysphonia, the objectives of this study were to investigate (1) the knowledge of primary school

teachers regarding voice and voice disorders, (2) the primary school teacher's ability to identify and refer a dysphonic child to an SLP, and (3) potential contributing factors that might affect this ability.

2. Method

This study was approved by the Ethics Committee of Ghent University Hospital (BC-07536).

2.1 Participants

Thirty-one primary school teachers (30 women, one man) with a mean age of 33 years (range: 22-57 years; SD: 11.1 years) were included in this study. The teachers were from Flanders (Belgium).

They were recruited on a voluntary basis from the social circle of the authors, by an advertisement in a Facebook group for primary school teachers, and by mailing different schools in Flanders. A flyer was available to inform the teachers about the study process. All participants agreed via written informed consent.

2.2 Materials

2.2.1 Questionnaire

The teachers completed an online questionnaire to gather information about their confidence and experience on voice, vocal health and voice disorders. The online platform *Survio* was used. The questions covered three categories: (1) demographics (age, gender, degree level, years of teaching experience, presence of a voice disorder in the past or present, voice treatment), (2) estimations of knowledge regarding voice and voice disorders (description of their knowledge, voice-related information during their education, etc.), and (3) their ability to refer a child with a voice disorder to an SLP. The questionnaire included multiple choice questions, in which only one answer could be selected, except for the consulted sources to obtain voice knowledge (multiple answers). For each question, teachers could justify their answer or add a motivation or comment. The topics covered in the questionnaire are summarized in Table 1.

2.2.2 Quiz

Additionally, the teachers filled in a nine-item multiple choice online quiz to actually test their voice-related knowledge. The quiz included basic questions on voice, vocal health and voice disorders. The online platform *Typeform* was used. For each question, only one answer could be selected. The questions are provided in Table 2.

2.3 Data analysis

IBM SPSS Statistics 27 (SPSS Corporation, Chicago, IL, USA) was used for the data analysis. Analyses were conducted at $\alpha = 0.05$. The frequency distribution was requested for each question. Additionally, the Chi square test or the Fisher Exact test were used to determine any association between the different responses on the questionnaire. Finally, the total score on the quiz was compared to the teachers' estimations of their knowledge regarding voice (disorders), the occurrence of a voice disorder, attendance of voice therapy, and the years of teaching experience, using the Fisher Exact test. If a significant association was found, posthoc tests were performed with a Bonferroni-adjusted α.

3. Results

3.1 Questionnaire

The frequency distribution of the responses on the questionnaire is represented in Table 1.

More than half (58.1%) of the teachers rated their knowledge regarding voice and voice disorders as basic, 16.1% as adequate and 25.8% as good. One out of four (25.8%) reported to have received voice-related information during their education. A substantial part of the teachers (38.7%) gathered information through other channels, such as voice therapy. Almost all teachers (90%) reported to have no or little experience with dysphonic children. Half of them (51.6%) felt unsure about their ability to refer a dysphonic child to an SLP, and 54.8% were willing to attend extra voice workshops.

The Fisher Exact test showed a significant association between the estimated knowledge regarding voice (disorders) and attendance of voice therapy (p=0.020). The post hoc test showed that 57.1% of the teachers who attended voice therapy rated their knowledge as good and 14.3% as basic. Of the teachers who did not attend voice therapy, on the other hand, 70.8% rated their knowledge as basic and 16.7% as good. The difference between these two groups is shown in Figure 1. There was no significant difference between the groups ‘basic knowledge’ and ‘adequate knowledge’ (p=0.107) and between the groups ‘adequate knowledge’ and ‘good knowledge’ (p>0.999). No significant associations were found between the responses on the other questions.

3.2 Questionnaire and quiz

The frequency distribution of the responses on the quiz can be found in Table 2.

Most of the teachers (83.9%) scored between 7-9 on the quiz, whereas 5 teachers (16.1%) scored between 4-6.

The Fisher Exact test showed a significant association between the years of teaching experience and the quiz total score (p=0.040). The post hoc test showed that 57.1% of the teachers with the least teaching experience (1 – 3 years) achieved a score between 4 and 6, whereas the teachers with more experience all achieved a score between 7 and 9 (except for one teacher with 17 – 20 years of experience who also scored between 4 and 6).

The Fisher Exact test reported no significant association between the estimation of the teachers’ knowledge and the total score of the quiz (p>0.999). Further, the Fisher Exact test showed no significant association between the occurrence of a voice disorder or attendance of voice therapy and the total score of the quiz.

Table 1: Frequency distribution responses online questionnaire (n = 31)

	n (%)
highest academic degree	
professional bachelor	28 (90.3)
academic bachelor	3 (9.7)
years of teaching experience	
1-3	7 (22.6)
3-5	2 (6.5)
5-8	6 (19.4)
8-11	4 (12.9)
11-14	0 (0)
14-17	2 (8.5)
17-20	3 (9.7)
>20	7 (22.6)
voice disorder	
current	2 (6.5)
in the past	10 (32.3)
attended voice therapy	7 (22.6)
underwent phonosurgery	2 (6.5)
knowledge regarding voice (disorders)*	
none	0 (0)
basic	18 (58.1)
adequate	5 (16.1)
good	8 (25.8)
consulted sources to obtain voice knowledge	*(multiple answers were possible)*
education	8 (25.8)
literature	4 (12.9)
workshops	6 (19.4)
internet	1 (3.2)
other**	12 (38.7)
NA	7 (22.6)
willing to attend extra voice workshops	17 (54.8)
confidence referral dysphonic children to SLP	
definitely unsure	3 (9.7)
unsure	13 (41.9)
sure	12 (38.7)
definitely sure	3 (9.7)
experience with dysphonic children	
none	6 (19.4)
little	21 (67.7)
adequate	3 (9.7)
much	1 (3.2)
actual referral of dysphonic child to SLP	15 (48.4)
SLP available at school	13 (41.9)

** none: I do not have any knowledge of the voice or voice disorders; basic: I have knowledge of a healthy voice and how to distinguish it from a hoarse voice; adequate: I have knowledge of a voice disorder and how it arises and I know how to take care of my voice; good: I have knowledge of a voice disorder and how it arises, I can distinguish a healthy voice from a hoarse voice and I know some voice techniques that are applied by an SLP.*

***: Other sources reported: voice therapy for own voice disorder (n = 7), voice therapy for child's voice disorder (n = 1), information from ENT specialist (n = 1), information from family member who is SLP (n = 1), information from colleagues (n = 1), by experience with dysphonic children in school (n = 1).*

Table 2: Frequency distribution responses online quiz (n = 31)

1. When you are hoarse, …				
	You can still scream uncontrolled	*It is better to strain your voice minimally*	*You can only whisper*	
n (%)	0 (0)	30 (96.8)	1 (3.2)	
2. A healthy voice is characterized by a visible chest breathing				
	True		*False*	
n (%)	7 (22.6)		24 (77.4)	
*3. What is an organic voice disorder?**				
	A disorder characterized by no visible lesion on the vocal folds	*A disorder characterized by a larynx that does not function adequately because of vocal misuse or abuse*	*A disorder characterized by a dysfunction at the organs in the abdomen*	*A disorder characterized by a visible lesion on the vocal folds*
n (%)	0 (0)	9 (29.0)	1 (3.2)	20 (64.5)
4. To be intelligible and to spare your voice as much as possible, …				
	You need to speak loud and high	*You need to speak low and articulate well*	*You need to scream*	
n (%)	1 (3.2)	30 (96.8)	0 (0)	
*5. The vocal folds are located …**				
	In the larynx	*At the back of the throat*	*In the middle of the trachea*	*Just above the lungs*
n (%)	20 (64.5)	8 (25.8)	2 (6.5)	0 (0)
6. When you feel a tickle in the throat, …				
	You better clear your throat	*You better cough until it is gone*	*You better drink some water*	
n (%)	0 (0)	0 (0)	31 (100)	
*7. Humming is a great way to warm up the voice.**				
	True		*False*	
n (%)	29 (93.5)		1 (3.2)	
8. Reflux does not contribute to the development of a voice disorder.				
	True		*False*	
n (%)	6 (19.4)		25 (80.6)	
9. Which of the following is no risk factor for developing a voice disorder?				
	Smoking	*Drinking enough water*	*Stress*	*Lack of vocal hygiene*
n (%)	2 (6.5)	28 (90.3)	1 (3.2)	0 (0)
TOTAL SCORE				
	0-3	*4-6*	*7-9*	
n (%)	0 (0)	5 (16.1)	26 (83.9)	

**For these questions, one missing value was reported in the female subjects.*

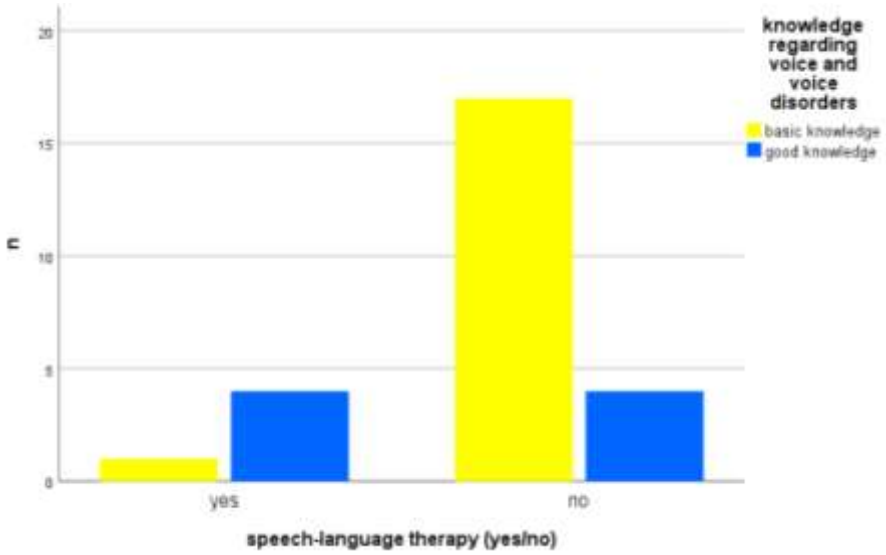

Figure 1: bar chart for the knowledge of teachers regarding voice and voice disorders (basic knowledge and good knowledge) for teachers who attended voice therapy and teachers who did not attend voice therapy

4. Discussion

The objectives of this study were to investigate (1) the knowledge of primary school teachers regarding voice and voice disorders, (2) the primary school teacher's ability to identify and refer a dysphonic child to an SLP, and (3) potential contributing factors that might affect this ability.

In line with earlier findings in the literature[15,17], the voice-related knowledge of primary school teachers seems limited. Most teachers rated their knowledge as basic. A more profound interpretation of voice disorders and how they arise, how to take care of the voice and how to treat dysphonia seems only applicable for one out of four (25.8%) teachers. Earlier research already suggested that (student) teachers have low levels of voice awareness and little understanding regarding the capacities and limitations of their own vocal apparatus[18,19]. According to Da Costa et al.[19], primary school teachers tend to believe that the development of dysphonia in teachers is normal and they were unaware of the benefits of voice therapy.

These findings suggest that voice education seems not yet an imbedded topic in the curricula of student teachers. Indeed, only 25.8% of the participants reported to have received voice-related information during their education. Although still low, this number is higher than the one found in a former Flemish study[15], reporting a percentage of only 13.5%. Differences might be due to the smaller sample size of the current study or an evolution to more voice education in recent years. Based on this last hypothesis, it might be assumed that the younger teachers would score better on the quiz than their colleagues with more teaching experience. However, the opposite was true, as teachers with the least teaching experience (1-3 years) achieved lower scores than their more experienced colleagues.

Attendance of voice therapy seems to be the most important contributing factor to a better voice knowledge. More than half of the teachers who attended voice therapy (57.1%) estimated their voice-related knowledge as good, compared to only 16.7% of the teachers who did not attend voice therapy. These findings correlate with the study of Gillivan-Murphy et al.[20], in which teachers self-reported a better understanding concerning voice care after voice therapy. These teachers also rated their knowledge better than those who did not attend voice therapy. Surprisingly, no association was found between attendance of voice therapy and the teachers' confidence in referring a dysphonic child. It seems that their theoretical and experimental knowledge achieved in voice therapy is insufficient to empower this confidence.

In conclusion, half of the primary school teachers felt unsure about their ability to refer a dysphonic child to an SLP. If we want to strive for an indirect assessment of pediatric dysphonia, and consequently faster referrals and more effective voice rehabilitation, teachers need to be well informed and extensively trained in using voice screening protocols. Results of this study suggest that most teachers are willing to attend extra voice workshops, to which we as SLPs have to comply with. Improved interactions between SLPs and teachers regarding the risks and needs of children with dysphonia are needed to provide the best available care and improve the children's quality of life.[11]

Limitations of this study are the small sample size and the non-randomized recruitment. Teachers who were interested in the topic or had already acquired some voice-related knowledge, could have been more inclined to participate in this study. Moreover, no gender differences could be reported because only one male subject was included in this study. Further research needs to investigate the voice-related expertise and confidence in a larger sample of teachers. In future, it could be interesting to explore the educational program of the teachers with the specific voice courses they obtained. Finally, a quiz with more specific

questions on pediatric dysphonia, including voice samples of children with or without dysphonia, could be used to examine the voice-related knowledge of primary school teachers.

5. Conclusion

This study suggests that the voice-related knowledge of primary school teachers is limited. Consequently, teachers do not feel confident in referring a dysphonic child to an SLP. As teachers can be important sources in indirect assessment of pediatric dysphonia, they need to be well informed and extensively trained in using voice screening protocols. Interdisciplinary cooperation between SLPs and teachers should be optimized to provide the best available care and improve the children's quality of life.

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