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Telepractice program in voice therapy for primary school teachers: A Pilot study

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ABSTRACT

Background: Teaching is an occupation where teachers consistently use their voices. However, excessive voice use causes voice disorders, especially in primary school teachers. Therefore, to prevent voice disorder problems in teachers during the COVID-19 pandemic, voice therapy using telepractice was adopted so that teachers would gain knowledge and know how to prevent voice disorders.

Objectives: The main aim of this study was to develop and implement a pilot study on a telepractice program in voice therapy for primary school teachers.

Materials and methods: Telepractice program for primary school teachers was designed from the literature review under the theory of voice therapy for those people with voice disorders. Five experts with more than five years' experience in voice therapy tested the content validity, and five teachers undertook the entire program. Descriptive statistics were used to analyze the data.

Results: The results of index of item-objective congruence (IOC) for content validity in Part 1 (program outline), Part 2 (program manual), Part 3 (telepractice videos), and Part 4 (telepractice program quizzes) were 0.8, 0.89, 0.88, and 0.87, respectively. The IOC of the entire telepractice program was found to be 0.86, which passed the criteria. The try-out phase resulted in teachers suggesting adjusting their participation time to after 6 pm. for more convenience. Other suggestions for using voice for online and onsite teaching during COVID-19 pandemic were also provided, e.g., voice level control while using a microphone, a headset, and a computer setting during online teaching.

Conclusion: The pilot study of the telepractice program in voice therapy for primary school teachers passed the content validity test and try-out criteria for primary school teachers. Thus, the program could be used in voice therapy for teachers with voice disorders to eliminate program's efficiency in the next phase.

Introduction

Voice disorders occur when voice quality, pitches, and loudness are different or unsuitable for each individual's age, sex, cultural background, or domicile. Voice disorders are caused by the dysfunction or pathogenesis of vocal organs due to congenital anomalies, diseases, accidents, emotional and mental problems, vocal abuse, or unknown causes.[1,2]

Teachers are usually found with voice disorders because they must continually utilize their voices for teaching. Consequently, verbal communication all day long without a break causes teachers to have vocal fatigue.[3,4] Moreover, loud noises in school environments cause teachers to speak louder, resulting in shouting, vocal strain during phonation, and incorrect breathing

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during phonation. These issues imply hyperfunctional voice disorders.[4-7] If these ways of phonation are used for a long time while teaching until they become familiar, vocal abuse and misuse will occur, possibly leading to vocal injuries.[8]

From the data on the prevalence of voice disorders in teachers, Caitriona and Ray[4] reported that 27% of primary school teachers were usually found with voice disorders. According to De Alvear *et al*.,[3] 59% of kindergarten and primary school teachers in Spain had voice disorders. Likewise, Seifpanahi *et al*. found that 54.6% of primary and high school teachers in Iran had voice disorders.[9] In Thailand, Sajjaluck also found that 14.94% of primary school teachers had voice disorders. Additionally, Chantree and Hengphraphrom reported that 62.6% of primary school teachers had voice disorders.[10]

Speech and language pathologists play a crucial role in solving voice disorders for teachers who require voice therapy. Voice therapy approaches consist of 1) direct therapy, mainly focusing on voice practice behavior and reducing incorrect phonation behavior, i.e., education of hygienic voice therapy, symptomatic voice therapy with symptomatic treatment, and physiologic voice therapy as a holistic practice, and 2) indirect therapy, mainly focusing on emotional and mental states of those with voice disorders to direct them to correct voice therapy approaches in the long term.[11]

This pilot study aimed to develop a telepractice program in voice therapy for primary school teachers and brought the program to try out to improve the program. In particular, due to the current COVID-19 pandemic, there was no telepractice program in voice therapy for primary school teachers in Thailand. Hence, the researcher intended to develop an active practice approach to prevent voice disorders using telepractice. The communication technology method from telepractice aimed to facilitate speech and language pathologists to provide remote services for those with voice disorders. As such, for telepractice, the researcher combined a hybrid approach by using technology for synchronous practice with an asynchronous method to access the data at different times.[12,13] The researcher also viewed that primary school teachers should have comprehension and correct their vocal behavior in the long term under a telepractice program that would reduce costs, travel time, and exposure to COVID-19 for the correct use of voice in primary school teachers. Thus, the telepractice program in voice therapy for primary school teachers was implemented to examine and analyze its efficiency.

Materials and methods

This study was divided into two phases: 1) To develop the program and determine content validity and 2) to conduct a pilot study of the program.

Study design

This research was experimental research using a one-group pretest-posttest design. The study aimed to develop a telepractice program in voice therapy for primary school teachers and pilot it to improve any drawbacks before searching for its efficiency later.

Voice telepractice program

Researchers reviewed the literature on voice therapy principles for primary school teachers. Then, the telepractice program was developed, which consisted of four parts: Part 1: Telepractice program outline, Part 2: Telepractice program manual as shown in the examples of lesson 1 in Figure 1, Part 3: Telepractice videos as shown in examples of lesson 1 in Figures 2, and Part 4: Telepractice program quizzes. The telepractice program was divided into two sections as follows:

Section 1: Telepractice program training for 1.5 hours, which comprised introduction, vocal hygiene education with data about basic anatomy and physiology of phonation, videos of 10 situations presenting the incorrect use of voice for teachers, and a question-and-answer period at the end of the session (Table 1).

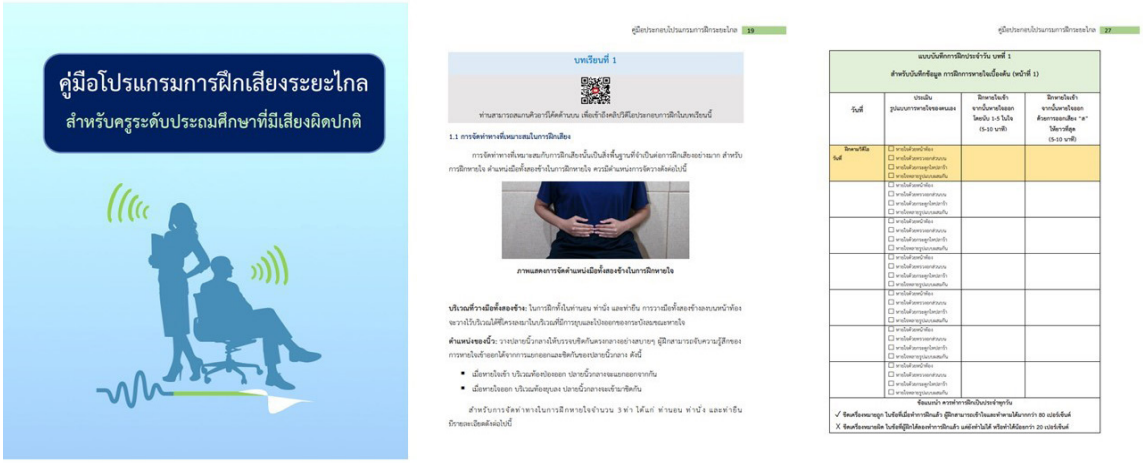

Figure 1 *Example of telepractice program manual in lesson 1.*

Figure 2 *Examples of telepractice videos in lesson 1.*

Table 1 Details about the telepractice program in Section 1.

Section 1: Timing and telepractice program training for 1.5 hours via Zoom cloud meetings		
Part 1: Introduction	- Official introduction of the project in terms of the detail procedures, implementation method, duration, and the end of the program.	15 minutes
Part 2: Vocal hygiene education	- Theoretical training. (The contents were about basic anatomy and physiology of phonation.)	15 minutes
	- Online workshop: - For vocal hygiene education and motivation of the comprehension to apply knowledge of vocal hygiene in real life. - Videos of 10 situations presenting the incorrect use of the voice were presented as the samples, e.g., how to avoid speaking in noisy environments and how to avoid speaking when exercising.	45 minutes
Part 3: Q & A session	- The researcher allowed the participants to ask questions about the telepractice program and all data obtained from the descriptions.	15 minutes

Section 2: Telepractice following the five lessons, one lesson per week, which had to be done twice a week (a total of 10 times) via YouTube for 30 minutes whenever the participants were convenient. The activities included group practice with speech and language pathologists for one hour via Zoom cloud meetings (Table 2). The participants would contact the researcher via LINE official. They were also required to complete Google Forms every time after the practice for self-assessment, answer the quizzes, and record the training to confirm their participation in each lesson. The researcher would check this part's data to monitor all the participants' results and to correct and provide more data for each participant in the following session.

Table 2 Details about the telepractice program training in Section 2.

Section 2: Practice Lessons 1-5 for 10 times twice a week	
Lesson 1 consisted of the following contents: - Posture for voice therapy - Relaxation technique - Basic breathing	Session 1: Practice Lesson 1 via YouTube for 30 minutes.
	Session 2: Group practice via Zoom cloud meetings for 60 minutes.
Lesson 2 consisted of the following contents. - Diaphragmatic breathing - Warm-up and warm down	Session 3: Practice Lesson 2 via YouTube for 30 minutes.
	Session 4: Group practice via Zoom cloud meetings for 60 minutes.
Lesson 3 consisted of the following contents: - Chewing method - Yawn-sigh method - Reduced glottal attack	Session 5: Practice Lesson 3 via YouTube for 30 minutes.
	Session 6: Group practice via Zoom cloud meetings for 60 minutes.

Table 2 Details about the telepractice program training in Section 2. (continued)

Section 2: Practice Lessons 1-5 for 10 times twice a week	
Lesson 4 consisted of the following contents. - Resonant voice therapy - Chant talk	Session 7: Practice Lesson 4 via YouTube for 30 minutes.
	Session 8: Group practice via Zoom cloud meetings for 60 minutes.
Lesson 5 consisted of the following contents: - Yoga voice - Vocal function exercises	Session 9: Practice Lesson 5 via YouTube for 30 minutes
	Session 10: Group practice via Zoom cloud meetings for 60 minutes.

Phase 1: Content validity

After four parts of the telepractice program had been developed, they were submitted for the content validity test by five experts (who had at least five years of specialization in voice therapy for those with voice disorders), i.e., two speech and language pathologists, two lecturers in voice disorders from the master's degree program, Faculty of Associated Medical Sciences, Chiang Mai University, and one otolaryngologist. The index of item-objective congruence (IOC) was considered. IOC >0.5 would pass the criteria.[14,15]

Phase 2: Try-out

After the experts and the revision determined content validity test was completed, the program was brought for a try-out for one week in January 2022 at Watsuandok school with five primary school teachers who used their voice in class for over four hours a day, five days a week.

In the try-out phase, within one week, the teachers had participated in vocal hygiene education once for 1.5 hours and asynchronous practice via Lesson 1 from an online video (the full version of the telepractice program included five lessons for 10 sessions) together with using of the manual. The participants were required to complete the data obtained by practice in the record form at the end of manual. Then, they completed Google Forms to record training data and to do the quizzes. Afterward, the participants assessed their comprehension with 6 parts of try-out and provided suggestions for the program in Google Forms. The 6 parts of the assessment are the Introduction of the program and vocal hygiene education, Zoom cloud meetings, telepractice program manual, telepractice video, quizzes and self-assessment, and overall convenience of use. Descriptive statistics were used to analyze the assessment data of 6 parts from participants with percentages. Next, the researcher took those suggestions for further improvement of this telepractice program.

Results

Phase 1: Content validity

According to the examined IOC, each item of the content validity test passed the criteria (Table 3).

Table 3 Content validity of the telepractice program.

Content validity			
Part	**Content**	**IOC**	**Conclusion**
1	Outline	0.80	Passed
2	Manual	0.89	Passed
3	Video	0.88	Passed
4	Quizzes	0.87	Passed
Total	All four parts	0.86	Passed

Phase 2: Try-out

Suggestions from all five teachers after the try-out and the scores of their comprehension in participation, zoom cloud meetings, manual, video, access to the assessment form and quizzes, and convenience of use based on their viewpoints are displayed in Table 4. All scores were over 80% in all items.

Table 4 Suggestions from the five users of the try-out phase.

Part	**Comprehension Score (%)**	**Suggestion**	**Implementation**
1. Introduction of the program and vocal hygiene education	83.89	- In reality, teachers could neither avoid any noises nor use their voice correctly in all situations from the videos of the 10 conditions about the incorrect use of the voice.	- Added an amplifier and a headset. - Added vocal hygiene education in online teaching.
2. Zoom cloud meetings	85	- No problem was found.	- -
3. Telepractice program manual	88	- No problem was found.	- -

Table 4 Suggestions from the five users of the try-out phase. (continued)

Part	Comprehension Score (%)	Suggestion	Implementation
4. Telepractice program manual	84	- Clear and attractive voice, but with noises sometimes, e.g., breathing practice in each posture.	- Revised as per the suggestion
5. Quizzes and self-assessment	88	- No problem was found.	- Added an amplifier and a headset. - Added vocal hygiene education in online teaching.
6. Overall convenience of use	92	- Convenient for use. - 4.30-6.00 pm. was the period that most teachers went home. Thus, it might not be convenient for their participation.	- Adjusted the participation duration to be more flexible after 9.00 pm. - Added concise information that should be practiced each week in the online assessment form at the end of the lessons. - Added an auto-alert notification in LINE Official for convenience and participants' comprehension of the summarized issues for practice each week.
Total	85.97		

Discussion

Phase 1: Content validity

From the content validity test by five experts, the score had to pass criteria score of 0.5, as shown in Table 3.[14,15] Thus, when considering the content validity of the entire program, it was found that the telepractice program for primary school teachers passed the criteria in terms of its content validity because the researcher reviewed the related literature and theories before setting the contents.

In Thailand, some voice programs emphasize that patients with voice disorders practice only breathing exercises through videos and manuals.[16] Lopez *et al*.[17] prepared the videos for a short training on vocal health in teachers; besides that, several researchers created a new manual for voice therapy in primary school teachers.[18-20] Many voice therapy programs have a vocal hygiene education session before participating in voice therapy.[17-21] It is essential content for teachers with voice disorders to understand and protect their vocal health. According to Liu *et al*.,[18] they have workshops with vocal hygiene education before attending direct voice therapy sessions with teachers.

So, in this research, the knowledge of voice telepractice program was designed from the theory of voice therapy and analysis from previous research studies about programs of voice therapy for primary school teachers, then rearrange the techniques from basic to advance with 5 lessons. Likewise, Lopez *et al*.[17] planned the program for 4 sessions starting with easy to difficult tasks such as vocal hygiene education, posture for voice therapy, breathing exercises with mindfulness and vocal training, and singing. Pizolato *et al*.[20] designed the techniques for the voice therapy program with 4 sessions as posture and cervical relaxation, respiration, phonation, and the last sessions with resonance and articulation. This research designed the practice of voice therapy for participants with 5 lessons. The practice of 5 lessons of the voice telepractice program, lesson 1: consisted of posture for voice therapy,[2,16,22] relaxation technique,[2] and basic breathing to improve the basics of breathing of primary school teachers.[22] Lesson 2: consisted of diaphragmatic breathing[22] and vocal warm-up and warm-down techniques[19,22-24] to prepare their voice before and after teaching in the classroom. Lesson 3: consisting of the chewing method,[2,24] yawn-sigh method,[2,25] and reduced glottal attack by the /h/ sound.[22,26] The main objective of this lesson is to reduce the incorrect habit of phonation in teachers. Lesson 4: consisted of resonant voice therapy[11,24] and chant talk[2,24] to increase the quality of phonation and find the suitable voice of frequency and loudness in participants. Lesson 5: consisted of yoga voice[2] and vocal function exercises,[22,24,25] in this lesson, the participants will practice advance techniques about pitch and overall method to maintenance voice quality in the long term.

For data suggested by the experts for revision in the telepractice program, Part 1: Telepractice program outline, the experts recommended changing the wording for better comprehension by the participants. As such, the data about hygienic voice therapy had to be rearranged, and redundancies or complicated words were deleted. For Part 2: Telepractice program manual, images had to be added to increase the clarity of the contents. Furthermore, the wording had to be changed for easier comprehension. Dangerous postures of muscle relaxation also had to be avoided, e.g., raising their head, which could be risky for those with cervical spine problems. Thus, the researcher deleted those challenging postures and added more cautionary warnings about unsuitable movements for some participants. Moreover, this program contained quite a lot of content. Thus, it was suggested to lessen the

number of words. For this reason, the researcher reduced those words, i.e., words, syllables, sentences, and articles.

For Part 3: Telepractice video, the brightness of video in some lessons had to be adjusted. The samples of incorrect or too similar voices in some parts of Lesson 4 were revised. For example, some monotones of the prototypes in the video were not different. The clarity of descriptions in video had to also be increased, that is, how many times they should be practiced for congruent comprehension in the sample viewers. In addition, for Lesson 4, a suggestion was made about having images to create an understanding of phonation.

Finally, for Part 4: Telepractice program quizzes, the experts suggested this part differently. For example, some suggested not using the names of people in the quizzes. Some advised not to ask, "Which one is correct or incorrect?" and use other quiz patterns instead. Some even suggested that the participants might not like quizzes at the end of the lessons. However, researcher's objective did not mainly focus on scoring but also on the exercise to examine the participants' comprehension and correct their miscomprehension of each class. Thus, the researcher reduced number of quizzes from five to three for each lesson. The deleted ones were those that seemed ambiguous or with unclear answers. Only the suitable ones remained. These were all revised and improved per the experts' suggestions for the try-out phase.

Phase 2: Try-out phase

According to the five teachers' comprehension assessment from the try-out phase, their total comprehension score was 85.97%, as shown in Table 4. The details of each part are as follows:

Part 1: Introduction of the program and vocal hygiene education received 83.89%. For the suggestions of this part, despite the concise and comprehensible objective, the teachers had to have time to participate in this long program. The teachers also said that activities suggested in the videos were suitable but could not be done in real life because primary school children were still hyperactive and could not control themselves like high school students. Teachers had to use their voices still to manage and teach these young children.

During the public relations of the try-out phase to find participants, the teachers mainly taught online. Then, they were required to teach onsite during the try-out week. This event made the researcher view both sides of the school environment. After talking with the participants directly during the post-program, it could be concluded that online content should be added to hygienic voice therapy to match the current COVID-19 pandemic. Proper voice control sentences while using the microphone should also be added in the videos of the 10 situations because the participants viewed that they still had to speak loudly despite utilizing a microphone. Likewise, Oliveira *et al*.[19] reported that teachers should use the amplifier as a microphone all the time in the classroom to reduce vocal problems. The participants also commented that vocal hygiene education and practice of all the lessons with speech and language pathologists in the evening had been set at 5 pm., but the teachers in the try-out phase informed that 4-6 pm. was period to go home and clear their work at school. Thus, it would not be convenient for any teachers to participate in the project during that time. For this reason, the researcher adjusted the practice time to after 6 pm. to facilitate the teachers who would join on weekdays.

Part 2: Zoom cloud meetings received a score of 85%. No suggestions were provided for this part. As for Part 3: Telepractice program manual scored 88%. Part 4: Telepractice video scored 84%. Lesson 1 suggested that it contained clear descriptions and clear voice but sometimes had noise. Thus, the researcher removed the noise as per suggestion. In accordance with Grillo[13] suggested that the media for telepractice as synchronous, synchronous, and hybrid should have good quality pictures, video, alphabet, and audio to benefit the participants. Finally, for Part 5: Quizzes and self-assessments in Google Forms scored 88%. In this part, the participants believed thequizzes suited the contents. Part 6: Overall convenience of use, Convenience to participate in the program achieved 92%. In this part, they viewed the program as useful for teachers with voice disorders (96%). Voice telepractice program for primary school teachers was a hybrid method from using synchronous zoom cloud meetings[27] and asynchronous as a private account of Line Application,[28,29] website of private YouTube channel[13] and Google Forms[30,31] to communicate with participants. All of the information in each week will send to them via Line Application with a video link of YouTube and Google Forms. Similarly, Grillo[13] reported that they used You tube to send the example of videos to patients in the telepractice program and used Google drive to keep the information from patients. It reduces times to go to the hospital and makes it convenient for patients to practice voice therapy at home during the COVID-19 pandemic.

Limitations

Because of COVID-19 pandemic, most of the teachers were very busy adapting their teaching methods, which affected the convenience of joining the program. However, in this small group of participants, the researcher still received helpful information to adjust the program to be more suitable for finding the program's effectiveness in the next phase.

Conclusion

It could be concluded that the telepractice program in voice therapy passed the content validity test by the five experts and was already improved as per the suggestions from the five users. Thus, the program could be used for the program's effectiveness in the next phase of research.

Ethical approval

This study was approved by the Research Ethics Committee of the Faculty of Associated Medical Sciences, Chiang Mai University (Approval ID: AMSEC-64EX-035).

Conflicts of interests

The authors declare that they have no conflict of interest.

References

[1] American speech language hearing association [Internet]. The United States of America: American speech language hearing association;c1997-2021 [cited 2022 Aug 7]. Available from: https://www.asha.org/practice-portal/clinical-topics/voice-disorders

[2] Sapienza CM, Hoffman B. Voice disorders. San Diego, CA: Plural Publishing; 2018.

[3] De Alvear RMB, Baron FJ, Martinez-Arquero AG. School teachers vocal use, risk factors, and voice disorder prevalence: guidelines to detect teachers with current voice problems. Folia Phoniatr Logop. 2011; 63(4): 209-15.

[4] Munier C, Kinsella R. The prevalence and impact of voice problems in primary school teachers. Occup Med. 2008; 58(1): 74-6.

[5] Joshi AA, Mukundan P, Dave VJ, Bradoo RA, Dhorje NR. Prevalence of voice disorders in Indian female secondary school teacher population a cross sectional study. Int J Otorhinolaryngol Head Neck Surg. 2020 Sep 15. [Epub ahead of print]

[6] Sujjalak K. The study of vocal quality disorders among elementary school teacher in Dusit area [Dissertation]. Master of arts (Communication disorders): Mahidol University; 1988 (in Thai).

[7] Devadas U, Bellur R, Maruthy S. Prevalence and risk factors of voice problems among primary school teachers in India. J Voice. 2017; 31(1): 117. e1-e10.

[8] sutthiwisapong T, kongpulsilp N, Khumtong N, Pradabsook N, Prailucha V, Pinithsoontorn S, Paileeklee S. Proportion of teachers in a school in Khon Kaen province with sufficient knowledge regarding vocal abuse. Srinagarind Med J 2018; 33: 83-84. (in Thai).

[9] Seifpanahi S, Izadi F, Jamshidi A-A, Torabinezhad F, Sarrafzadeh J, Sobhani-Rad D, et al. Prevalence of voice disorders and associated risk factors in teachers and nonteachers in Iran. J Voice. 2016; 30(4): 506. e19-e23.

[10] Chantree A, Hengphraphrom S. Prevalance and risk factor assosiated with voice disorders of teachers in Bangkok. TMJ. 2015; 15(2): 232-41. (in Thai).

[11] Stemple JC, Hapner ER. Voice therapy : clinical case studies. San Diego, CA: Plural Publishing; 2000.

[12] American speech language hearing association. Telepractice: overview [Internet]. 2021 [cited 2022 Aug 7]. Available from: https://www.asha.org/practice-portal/professional-issues/telepractice/

[13] Grillo EU. Building a successful voice telepractice program. Perspect Asha Spec Interest Groups. 2019; 4: 100-10.

[14] Turner R, Carlson L. Indexes of item-objective congruence for multidimensional items. Int. J. Test. 2003; 3: 163-71.

[15] Tuntavanitch P, Jindasri P. The real meaning of IOC. JEM-MSU. 2018; 24(2): 3-12. (in Thai).

[16] Prathanee B, Srirompothong S, Saesiew P, Saengnipanthkul R. Self-training voice therapy for patients with hoarseness. J Med Assoc Thai 2017; 100 (8): 136

[17] López JM, Catena A, Montes A, Castillo ME. Effectiveness of a short voice training program for teachers: a preliminary study. J Voice. 2017; 31(6): 697-706.

[18] Liu H, Chen S, Gao L, Li J, Liu B, Raj H, et al. Comparison between combination of resonant voice therapy and vocal hygiene education and vocal hygiene education only for female elementary school teachers. J Voice. 2020 Sep 30. [Epub ahead of print]

[19] de Oliveira Bastos PRH, Hermes EC. Effectiveness of the teacher's vocal health program (TVHP) in the municipal education network of Campo Grande, MS. J Voice. 2018; 32(6): 681-8.

[20] Pizolato RA, Rehder MIBC, dos Santos Dias CT, de Castro Meneghim M, Ambrosano GMB, Mialhe FL,et al. Evaluation of the effectiveness of a voice training program for teachers. J Voice. 2013; 27(5): 603-10.

[21] Sundram E, Norsa'adah B, Mohamad H, Moy F-M, Nik Husain N, Shafei MN. The effectiveness of a voice care program among primary school teachers in Northeastern Malaysia. Oman Med J. 2019; 34: 49-55.

[22] Sataloff RT. Treatment of voice disorders. San Diego, CA: Plural Publishing; 2017.

[23] Mailaender E, Muehre L, Barsties B. Lax Vox as a voice training program for teachers: a pilot study. J Voice. 2017; 31(2): 262. e13-e22.

[24] Stemple JC, Roy N, Klaben BK. Clinical voice pathology: Theory and management. 4th ed. San Diego, CA: Plural Publishing; 2014.

[25] Colton RH, Casper JK, Leonard R, Leonard R. Understanding voice problems: a physiological perspective for diagnosis and treatment. 4th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams and Wilkins; 2011.

[26] Makarabhirom K. The study of effectiveness of voice therapy in adult patients with vocal nodules in speech clinic of Ramathibodi Hospital [Dissertation]. Master of arts (Communication disorders): Mahidol University; 1988 (in Thai).

[27] Zekan M, Goldstein N. Substance Use disorder treatment via telemedicine during Coronavirus disease 2019. J Nurse Pract. 2021: e1-e3.

[28] Chen K-H. Using Line apps to encourage active participation in evidence-based practice journal club. ISDM ISEHC2015 Conference; 2017 Apr 8; University of Sydney. Sydney: University of Sydney; 2017.

[29] Risani TD. Writing news item in English language teaching context: line apps platform for senior high school students. Utamax. 2020; 2(1): 24-8.

[30] Rayhan RU, Zheng Y, Uddin E, Timbol C, Adewuyi O, Baraniuk JN. Administer and collect medical questionnaires with Google documents: a simple, safe, and free system. Appl. Med. Inform. 2013; 33(3): 12-21.

[31] Mondal H, Mondal S, Ghosal T, Mondal S. Using Google forms for medical survey: A technical note. Int. J. Clin. Exp. Physiol. 2018; 5(4): 216-18.