



Speech therapy management of the tracheostomized patient in the context of Covid-19: a review of current knowledge

Manejo fonoaudiológico do paciente traqueostomizado no contexto da Covid-19: uma revisão do conhecimento atual

Manejo fonoaudiológico del paciente traqueostomizado en el contexto del Covid-19: una revisión de los conocimientos actuales

Sabrina Brisse Gonçalves Cerqueira* 

Julianne Pitanga Teixeira* 

Tatiane Costa Carneiro* 

Grasiella Pereira Ferreira* 

Júlia Hellen Santana da Silva* 

Larissa Oliveira da Graça* 

Wellida Gardeny Silva* 

Brenda Carla Lima Araújo* 

Abstract

Introduction: SARS-CoV-2 has established itself as one of the main etiological agents of instability of pulmonary function and repercussions in the respiratory tract. Due to the need for prolonged ventilatory support, an increased demand for tracheostomy indication. **Objective:** to verify the available evidence on the speech therapy management of tracheostomy in patients with COVID-19, through a brief review of

* Universidade Federal de Sergipe, Sergipe, São Cristóvão, Brazil.

Authors' contributions:

SBG: contributed in all stages of the study design.

LOG, JPT and JHSS: contributed to the methods, data collection and draft of the article.

GPF, CBT and WGS: contributed to the critical review.

BCLA: contributed in all stages of the study design and guidance.

Correspondence e-mail: Sabrina Brisse Gonçalves Cerqueira - sabrinabrisse@hotmail.com

Received: 02/10/2020

Accepted: 06/11/2020



current knowledge. **Method:** Searches were carried out in the databases of Pubmed, Lilacs, Scielo, Web of Science, Scopus and Google Scholar, in the period of August 2020, using the descriptors “tracheostomy and COVID-19”, extracted from the Medical Subject Headings (MeSH) and Health Sciences Descriptors (DeCS). Results: six studies were selected, according to the eligibility criteria. The process of weaning the cuff or changing the tracheostomy cannula was suggested after a negative result for COVID-19. Studies suggest clinical evaluation of swallowing, the use of cannulas without fenestra, with inflated cuff. The use of personal protective equipment was strongly recommended during the procedures. There is no consensus regarding speech therapy for patients with tracheostomy with COVID-19. **Conclusion:** This review did not show any scientific evidence on the speech therapy management of tracheostomy in patients with COVID-19.

Keywords: Speech, Language and Hearing Sciences; Tracheostomy; Coronavirus; Deglutition Disorders; Hospital Care.

Resumo

Introdução: O SARS-CoV-2 se estabeleceu como um dos principais agentes etiológicos de instabilidade da função pulmonar e repercussões no trato respiratório. Devido à necessidade de suporte ventilatório prolongado, pode ser observado aumento na demanda da indicação da traqueostomia. **Objetivo:** verificar as evidências disponíveis sobre o manejo fonoaudiológico da traqueostomia em pacientes com COVID-19, através de uma revisão breve do conhecimento atual. **Método:** As buscas foram realizadas nas bases de dados do Pubmed, Lilacs, Scielo, Web of Science, Scopus e Google Scholar, no período de agosto de 2020, através dos descritores “tracheostomy and COVID-19”, extraídos do Medical Subject Headings (MeSH) e dos Descritores em Ciências da Saúde (DeCS). **Resultados:** seis estudos foram selecionados, de acordo com os critérios de elegibilidade. O processo de desmame do cuff ou troca da cânula da traqueostomia foi sugerido após resultado negativo para COVID-19. Os estudos sugerem avaliação clínica da deglutição, o uso de cânulas sem fenestra, com cuff insuflado. O uso de equipamentos de proteção individual foi fortemente indicado durante os procedimentos. Não há consenso quanto à intervenção fonoaudiológica para pacientes traqueostomizados com COVID-19. **Conclusão:** Esta revisão não mostrou evidências científicas sobre o manejo fonoaudiológico da traqueostomia em pacientes com COVID-19.

Palavras-chave: Fonoaudiologia; Traqueostomia; Coronavírus; Transtornos de deglutição; Assistência Hospitalar.

Resumen

Introducción: El SARS-CoV-2 se ha consolidado como uno de los principales agentes etiológicos de inestabilidad de la función pulmonar y repercusiones en el tracto respiratorio. Debido a la necesidad de soporte ventilatorio prolongado, una mayor demanda de indicación de traqueotomía. **Objetivo:** verificar la evidencia disponible sobre el manejo logopédico de la traqueotomía en pacientes con COVID-19, a través de una breve revisión de los conocimientos actuales. **Método:** Se realizaron búsquedas en las bases de datos de Pubmed, Lilacs, Scielo, Web of Science, Scopus y Google Scholar, en el período de agosto de 2020, utilizando los descriptores “traqueotomía y COVID-19”, extraídos de Medical Subject Headings (MeSH) y Descriptores de Ciencias de la Salud (DeCS). **Resultados:** se seleccionaron seis estudios, según los criterios de elegibilidad. El proceso de destete del manguito o cambio de cânula de traqueotomía se sugirió después de un resultado negativo para COVID-19. Los estudios sugieren una evaluación clínica de la deglución, el uso de cânulas sin fenestra, con manguito inflado. Se recomienda encarecidamente el uso de equipo de protección personal durante los procedimientos. No existe consenso con respecto a la terapia del habla para pacientes con traqueotomía con COVID-19. **Conclusión:** Esta revisión no mostró evidencia científica sobre el manejo logopédico de la traqueotomía en pacientes con COVID-19.

Palabras clave: Fonoaudiología; Traqueotomía; Coronavirus; Trastornos de la deglución; Atención Hospitalaria.

Introduction

Currently, SARS-CoV-2 is one of the main etiologic agents of lung function instability and sequelae in the respiratory tract¹. Evidence suggests that more severe conditions, such as pneumonia and acute respiratory distress syndrome (ARDS), cause pulmonary changes characterized by signs of the destruction of the lung parenchyma and interstitial inflammation². These complications justify the need for intensive care and mechanical ventilatory support².

In the current COVID-19 pandemic scenario, there has been a significant increase in the demand for procedures for orotracheal intubation (OIT) and invasive mechanical ventilation (IMV), ranging from 2.3 to 4% to rates of 42 to 47%³. Given the need for prolonged ventilatory support, a common situation for the indication of tracheostomy, an increase in the demand for the procedure was observed⁴. It is known that the benefits of tracheostomy include the ability to wean off sedation, gradually reduce ventilatory support and bronchial hygiene, improve communication, reduce dead space and long-term complications such as granuloma of the vocal folds and stenosis, and scarring⁵.

Despite reestablishing the airway, tracheostomy has mechanical and functional impacts, which may affect, besides the respiratory function, the stomatognathic system, and communication. Evidence indicates that tracheostomy can reduce the sensitivity, elevation, and hygiene of the larynx, promote uncoordinated laryngeal closure when swallowing, and also provide airflow changes, alteration of phonation, and swallowing⁶. The COVID-19 pandemic resulted in the implementation and change of protocols and guidelines related to the indications and precautions for the risk of contamination in procedures related to tracheostomy.

Therefore, it is important to consider the performance of the speech therapist with the tracheostomized patient, specifically in the context of COVID-19. There is no consensus in the literature regarding standardization or care routine regarding speech therapy management of tracheostomized patients. The purpose of this review was to verify the evidence on such management of tracheostomy in patients with COVID-19.

Methods

This study aims to answer: What evidence is available about the speech therapy management of tracheostomy patients with COVID-19? To this end, a literature search was conducted to identify relevant studies in the Pubmed, Lilacs, Web of Science, Scopus, and Google Scholar databases.

The eligibility criteria were defined in: papers that addressed such management practice in tracheostomy patients, and safety measures in the context of COVID-19. The search also included a manual cross-reference search of original papers and reviews. The structured search strategy was adapted according to the search database, to cover the largest possible number of studies, using the following descriptors in the different databases: “tracheostomy” and “COVID-19”, extracted from Medical Subject Headings (MeSH) and Health Sciences Descriptors (DeCS).

Initially, two reviewers independently selected search results and identified studies that were potentially relevant based on the title and summary of the article, excluding studies that did not meet the eligibility criteria. The second phase consisted of examining the complete texts of the eligible preliminary studies to verify if they met all pre-established criteria. No filters were used in the search. Studies unrelated to the topic were excluded, in addition to book chapters and works published in conference proceedings. Expert opinions and literature reviews were considered in this study, according to the eligibility criteria.

Two independent researchers extracted data from published papers using a predefined protocol. Information about the author, year, country, place of study, type of study, population, and the main results of the studies were considered.

Results

The initial search found 5,838 studies distributed in the databases. After reading the titles and abstracts, 16 papers were selected for the analysis of the full text, of which, only six studies^{2,4,7,8,9,10} met the eligibility criteria and were included in our review, as indicated in Table 1.

Table 1. Evidence on the speech therapy management of tracheostomy in COVID-19 patients.

Author	Location	Type of Study	Evidence
Rovira A, Deborah D, Abigail W, Crisóstomos T, Alison D, Neil F et al.	United Kingdom	Review	Speech therapy evaluation to consider alertness, secretion control, and effective cough; assess swallowing due to the high risk of silent aspiration and identify rehabilitation strategies to promote airway protection. The instrumental assessment of swallowing - in urgent cases and after a decision with a multidisciplinary team.
McGrath BA, Brenner MJ, Warrillow SJ, Pandian V, Arora A, Cameron TS et al.	United Kingdom	Review	Tracheostomy after approximately 10 days of mechanical ventilation, with cannula without fenestra and inflated cuff, closed suction system, and careful cuff weaning approach.
McGrath BA, Ashby N, Birchall M, Dean P, Doherty C, Ferguson K et al.	United Kingdom	Review	Tracheostomy after approximately 10 days of mechanical ventilation, cannula without fenestra and inflated cuff, closed suction system, and careful cuff weaning approach. Decannulation occurs with the multidisciplinary team. Speech-language assessment is recommended for vocal and swallowing disorders.
Zaga CJ, Pandian V, Brodsky M, Wallace S, Cameron TS, Chao C et al.	Australia	Tutorial	They directly describe the speech therapy management of tracheostomized patients in the context of COVID-19 with guidelines for minimizing the risk of infection during the procedures. The use of PPE is reinforced mainly in aerosol-generating procedures.
Namasivayam-MacDonald AM, Riquelme LF.	Canada	Recommendation	They report that the protocols for clinical swallowing evaluations, including at the bedside, should not be different from those already performed in speech therapy clinical practice, reinforcing the appropriate use of PPE's for reducing exposure. The use of fault valves should be discussed as an interprofessional team, as well as other invasive procedures, considering risks and benefits; comments on the management of the airways, voice, and swallowing.
Tornari C, Surda P, Takhar A, Amin N, Dinham A, Harding R et al.	United Kingdom	Cohort study	Tracheostomy and decannulation care must be performed by a multi-professional team, including speech therapists; tracheostomy weaning using an individualized protocol, with speech therapy and physical therapy team. Vocal assessment carried out by the speech therapist, subjectively (aphonic, dysphonic, or normal) and after the first attempt to deflate or cuff.

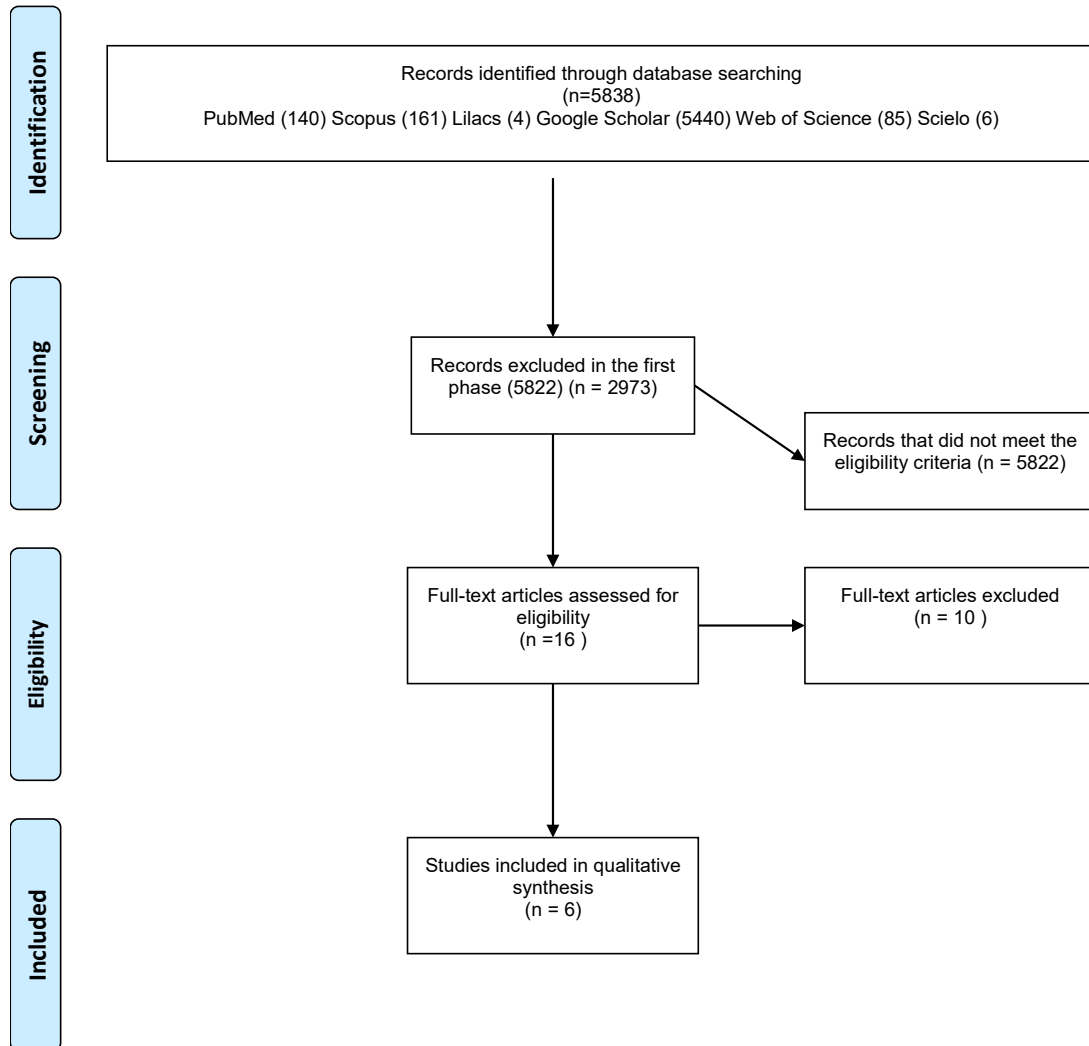


Figure 1. Flowchart of the article search process.

The selected studies are of the following types: tutorial⁸, recommendation⁹, cohort study¹⁰, and review^{2,4,7} published in 2020. Based on the research, it was possible to observe that only one study⁸ focused on speech therapy management of tracheostomy. The other five papers discuss techniques for tracheostomy management in general and prevention of contamination by COVID-19 by biosafety measures.

The tutorial⁸ aimed at guiding the practice of speech therapists in evaluating the tracheostomized patient by safe procedures to minimize the risk of infection. The authors reinforce the use of personal protective equipment, including N95 res-

pirator, gloves, goggles, and gowns. These PPE's are needed in aerosol-generating procedures in patients with COVID-19 to minimize the risk of contamination.

In the recommendations⁹, the protocols for clinical swallowing assessments, including at the bedside, should not be different from those that are already performed in clinical speech therapy. On the other hand, the authors reinforce the use of appropriate PPE's to reduce exposure. The use of speech valves should be discussed with the interprofessional team, in addition to other invasive procedures, considering risks and benefits, besides airway, voice, and swallowing management.



In a cohort study¹⁰ in patients with COVID-19, the authors reinforce that care with tracheostomy and decannulation should be performed by a multidisciplinary team, including speech therapists. In this study, patients with COVID-19 were weaned from the tracheostomy by an individualized protocol, with a Speech, Language and Hearing Sciences and Physical Therapy team. The vocal evaluation was performed by the speech therapist subjectively (aphonic, dysphonic, or normal) and after the first attempt to deflate the cuff.

In Rovira et al.², the authors recommend that speech-language assessments should consider alertness, secretion control, and effective cough. Swallowing should be assessed due to the high risk of silent aspiration and the need to identify rehabilitation strategies to promote airway protection. The authors suggest that instrumental swallowing assessment should be performed in urgent cases and after a joint decision with a multidisciplinary team.

The other two review studies^{4,7} indicate the non-fenestrated tracheostomy cannula and with inflated cuff, with a closed suction system to attenuate the production of aerosols. In cases of upper airway pathology, with lack of vocalization and inability to manage oral secretions or swallow, clinical speech therapy evaluation is recommended. Regarding cuff weaning, the authors suggest that patients have minimal pressure support, sufficient cough strength to expectorate secretions, safe swallowing of saliva, absence of tracheal aspiration, and patency of the upper airways⁷.

The studies, in general, highlight that communication in the tracheostomized patient must be considered. Current studies suggest that supplemental and alternative communication may be a positive factor in the patient's spirit. Early care by speech therapists can reduce patient anxiety and facilitate dialogue and communication during care^{4,7}. Only one study included⁸ in this review clearly describes the speech therapy management of tracheostomized patients in the context of COVID-19. For the other five studies, this information was obtained indirectly or as a factor correlated with the outcome of the tracheostomy.

Discussion

Tracheostomy is considered a procedure that generates droplets and aerosols, both for its performance, percutaneous or surgical, and man-

agement¹¹. Due to the transmission of COVID-19 originating from these two pathways, droplets and aerosols, the direct risk of occupational exposure by health professionals when exercising care for these patients was highlighted by all the studies in this review.

From the urgent and emerging need to minimize the risks of occupational contamination, technical standards and ordinances were created to guide professionals on the correct use of Personal Protective Equipment (PPE). National guidelines recommend that when performing assistance and performing aerosol-generating procedures, the following PPE should be used: disposable cap, goggles or face shield, N95 mask or equivalent, waterproof apron, and procedure gloves¹². Although there is no convincing evidence regarding Speech, Language and Hearing Sciences practice, general guidelines regarding aerosol precautions should be followed by speech therapists.

As for the clinical and speech therapy management of the tracheostomy, failure to indicate a fenestrated cannula, maintaining an inflated cuff, changing the cannula, or decannulation after a negative COVID-19 test and the clinical evaluation of swallowing were common points between the studies. The literature points out that the criteria for decannulation include the ability to tolerate a deflated cuff for 24 hours and occlusion of the tracheostomy, besides effective cough, with the ability to eliminate secretion through the mouth, intact upper airways, ability to swallow, absence of support from oxygen, saturation above 90%, breathing at less than twenty breaths per minute, and also assessing the patient's level of consciousness⁵. The studies in this review also reinforce the need for the participation of speech therapists in the decannulation in tracheostomized patients.

It is important to consider that the blue dye test was not suggested by studies in patients with COVID-19 included in this review. A specific study with 28 speech therapists who work with tracheostomized patients in the hospital bed and/or home care found that all these professionals use this procedure in the clinical practice of tracheostomized patients¹³. However, although the presence of blue dye inside or around the tracheostomy tube suggests a possible aspiration of food/saliva in the lower airways, the evidence suggests that this procedure has doubtful reliability and may have false-negative results¹⁴. It is still unclear the

literature's recommendations on the use of the blue dye test in the evaluation of tracheostomy patients with COVID-19.

Communication in the tracheostomized patient was mentioned in three studies^{2,4,7}. A recent systematic review with meta-analysis reinforces the benefits of using the speech valve, including improved smell, secretion management, ventilation, and quality of life, besides reduced aspiration¹⁵. On the other hand, there are still controversies about the appropriate time for the use of the speech valve in patients with COVID-19. There is also evidence of other interventions in communication in tracheostomized patients such as communication boards and supplementary and high-tech alternative communication devices⁸. Due to the impossibility for COVID-19 patients to receive visits from friends and family, the reestablishment of communication by any means of communication is essential for the improvement of the patient's clinical and emotional state.

In this review, it was possible to observe that the COVID-19 pandemic requires a reformulation of many principles of the treatment of tracheostomy, mainly in speech therapy management. The protocols cited in the studies were not available. However, most of them suggest an approach with individualized decannulation protocols. These guidelines are essential to provide the best standard of care, mainly because speech therapists who work with tracheostomized patients with COVID-19 manage a greater flow of patients in the current scenario.

Some limitations should be considered in this review, such as the reduced number of papers included. Most studies are reviews/brief comments and discuss the care of the tracheostomy, to minimize the risks of contamination and optimize the ventilatory support. However, they do not provide robust evidence, nor protocols on the therapeutic management of the tracheostomy in patients with COVID-19, mainly regarding the speech therapy approach. The need for information on COVID-19 and daily updates on the subject are factors that justify the studies included in this review. However, these findings are relevant to draw attention to the indication procedure and safety recommendations during the care of tracheostomized patients with COVID-19. This review reinforces the need for new clinical studies in this population, with specific clinical indicators to further improve the quality of

the evidence regarding a critical situation and to provide subsidies for the speech therapy clinical practice.

Conclusion

This review did not identify scientific evidence about speech therapy management of tracheostomy in patients with COVID-19.

References

1. Da Silva DP, Dos Santos IMR, Melo VS. Aspects of Coronavirus infection caused by Severe Acute Respiratory Syndrome 2 (SARS-CoV-2). *Braz. J. Hea. Rev.* 2020; 3(2): 3763-79.
2. Rovira A, Dawson D, Walker A, Tornari C, Dinham A, Foden N, et al. Tracheostomy care and decannulation during the COVID-19 pandemic. A multidisciplinary clinical practice guideline. *Eur Arch Otorhinolaryngol.* 2020; 17: 1-9.
3. Da Silva CM, Silva ADNA, Nepomuceno B, Xavier DS, Lima E, Gonzalez I et al. Evidências científicas sobre Fisioterapia e funcionalidade em pacientes com COVID-19 Adulto e Pediátrico. *J Hum Growth Dev.* 2020; 30(1): 148-55.
4. McGrath BA, Brenner MJ, Warrillow SJ, Pandian V, Arora A, Cameron TS et al. Tracheostomy in the COVID-19 era: global and multidisciplinary guidance. *Lancet Respir Med.* 2020; 8(7): 717-25.
5. De Medeiros GC, Sassi FC, Silva CL, De Andrade CRF. Critérios para decanulação da traqueostomia: revisão de literatura. *CoDAS.* 2019; 31(6): 1-9.
6. Shinn JR et al. Incidência e resultados de lesão aguda da laringe após ventilação mecânica prolongada. *Crit Care Med.* 2019; 47(12): 1699-706.
7. McGrath BA, Ashby N, Birchall M, Dean P, Doherty C, Ferguson K et al. Multidisciplinary guidance for safe tracheostomy care during the COVID-19 pandemic: the NHS National Patient Safety Improvement Programme (NatPatSIP). *Anaesthesia.* 2020: 1-12.
8. Zaga CJ, Pandian V, Brodsky MB, Wallace S, Cameron TS, Chao C et al. Speech-Language Pathology Guidance for Tracheostomy During the COVID-19 Pandemic: An International Multidisciplinary Perspective. *American Journal of Speech-Language Pathology.* 2020; 29: 1320-34.
9. Namasivayam-Macdonald AM, Riquelme, LF. Speech-Language Pathology Management for Adults With COVID-19 in the Acute Hospital Setting: Initial Recommendations to Guide Clinical Practice. *American Journal of Speech-Language Pathology.* 2020; 1-16.
10. Tornari C, Surda P, Takhar A, Amin N, Dinham A, Harding R et al. Tracheostomy, ventilatory wean, and decannulation in COVID-19 patients. *Eur Arch Otorhinolaryngol.* 2020; 1-10.
11. Heyd CP, Desiato VM, Nguyen SA, O'Rourke AK, Clemmens CS, Awad MI et al. Tracheostomy protocols during COVID-19 pandemic. *Head & Neck.* 2020; 42(6): 1297-302.



12. Agência Nacional de Vigilância Sanitária: ANVISA. Nota técnica GVIMS/GGTES/ANVISA Nº 07/2020, de 05 de Agosto de 2020. Orientações para a prevenção da transmissão de COVID-19 dentro dos serviços de saúde. Available from: <<http://portal.anvisa.gov.br/documents/33852/271858/NOTA+T%C3%89CNICA+-GIMS-GGTES-ANVISA+N%C2%BA+07-2020/f487f506-1eba-451f-bccd-06b8f1b0fed6>>.
13. Santana L, Fernandes A, Brasileiro AG, Abreu AC. Critérios para avaliação clínica fonoaudiológica do paciente traqueostomizado no leito hospitalar e internamento domiciliar. Rev. CEFAC. 2014; 16(2): 524-36.
14. Béchet S, Hill F, Gilheaney Ó, Walshe M. Diagnostic Accuracy of the Modified Evan's Blue Dye Test in Detecting Aspiration in Patients with Tracheostomy: A systematic review of the evidence. Dysphagia. 2016; 31(6): 721-29.
15. O'connor LR, Morris NR, Paratz J. Physiological and clinical outcomes associated with use of one-way speaking valves on tracheostomised patients: A systematic review. Heart Lung. 2019; 48(4): 356-64.